

Justification for a self-regulated learning training program for higher education students in massive open online courses

Cao-Tuong Dinh^{1,2}, Hoang-Yen Phuong¹

¹School of Foreign languages, Can Tho University, Can Tho, Vietnam

²Department of English Language, FPT University-Can Tho Campus, Can Tho, Vietnam

Article Info

Article history:

Received Mar 22, 2024

Revised Jan 7, 2026

Accepted Feb 22, 2026

Keywords:

Higher education

Massive open online courses

MOOCs

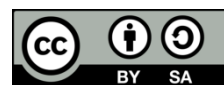
Self-regulated learning

Social cognitive theory

ABSTRACT

Self-regulated learning (SRL) has been well documented in the literature for its benefits for students' learning success. However, there is still a dearth of imperial intervention that helps promote students' self-regulation, and a theoretical justification for such a program is essential. To date, literature has shown three prominent theories: social cognitive, social-cultural, and cognitive constructivist. The goal is to explore the conceptualization of SRL, which, despite it is long history, lacks a universally accepted definition. We analyze these theories and their models to determine which best supports the design of a SRL strategy intervention for university students in massive open online course (MOOC) environments. Based on this analysis, we propose a working definition of SRL that fits the unique demands of MOOCs. The results suggest that the social-cognitive theory offers the most suitable framework, as it integrates cognitive, metacognitive, motivational, and social aspects of learning. Additionally, it provides a practical model of strategies that can be implemented in MOOC-based learning environments.

This is an open access article under the [CC BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.



Corresponding Author:

Cao-Tuong Dinh

Department of English Language, FPT University-Can Tho Campus

Can Tho, Vietnam

Email: TuongDC@fe.edu.vn

1. INTRODUCTION

Albeit some acknowledged drawbacks, such as a shortage of social interaction, a feeling of isolation, and inadequate tutorial supervision [1], online education has increasingly permeated various levels of education, with a growing emphasis on higher education (HE). It is expected that online teaching and learning modality will surpass conventional classroom-based formats by 2025 due to its flexible nature in terms of time and location, coupled with its ability to provide effective learning outcomes despite diverse challenges [2]. For example, during global crises like the COVID-19 pandemic, institutions worldwide [3], [4], including those in Vietnam, have leveraged online platforms such as Zoom and Microsoft Teams to maintain instructional continuity [5].

Massive open online courses (MOOCs) have recently been documented as a part of required learning [6]. Despite some drawbacks [7]–[10], integrating MOOCs in HE contexts has grown widespread rapidly, especially in developing nations [10]. This means that this modality of teaching and learning is very potential for further investigation, especially in this era of rapid digital growth when internet connection has become much more easily accessible. A variety of well-known MOOC platforms for online courses has been deployed, such as Khan Academy, edX, Coursera, Udacity, IITBombayX, and National Programme on Technology Enhanced Learning (NPTEL). Among these, Coursera has tremendously increased its application worldwide [11]. MOOCs has been investigated with various models [10], yet the combination of MOOC-based learning

with offline mentoring is still scanty [12]. Nevertheless, according to Virani *et al.* [13], MOOCs integration in effective conventional teaching practices could boost educational standards and quality.

In the online learning environments, students are supposed to manage the learning by themselves [14] to be successful in online academic performance [15], [16], which requires their self-regulated learning [17], which has been received an increasing attention in online and hybrid-learning environments [18]. Self-regulated learning (SRL) refers to the extent that students actively become involved in “an active, constructive process whereby learners set goals for their learning and then attempt to monitor, regulate and control their cognition, intentions and behavior, guided and constrained by their goals and the contextual features of the environment” [19]. Also, it is considered an essential prerequisite for lifelong learning. What is more, SRL is postulated as a pivotal factor in determining learners’ success in internet-based learning environments [20]–[24]. In order to develop a self-regulative habit, students need to employ techniques that help them to self-regulate their own learning. In other words, they need to master SRL strategies to assist them absorb knowledge efficiently and comprehensively [25]. To date, SRL strategies have been scrutinized in HE contexts in four approaches: i) factors that support SRL; ii) SRL strategies employed by students; iii) impact of students’ SRL strategy use on learning outcomes; and iv) the impact of SRL intervention programs on students’ academic achievements, self-regulatory skills, and motivation.

In terms of SRL strategies employed by students, Broadbent and Poon [15] made an endeavor to unravel SRL strategies improving students’ performance in digital learning environments. They systematically reviewed and analyzed published studies in the period of 2004–2014, adhering to preferred reporting items for systematic reviews and meta analyses (PRISMA) guidelines by Moher *et al.* [26]. The results indicated that only 4 out of 14 categories of SRL strategies [27], [28], namely time management, metacognition, critical thinking, and effort regulation, were strongly positively correlated with academic performance in online settings. On the contrary, other strategies, such as rehearsal, study scheduling, and elaboration showed limited effects. The authors called for further examination of impact of peer learning on students’ academic results since its scanty evidence in this category albeit its strong effects were confirmed in the literature. A response to this call is a recent quantitative study by Lim *et al.* [24], which indicated the positive impact of peer learning on students’ academic achievement. A doubt casted on this result mainly comes from the utilization of self-report response from the participants, which is raised by Cole and Gonyea [29]. However, an intriguing finding from this study is that it dismissed a notable correlation between SRL and learners’ learning performance. The extensive work discussed earlier reveals that the impact of SRL strategies on academic achievement in online learning contexts is still widely debated.

Likewise, a subsequent study by Anthonysamy *et al.* [30] demonstrated the effects of SRL strategies on students’ non-academic outcomes in blended learning (BL) environment in HE settings, particularly student satisfaction and engagement, by the utilization of PRISMA guidelines [26] to systematically divulge the literature on the issue. The results highlighted that SRL strategies significantly positively impact students’ non-academic accomplishments in HE BL environments, albeit the imbalance of research on each domain of SRL strategies. In particular, much research was on resource management and motivational beliefs while scarce investigation of cognitive and metacognitive strategies into this issue. What is more, little research in their review employed qualitative design to obtain deep insight of participants’ standpoints on the influence of SRL strategies on their learning processes. Consequently, the meta-analysis study calls for further examination of the impact of all domains of SRL strategies on learners’ non-academic accomplishments as a whole. However, it is still unclear whether, or to what extent, the SRL strategies found in earlier studies are actually employed by students in digital learning environments, especially where instructors’ monitoring or guidance is limited in the learning process. Additionally, the factors that influence these behaviors and their potential effects remain largely unexplored.

Regarding the effectiveness of SRL programs on students’ learning outcomes, SRL strategy use, and motivational aspects, a meta-analysis on these aspects by Theobald [31] found that SRL intervention programs improved students’ academic performances, promoted metacognitive, cognitive, and resource management strategies (e.g., time management, effort regulation, help seeking, and study environment management), as well as maintained students’ motivational dimension, especially self-efficacy. Although the author found that SRL training was fruitful for students at the tertiary level, detailed descriptions such as the duration, schedules, materials, study modes (i.e., online, offline, or MOOCs), and particular beneficiaries of these programs were not reported or clearly stated, which made the implementation of these programs in specific contexts need to be revisited.

Albeit extensive research on MOOCs since its first appearance over a decade ago [32], research on SRL in MOOCs is still scanty [33]. Regarding on SRL strategies in MOOCs, prior research focuses on three approaches, namely: i) SRL strategies used in MOOCs [34]; ii) types of supports for SRL strategies and learning outcomes (prompts, feedback), and roles of human factors in these supports [16]; and iii) strategies used in each SRL phase [33]. In addition, a latest scoping review on SRL and academic performance in

online and BL environments by Xu *et al.* [18] indicated that that despite the importance of the initial and planning phases of students' SRL in online learning platforms, few studies have been conducted. This may result in students' demotivation and challenges in their online learning.

It has been argued that the ability to self-regulate their learning is a Western value, yet Asian students such as Vietnamese ones could also possess this skill if they were given sufficient opportunities to be self-regulated [35]. In the field of English as a second language (ESL)/English as a foreign language (EFL), there is an increasing number of studies examining the roles SRL strategies play on students' EFL competence. For instance, it is evinced that the employment of SRL strategies had significant impacts on students (academic) writing performances [36], [37]. Similarly, students' also showed their improvement in Speaking competence when using a variety of motivation self-regulation strategies [38], [39]. Also in Asia context, a recent experimental study by Apridayani [40] found a significant impact of SRL strategies on students' English proficiency. However, the study showed that students with lower English proficiency levels (A1 and A2 levels in CEFR framework) benefited more than those with higher levels (B1 and B2). This result was also congruent with previous research [31].

The analyses highlighted several significant challenges: the lack of social interaction in online learning, the effectiveness of SRL strategies within educational research, the integration of SRL strategies in MOOCs, the implementation of SRL training programs, cultural considerations. In response to these challenges, this study aims to explore the conceptualization of SRL within MOOC-based learning environments, the appropriateness of the theories which have been used to explore students' SRL in the literature, as well as relevant models with a view to identifying which construct definition and operationalization in the existing literature best fits the purpose of a training program of SRL strategies in a MOOC-based learning modality. In order to obtain these objectives, three research questions are formulated:

- What different constructs of SRL in the existing literature are defined?
- What is the most appropriate construct for the research aims?
- What is most suitable underlying theory and model that together form the backbone of the proposed study?

2. THE NEED OF TEACHING THESE STRATEGIES TO FIRST-YEAR MOOC LEARNERS IN DEVELOPING COUNTRIES

Teaching students SRL strategies is of paramount importance as it contributes to enhancing their self-regulatory skills in their learning process [41]. The utilization of SRL strategies entails a self-driven process where learners leverage their cognitive abilities to build task-based competencies in diverse contexts [42]. These strategies play a pivotal role in assisting students in mitigating digital disruptions and enhancing their educational and academic achievements [43]. Furthermore, in today's digital era, there is an escalating emphasis on proficiencies like active learning, learning approaches, and critical thinking that students must adeptly master [44], [45]. This emphasizes the need for students to grasp what to learn and how to acquire knowledge effectively. A study by Hsu [46] who implemented an experimental intervention to scrutinize the effects of self-regulated learning user's interfaces (SRLUI) on students' academic achievements in MOOCs revealed that SRL tools can facilitate a subset of learners in attaining superior grades in MOOCs. Nonetheless, the study failed to delve into other variables that might influence learning results in MOOCs, such as learners' previous insights, instructor guidance, or the caliber of course content. Moreover, the study was solely reliant on pre-course surveys completed by participants to gauge their SRL, which could be susceptible to prejudices and inaccuracies. Nevertheless, not many studies consider SRL in HE may pose challenges for high school graduates who have just transitioned to university, a complete new learning environment where learner autonomy is highly expected [47]. As a result, an SRL training intervention could prove advantageous for this cohort [31].

3. METHOD

3.1. Research design

This justification paper employed a qualitative approach, focusing on the reasoning of the literature review and the integration of theoretical frameworks relevant to SRL. This section describes the systematic methods used to select and analyze the relevant theories and their application to designing an SRL strategy intervention for MOOC learners. The primary aim is to examine existing SRL theories, identify their core components, and synthesize these components to develop a rigorous theoretical foundation for an SRL intervention in MOOCs, particularly for students new to tertiary learning environments.

3.2. Data collection

Keywords such as "self-regulated learning", "MOOCs", "online education", "social cognitive theory", "socio-cultural theory", and "cognitive constructivism" were entered into Web of Science, Scopus,

Google Scholar, and ERIC databases, to search for relevant studies. The selected publications for this study were based on three criteria: theoretical contributions, relevance to SRL, and applicability to digital-based learning environments. Additionally, only papers written in English were selected.

3.3. Data analysis

Different theoretical perspectives on SRL were compared, contrasted, and synthesized to construct a comprehensive view that integrates their strengths and addresses the specific challenges of learning in MOOCs. Based on this analysis and interpretation, a working definition of SRL was developed. This working definition is also used as a basis to select the underlying theory and model that together form the backbone of the proposed intervention study.

4. RESULTS AND DISCUSSION

4.1. Conceptualization of self-regulated learning

The existing literature has shown a wide range of SRL definitions, which, however, can be basically recategorized into three different types based on their core insights: i) more goal oriented (social-cognitive, volitional, and operant); ii) more metacognitive and cognitive driven (information processing); and iii) more emotional and motivational focused (phenomenological, cognitive constructivist, and sociocultural). As for the first type, SRL is defined as the degree to which students actively use meta-cognitive, motivational, and behavioral strategies in their own learning process to obtain their academic goals [48], [49]. Similarly, SRL refers to a process in which students actively make use of cognitive, metacognitive, and resource management strategies to regulate their learning in order to achieve the preset goals [19], [28]. In a similar vein, Boekaerts *et al.* [50] conceptualize SRL as a self-directing process that students modulate their cognitions, affects, behavior, and the learning environment to achieve the learning goals. In these definitions, SRL is considered a process whereby students employ specific affective, (meta)cognitive, behavioral as well as social strategies to attain their learning goals.

When it comes to the second type of definition, SRL is often viewed as “a metacognitively-governed behavior wherein learners adaptively regulate their use of cognitive tactics and strategies in tasks” [51]. This definition emphasizes the metacognitive and cognitive aspects in learning, whereas other aspects of learning features such as emotions or motivation are underestimated. The third classification of SRL definition is based on the purposes of SRL, such as expanding knowledge and skills (i.e., the need of pursuing the self-generated goals for tasks, also known as “top-down self-regulation”), and protecting one’s commitment (self-consequencing thoughts or “re-routing activities”) [52]. According to Boekaerts [52], students’ emotions play a crucial role in their SRL in the learning process because emotions can influence their cognitions and behavior, and so may affect their achievement. It can be seen that, in Boekaerts’ view, the match and mismatch between the task goals and the students’ personal learning goals would trigger positive or negative emotions, which would in turn impact students’ self-regulation strategies to steer their behavior in the attainment of goals. This definition clearly does not cover the social aspects such as social interactions and scaffolding. The social-cultural perspective would better explain this aspect of learning process. According to Swain and Deters [53], students’ development of cognitive and emotion is constituted by the social environments. In other words, it is the interaction of the individuals with their learning environments would contribute to their cognitive and emotional development during the learning process.

Based on the analysis of all existing SRL definitions, it is clear that each category has their own merits and demerits and no category best fits the aims of a study which employs instructing university students, especially those who have just transitioned from high school to university, in SRL techniques within the context of MOOCs. Therefore, it might be a good idea to construct a working definition for the present justification paper by combining the relevant tenets of the aforementioned SRL conceptions. The resulting working definition of SRL used in the study refers to students’ self-awareness of deploying the taught metacognitive, cognitive, motivational, and social strategies when learning in MOOCs to achieve their learning goals. Based on this operational definition, the fundamental theoretical framework and conceptual model that constitute the foundation of the proposed study were chosen.

4.2. Socio-cultural theory

Instead of emphasizing the roles of self-perception in SRL, the socio-cultural theory places its focus on the importance of social mediation in the formation of students’ SRL. Vygotsky [54] posits that learning is a social and cultural phenomenon rather than an intrapersonal one. It means that children learn through interaction with others, especially more knowledgeable others (MKOs) to gain new knowledge and cultural values in their living environments. During the social interaction, children use language to structure their thoughts and regulate their behaviors in harmony with their goals and intentions and in accordance with

the environmental stimuli. “Human capacity for language enables children to plan a solution to a problem prior to its execution, and to master their own behavior” [54]. In other words, language is powerful tool of their learning. When children’s language becomes internalized (i.e., inner speech), their SRL becomes possible [55]. A recent finding from DiDonato [56] showed that students’ interaction with peers in the classroom context indeed fostered their SRL development, for example.

Another important aspect of socio-cultural theory in relation to SRL is the zone of proximal development (ZPD). Vygotsky [54] ZPD suggests that students, with assistance of MKOs such as teachers or more able peers, can obtain knowledge which is beyond their current capacity. Research also supports this view as the development of a person’s cognitive and emotional aspects (including SRL) is found to be constituted by their interaction with such MKOs as their friends, professors, or family members [53]. Within the ZPD, teachers’ task is to provide necessary scaffolding and design appropriately challenging learning tasks that help students go beyond their current level of self-regulation. By doing this, students are expected to strengthen their understanding, receive socio-emotional support, and gradually develop autonomy. This is evidenced by a recent study Raslan [57], who reviewed studies on the ZPD and scaffolding and found that appropriately calibrated instructional support is associated with improved students’ problem-solving skills and learning outcomes, facilitating a gradual shift toward greater learner independence.

From the analysis, it postulates that the sociocultural theory can be used to promote learners’ SRL via their use of social interactions and ZPD. Social interactions can enhance students to use the target language to control the environment, regulate their thoughts and behavior. With relevant scaffolding from teachers or other MKOs, students improve their confidence during the process of self-regulated activities. Nevertheless, the use of scaffolding faces some arguments. Some argue that the more scaffolding students receive from teachers, the less they become self-regulated [58]. To deal with this conundrum, some solutions have been suggested. One positive way is to “fade” the teachers’ support time to time to increase learners’ responsibilities [58], or to use a five-level contingency scale proposed by Pol *et al.* [59].

In contexts of language education, teachers can create various kinds of language tasks that involve independent or collaborative work to foster students’ SRL [56]. Through social interaction and scaffolding during a learning task, L2 learners can have opportunities to accumulate their knowledge and skills. For example, students can be assigned to do a task of how to write a persuasive paper or how to read effectively which requires both group collaboration and individual contribution so that the final product yields a productive result. Knowledge of vocabulary, negotiation to clarify task-related responsibilities among group members, and speaking skills are all found to increase after the task completion [56]. The review suggests that this theory has been among a few theories to date which look at the social aspect of learning and use this aspect as an integral complement to the individual counterpart. However, as the founder of this theory-Vygotsky-passed away, the theory itself has not been fully developed and no operationalization of how learners interact with other MKOs in their ZPDs and how learning occurs in such interaction episodes has been proposed and validated, which in turn make it hard to translate this theory into practice.

4.3. Cognitive constructivism theory

The founder of cognitive constructivist learning theory is Piaget, who considers children’s cognitive development as a progress in which they actively interact with the environment, based on their prior knowledge of the world. Constructivist theory contends that students actively and collaboratively construct knowledge by building on their prior knowledge through interaction with MKOs, and that teachers function as facilitators of the learning process [60]. Hence, the teacher plays a significant role in promoting students’ learning, such as setting goals, actively accessing to learning resources and tools, by providing them with authentic and meaningful activities [61], or in helping them to become self-regulated learners [62].

The cognitive constructivists views of SRL hold that when students are provided with opportunities to experience challenges, reflect on their learning process, and take responsibilities for their learning outcomes, their SRL skills can be promoted [62]. In particular, collaborative tasks or open-ended tasks are likely to create opportunities for students to make choices, set demanding goals, collaborate with others, and arouse feeling of self-efficacy [63]. For example, students can be asked to make a proposal for a tour that help foreigners understand more about particular local customs of food and beverage. The final stage is to have students debate which plan would be more practical and convincing enough to be financially funded. These activities would encourage students to participate in building knowledge by their own through group discussion, collaboration, information sharing, and self-direction as well.

What is more, giving students’ chances for self-assessment is key for them to develop SRL. In particular, it creates chances for reflection and evaluation of their own work [62]. Through such self-assessment, students develop their cognitive engagement, motivational, and affective aspects of learning. Having students to write portfolios or make a project to solve a practical problem in real life are some good examples for students’ self-assessment because it provides opportunities for students to show their evaluation of their choices or preferences, review of their collaborative writing processes, or express their interests.

In terms of motivation for self-regulation, Paris and colleagues emphasize that students' desire for the realization of self-identities (a competent student, for example) motivates them for self-regulation [62]. Based on these premises, cognitive constructivism model defines SRL as a process that learners combine their knowledge, learning strategies and motivation in a supported environment (from teachers) for self-regulation [62]. SRL definition in this view emphasizes learners' active role in building knowledge and teachers' central role in providing opportunities for students to become self-regulated.

Some merits and demerits can be drawn on the cognitive constructivism views of SRL. First, the theory emphasizes students' agency in building knowledge through collaborative work, problem-solving situation, for instance, in a meaningful contexts. Second, students' SRL can be built up thanks to teachers' facilitating role in open-ended instructional activities. In relation to teaching English, for example, teachers can provide higher-order thinking skills activities to develop students' writing and speaking skills such as group presentation, debating or peer-grading tasks. However, the theory is also questionable in terms of motivation and teachers' role in students' SRL. In terms of motivation, this theory largely ignores the roles of extrinsic motivation in learning as well as the dynamic transformation between extrinsic and intrinsic motivation during the learning process. Another counterargument against this theory is its strong emphasis on the role of teachers' in students' SRL formation. Nevertheless, research consistently shows that students are, in most cases, autonomous in their SRL development and that their teachers only provide some initial support when SRL strategies begin to establish.

4.4. Social-cognitive theory

Social-cognitive perspectives of SRL derived from the work by Bandura [64] highlight the triadic reciprocal interactions of three factors in the SRL formation: personal, behavioral, and learning environment. A recent study by Gebauer *et al.* [65] investigates how academic self-efficacy and its sources differ across socialization contexts, supporting the triadic reciprocal determinism hypothesis [48], [64]. According to Schunk and DiBenedetto [66], personal factors or internal influences include thoughts, emotions, perceptions, and beliefs. Behavioral factors include, among others, activity choices, effort, persistence, achievement, and environmental regulation. Environmental factors consist of observed social models, instruction, feedback, standards, rewards, and opportunities for self-evaluation. Social-cognitive theory also explains the origins of motivation for SRL, which are personal goals, self-efficacy, and outcome expectations. Self-efficacy refers to the students' self-awareness of their ability to control actions or outcomes [64]. It is found as one of the strongest predictors for students' academic achievement [67]. These factors help students to instigate and maintain their goal-oriented activities.

Social cognitive views of SRL posit that learners actively construct knowledge and achieve desired learning outcomes through setting their own achievable goals. A substantial body of literature has examined and validated this proposition. A recent study by Li and Lajoie [68] highlighted the importance of goal setting in the learning process through an examination of the integration of SRL and cognitive engagement. Once goals are set, learners initiate cognitive, metacognitive, behavioral, and motivational processes to attain these learning goals. Kim *et al.* [69] provide an interdisciplinary review that bridges cognitive and educational psychology perspectives, detailing how these processes are essential for effective self-regulation of learning. This is a cyclical learning process [49], [70], which is in turn governed by student's goal settings and environmental contexts [19]. In addition, SRL is not a fixed attribute, but rather a skill than can be honed and developed through relevant instruction [71], [72]. Some prominent models have been designed to describe how students approach their autonomous learning and identify factors or components influencing their SRL [19], [49], [73]–[75]. The SRL definition based on social-cognitive perspectives, therefore, embraces various aspects of learning such as cognitive, metacognitive, motivational, behavioral, and emotional or affective processes [75]. Table 1 makes a quick comparison of the core tenets across all seven underlying theories of SRL as well as against the working definition of SRL used in the present study.

It is clear from Table 1 that the social-cognitive theory best fits the working definition of SRL constructed for the present study. To be more specific, it encompasses all four important aspects of learning, namely cognitive, metacognitive, motivational and social. In addition, it is also accompanied by a model of specific strategies, which can be readily applied into our instructional practice. Therefore, this theory is selected as the theoretical backbone of the present research paper.

Table 1. Visualization of three underlying theories of SRL and SRL strategy supported model(s)

Theory	Cognitive	Metacognitive	Motivational	Social	Model of strategies
Socio-cultural	√	√	√	√	X
Cognitive constructivism	√	√	√	√	X
Social-cognitive	√	√	√	√	√

4.5. Self-regulated learning strategy model

One of prominent model portraying a cyclical process of SRL with specific strategies is the one by Zimmerman and Moylan [76]. In particular, their operationalization model presents the self-regulation process into three phases: forethought, performance, and self-reflection. The forethought phase (prior to task engagement) involves students' task analysis (e.g., goal setting and strategic planning) and self-motivation beliefs (including self-efficacy, outcome expectations, task interest or value, and goal orientation). After that, students proceed to phase 2, namely the performance phase (or actual task engagement) which encompasses on self-control (using cognitive, metacognitive, resource management, and motivational strategies) and self-observation to sustain attention and effort. In this phase, students employ a variety of (meta)cognitive, resource management, and motivation strategies to keep themselves involved and motivated to complete the task. The self-reflection phase occurs after task completion, involving learners evaluating their performance, outcomes, and strategies to inform future learning cycles [49]. These attributions may arouse students' satisfaction or dissatisfaction, and this may lead to students' positive or negative reaction to their future task performances. What is more, the current operationalization model of SRL [76] has been added metacognitive strategies in the performance phase which made his model more comprehensive [75], [77].

Results from empirical studies advocated Zimmerman's cyclical model of SRL [75], [78]. In addition, this model depicts a comprehensive picture of the various SRL sub-processes, which is more clearly articulated than other models [75]. In particular, it concentrates on the phases of SRL and particular SRL strategies (cognitive, metacognitive, and resource management) which are considered essential for online learning environments [23]. Last but not least, this model was found the most used one in digital learning contexts, such as in MOOCs [79]. Zimmerman's model was illustrated in Figure 1.

To operationalize the model, research has started to look into four different domains, namely cognitive engagement, metacognitive knowledge, resource management [80], and motivational beliefs [28]. Research has started to look into four different domains to operationalize the model, namely cognitive engagement, metacognitive knowledge, and resource management. A recent study by Li and Lajoie [68] proposes an integrative model of SRL and cognitive engagement, highlighting the importance of these domains in enhancing students' learning efficiency and effectiveness.

Another study by Khosa and Volet [81] examines effective involvement in cognitive processes and metacognitive control during group learning tasks, providing insights into how these processes can explain differences in students' conceptual understanding. According to Wan *et al.* [82], SRL strategies can be grouped into personal and social types. Personal SRL strategies are defined as learners' intrapersonal techniques, such as (meta)cognitive and motivational strategies to intentionally monitor their learning. In contrast, social SRL strategies involve collaborating social interactions with classmates, instructors, managerial staff, and information technology experts to guide and support learners' SRL processes. In the context of MOOCs, research has highlighted seven key SRL strategies that help students succeed, such as metacognitive strategies (goal setting, strategic planning, and self-evaluation), cognitive strategies (elaboration, task strategies), and resource management strategies (time management, help seeking) [14], [83]. Nonetheless, Jansen *et al.* [84] through a tool developed from earlier studies, have also emphasized the importance of two additional strategies, such as persistence and environmental structuring, in contributing to effective SRL strategy use among students in MOOCs. Hence, specific SRL strategies employed in this study all derive from the cyclical model, but yet in the combination of the aforementioned findings.

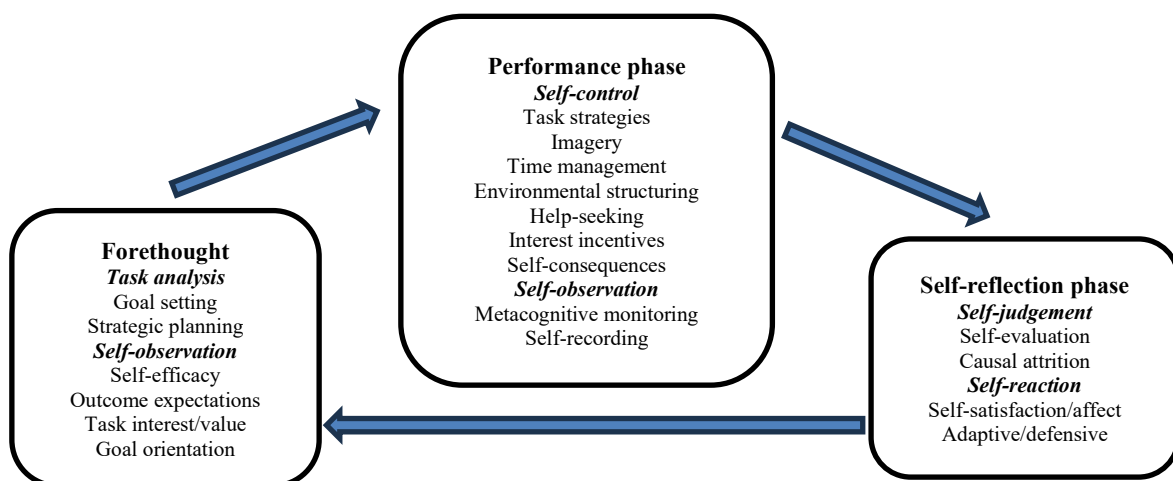


Figure 1. Cyclical phases model [76]

5. CONCLUSION

This paper has presented the conceptualization of SRL, unpack the core principles across the aforementioned theories of SRL as well as against the working definition of SRL in MOOCs. The social-cognitive theory encompasses all four important aspects of learning, namely cognitive, metacognitive, motivational and social. In addition, it is also accompanied by a model of specific strategies, which can be readily applied into a potential instructional practice. Therefore, this theory can be employed as the theoretical backbone of a training program of SRL strategies in a MOOC-based learning environment.

This theoretical justification, while insightful, has certain limitations. The paper focuses on specific theories of SRL, such as social-cognitive, socio-cultural, and cognitive constructivist theories. This could limit the exploration of other potentially relevant theories or frameworks that might also contribute effectively to understanding and improving SRL in MOOCs. Additionally, the paper focuses on MOOCs and HE, which might not reflect the dynamics of SRL in traditional classroom settings or in primary and secondary educational contexts

ACKNOWLEDGEMENTS

We would like to express my special thanks to Dr. Chi-Duc Nguyen from Vietnam National University for his insightful comments and advice on this paper.

FUNDING INFORMATION

Authors state no funding involved.

AUTHOR CONTRIBUTIONS STATEMENT

This journal uses the Contributor Roles Taxonomy (CRediT) to recognize individual author contributions, reduce authorship disputes, and facilitate collaboration.

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Cao-Tuong Dinh	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓
Hoang-Yen Phuong	✓			✓		✓	✓			✓		✓		

C : Conceptualization

M : Methodology

So : Software

Va : Validation

Fo : Formal analysis

I : Investigation

R : Resources

D : Data Curation

O : Writing - Original Draft

E : Writing - Review & Editing

Vi : Visualization

Su : Supervision

P : Project administration

Fu : Funding acquisition

CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

INFORMED CONSENT

This study does not involve human participants or personal data.

ETHICAL APPROVAL

This study is based solely on a review of previously published literature and does not involve any new experiments with human participants or animals. Therefore, ethical approval was not required.

DATA AVAILABILITY

Data availability is not applicable to this paper as no new data were created or analyzed in this study.

REFERENCES

- [1] J. H. Wu, R. D. Tennyson, and T. L. Hsia, "A study of student satisfaction in a blended e-learning system environment," *Computers & Education*, vol. 55, no. 1, pp. 155–164, 2010, doi: 10.1016/j.compedu.2009.12.012.
- [2] S. Palvia *et al.*, "Online education: worldwide status, challenges, trends, and implications," *Journal of Global Information Technology Management*, vol. 21, no. 4, pp. 233–241, 2018, doi: 10.1080/1097198X.2018.1542262.




- [3] O. Zawacki-Richter and I. Jung, "Shaping the field of open, distance, and digital education: an introduction," in *Handbook of Open, Distance and Digital Education*, O. Zawacki-Richter and I. Jung, Eds., Singapore: Springer Nature Singapore, 2023, pp. 3–12, doi: 10.1007/978-981-19-2080-6_94.
- [4] J. Broadbent, R. Ajjawi, M. Bearman, D. Boud, and P. Dawson, "Beyond emergency remote teaching: did the pandemic lead to lasting change in university courses?" *International Journal of Educational Technology in Higher Education*, vol. 20, no. 1, p. 58, 2023, doi: 10.1186/s41239-023-00428-z.
- [5] T. C. Dinh and P. B. N. Nguyen, "Impact of internet self-efficacy and self-regulated learning on satisfaction and academic achievement in online learning: a case study in Vietnam," *International Journal of Emerging Technologies in Learning*, vol. 17, no. 16, pp. 269–288, 2022, doi: 10.3991/ijet.v17i16.33819.
- [6] R. A. Hendriks, P. G. M. de Jong, W. F. Admiraal, and M. E. J. Reinders, "Uncovering motivation and self-regulated learning skills in integrated medical MOOC learning: a mixed methods research protocol," *BMJ Open*, vol. 10, no. 10, p. e038235, 2020, doi: 10.1136/bmjopen-2020-038235.
- [7] A. Margaryan, M. Bianco, and A. Littlejohn, "Instructional quality of massive open online courses (MOOCs)," *Computers & Education*, vol. 80, pp. 77–83, 2015, doi: 10.1016/j.compedu.2014.08.005.
- [8] J. Littenberg-Tobias and J. Reich, "Evaluating access, quality, and equity in online learning: a case study of a MOOC-based blended professional degree program," *Internet and Higher Education*, vol. 47, pp. 1–40, 2020, doi: 10.1016/j.iheduc.2020.100759.
- [9] S. A. Chapman, S. Goodman, J. Jawitz, and A. Deacon, "A strategy for monitoring and evaluating massive open online courses," *Evaluation and Program Planning*, vol. 57, pp. 55–63, 2016, doi: 10.1016/j.evalprogplan.2016.04.006.
- [10] V. F. de Moura, C. A. de Souza, and A. B. N. Viana, "The use of massive open online courses (MOOCs) in blended learning courses and the functional value perceived by students," *Computers & Education*, vol. 161, p. 104077, 2021, doi: 10.1016/j.compedu.2020.104077.
- [11] M. Dennis, "The impact of MOOCs on higher education," *College and University*, vol. 88, no. 2, pp. 24–30, 2012.
- [12] N. T. T. Ho, H. H. Pham, S. Sivapalan, and V. H. Dinh, "The adoption of blended learning using Coursera MOOCs: a case study in a vietnamese higher education institution," *Australasian Journal of Educational Technology*, vol. 38, no. 6, pp. 121–138, 2022, doi: 10.14742/ajet.7671.
- [13] S. R. Virani, J. R. Saini, and S. Sharma, "Adoption of massive open online courses (MOOCs) for blended learning: the Indian educators' perspective," *Interactive Learning Environments*, vol. 31, no. 2, pp. 1060–1076, 2023, doi: 10.1080/10494820.2020.1817760.
- [14] R. F. Kizilcec, M. Pérez-Sanagustín, and J. J. Maldonado, "Self-regulated learning strategies predict learner behavior and goal attainment in massive open online courses," *Computers & Education*, vol. 104, pp. 18–33, Jan. 2017, doi: 10.1016/j.compedu.2016.10.001.
- [15] J. Broadbent and W. L. Poon, "Self-regulated learning strategies & academic achievement in online higher education learning environments: a systematic review," *Internet and Higher Education*, vol. 27, pp. 1–13, 2015, doi: 10.1016/j.iheduc.2015.04.007.
- [16] J. Wong, M. Baars, D. Davis, T. van der Zee, G. J. Houben, and F. Paas, "Supporting self-regulated learning in online learning environments and MOOCs: a systematic review," *International Journal of Human-Computer Interaction*, vol. 35, no. 4–5, pp. 356–373, Mar. 2019, doi: 10.1080/10447318.2018.1543084.
- [17] V. P. Dennen and J. Bong, "Reframing MOOCs in higher education: exploring professional development options," in *Massive Open Online Courses and Higher Education: What Went Right, What Went Wrong and Where to Next?* 1st ed., R. Bennett and M. Kent, Eds., London: Routledge, 2017, pp. 151–167.
- [18] Z. Xu, Y. Zhao, J. Liew, X. Zhou, and A. Kogut, "Synthesizing research evidence on self-regulated learning and academic achievement in online and blended learning environments: a scoping review," *Educational Research Review*, vol. 39, p. 100510, May 2023, doi: 10.1016/j.edurev.2023.100510.
- [19] P. R. Pintrich, "The role of goal orientation in self-regulated learning," in *Handbook of Self-Regulation*, M. Boekaerts, P. Pintrich, and M. Zeidner, Eds., San Diego, CA: Academic Press, 2000, pp. 451–502, doi: 10.1016/b978-012109890-2/50043-3.
- [20] M. H. Cho and M. L. Heron, "Self-regulated learning: the role of motivation, emotion, and use of learning strategies in students' learning experiences in a self-paced online mathematics course," *Distance Education*, vol. 36, no. 1, pp. 80–99, 2015, doi: 10.1080/01587919.2015.1019963.
- [21] A. Ejubović and A. Puška, "Impact of self-regulated learning on academic performance and satisfaction of students in the online environment," *Knowledge Management and E-Learning*, vol. 11, no. 3, pp. 345–363, 2019, doi: 10.34105/j.kmel.2019.11.018.
- [22] C. H. Wang, D. M. Shannon, and M. E. Ross, "Students' characteristics, self-regulated learning, technology self-efficacy, and course outcomes in online learning," *Distance Education*, vol. 34, no. 3, pp. 302–323, 2013, doi: 10.1080/01587919.2013.835779.
- [23] T. Lehmann, I. Hähnlein, and D. Ifenthaler, "Cognitive, metacognitive and motivational perspectives on preflexion in self-regulated online learning," *Computers in Human Behavior*, vol. 32, pp. 313–323, 2014, doi: 10.1016/j.chb.2013.07.051.
- [24] C. L. Lim, H. A. Jalil, A. M. Marof, and W. Z. Saad, "Peer learning, self-regulated learning and academic achievement in blended learning courses: a structural equation modeling approach," *International Journal of Emerging Technologies in Learning*, vol. 15, no. 3, pp. 110–125, 2020, doi: 10.3991/ijet.v15i03.12031.
- [25] L. Anthonyamy, A. C. Koo, and S. H. Hew, "Self-regulated learning strategies in higher education: fostering digital literacy for sustainable lifelong learning," *Education and Information Technologies*, vol. 25, no. 4, pp. 2393–2414, 2020, doi: 10.1007/s10639-020-10201-8.
- [26] D. Moher, A. Liberati, J. Tetzlaff, and D. G. Altman, "Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement," *Journal of Clinical Epidemiology*, vol. 62, no. 10, p. 1006, 2009, doi: 10.1016/j.jclinepi.2009.06.005.
- [27] B. J. Zimmerman and M. M. Pons, "Development of a structured interview for assessing student use of self-regulated learning strategies," *American Educational Research Journal*, vol. 23, no. 4, pp. 614–628, 1986, doi: 10.3102/00028312023004614.
- [28] P. R. Pintrich, "The role of motivation in promoting and sustaining self-regulated learning," *International Journal of Educational Research*, vol. 31, no. 6, pp. 459–470, 1999, doi: 10.1016/S0883-0355(99)00015-4.
- [29] J. S. Cole and R. M. Gonyea, "Accuracy of self-reported sat and act test scores: implications for research," *Research in Higher Education*, vol. 51, no. 4, pp. 305–319, 2010, doi: 10.1007/s11162-009-9160-9.
- [30] L. Anthonyamy, A. C. Koo, and S. H. Hew, "Self-regulated learning strategies and non-academic outcomes in higher education blended learning environments: a one decade review," *Education and Information Technologies*, vol. 25, no. 5, pp. 3677–3704, 2020, doi: 10.1007/s10639-020-10134-2.
- [31] M. Theobald, "Self-regulated learning training programs enhance university students' academic performance, self-regulated learning strategies, and motivation: a meta-analysis," *Contemporary Educational Psychology*, vol. 66, p. 101976, Jul. 2021, doi: 10.1016/j.cedpsych.2021.101976.
- [32] R. L. Moore and S. J. Blackmon, "From the learner's perspective: a systematic review of MOOC learner experiences (2008–2021)," *Computers & Education*, vol. 190, p. 104596, Dec. 2022, doi: 10.1016/j.compedu.2022.104596.

- [33] M. E. Alonso-Mencia, C. Alario-Hoyos, I. Estévez-Ayres, and C. Delgado-Kloos, "Analysing self-regulated learning strategies of MOOC learners through self-reported data," *Australasian Journal of Educational Technology*, vol. 37, no. 3, pp. 56–70, 2021, doi: 10.14742/ajet.6150.
- [34] D. Lee, S. L. Watson, and W. R. Watson, "Systematic literature review on self-regulated learning in massive open online courses," *Australasian Journal of Educational Technology*, vol. 35, no. 1, pp. 28–41, 2019, doi: 10.14742/ajet.3749.
- [35] T. Q. Lập, "Stimulating learner autonomy in a Vietnamese context," (in Vietnamese), *Tạp chí Khoa học Trường Đại học Cần Thơ*, no. 10, pp. 169–175, 2008. [Online.] Available: <https://ctujsvn.ctu.edu.vn/index.php/ctujsvn/article/view/569>
- [36] K. F. Wijaya, "English education master students' self-regulated learning strategies in academic writing," *JET (Journal of English Teaching)*, vol. 7, no. 1, pp. 15–29, 2021, doi: 10.33541/jet.v7i1.2313.
- [37] L. S. Teng, R. E. Yuan, and P. P. Sun, "A mixed-methods approach to investigating motivational regulation strategies and writing proficiency in English as a foreign language contexts," *System*, vol. 88, p. 102182, 2020, doi: 10.1016/j.system.2019.102182.
- [38] M. Alotumi, "EFL college junior and senior students' self-regulated motivation for improving English speaking: a survey study," *Heliyon*, vol. 7, no. 4, p. e06664, 2021, doi: 10.1016/j.heliyon.2021.e06664.
- [39] M. S. Uzotun, "The development of a scale for measuring the self-regulated motivation for improving speaking English as a foreign language," *Language Learning Journal*, vol. 48, no. 2, pp. 213–225, 2020, doi: 10.1080/09571736.2017.1335766.
- [40] A. Apridayani, "Exploring Thai EFL students' self-regulated learning (SRL) strategies and English proficiency," *Mextesol Journal*, vol. 46, no. 1, pp. 1–10, 2022, doi: 10.61871/mj.v46n1-17.
- [41] A. Parveen and S. Jan, "Self-regulated learning among college students: unraveling gender and locality differences," *Journal of Reattach Therapy And Development Diversities*, vol. 6, no. 2s, pp. 429–432, 2023, doi: 10.53555/jrtdd.v6i2s.2296.
- [42] R. L. Nurjanah, "Self-regulated learning strategy in learning activities of literal reading course to build learning independence," *SALEE: Study of Applied Linguistics and English Education*, vol. 4, no. 1, pp. 296–314, 2023, doi: 10.35961/salee.v4i1.636.
- [43] M. Wang and Z. Yu, "Performance, motivation, engagement, and interactions in MOOC-based learning," *International Journal of e-Collaboration*, vol. 18, no. 1, pp. 1–21, 2022, doi: 10.4018/IJTHI.299066.
- [44] World Economic Forum, "The future of jobs report 2020," 2020. [Online.] Available: <https://www.weforum.org/publications/the-future-of-jobs-report-2020/>
- [45] World Economic Forum, "Future of jobs report," 2023. [Online.] Available: <https://www.weforum.org/reports/the-future-of-jobs-report-2023/>
- [46] S.-Y. Hsu, "An experimental study of self-regulated learning strategies application in MOOCs," Doctoral dissertation, Columbia University, United States, 2021.
- [47] S. Vosniadou, "Bridging secondary and higher education. The importance of self-regulated learning," *European Review*, vol. 28, no. S1, pp. S94–S103, 2020, doi: 10.1017/S1062798720000939.
- [48] B. J. Zimmerman, "A social cognitive view of self-regulated academic learning," *Journal of Educational Psychology*, vol. 81, no. 3, pp. 329–339, 1989, doi: 10.1037/0022-0663.81.3.329.
- [49] B. J. Zimmerman, "Attaining self-regulation: a social cognitive perspective," in *Handbook of Self-Regulation*, M. Boekaerts, P. R. Pintrich, and M. Zeidner, Eds., San Diego, CA: Academic Press, 2000, pp. 13–39, doi: 10.1016/B978-012109890-2/50031-7
- [50] M. Boekaerts, S. Maes, and P. Karoly, "Self-regulation across domains of applied psychology: is there an emerging consensus?" *Applied Psychology*, vol. 54, no. 2, pp. 149–154, 2005, doi: 10.1111/j.1464-0597.2005.00201.x.
- [51] P. H. Winne, "A metacognitive view of individual differences in self-regulated learning," *Learning and Individual Differences*, vol. 8, no. 4, pp. 327–353, 1996, doi: 10.1016/S1041-6080(96)90022-9.
- [52] M. Boekaerts, "Emotions, emotion regulation, and self-regulation of learning," in *Handbook of Self-Regulation of Learning and Performance*, 1st ed., B. J. Zimmerman and D. H. Schunk, Eds., New York: Routledge, 2015, pp. 422–439, doi: 10.4324/9780203839010.ch26.
- [53] M. Swain and P. Deters, "'New' mainstream SLA theory: expanded and enriched," *Modern Language Journal*, vol. 91, pp. 820–836, 2007, doi: 10.1111/j.1540-4781.2007.00671.x.
- [54] L. S. Vygotsky, *Mind in society: development of higher psychological processes*. Cambridge: Harvard University Press, 1978.
- [55] Y.-C. Huang, "Comparison and contrast of Piaget and Vygotsky's theories," in *Proceedings of the 7th International Conference on Humanities and Social Science Research (ICHSSR 2021)*, 2021, pp. 28–32, doi: 10.2991/assehr.k.210519.007.
- [56] N. C. DiDonato, "Effective self- and co-regulation in collaborative learning groups: an analysis of how students regulate problem solving of authentic interdisciplinary tasks," *Instructional Science*, vol. 41, no. 1, pp. 25–47, 2013, doi: 10.1007/s11251-012-9206-9.
- [57] G. Raslan, "The impact of the zone of proximal development concept (scaffolding) on the students problem solving skills and learning outcomes," in *BUID Doctoral Research Conference 2023: Multidisciplinary Studies*, 2024, pp. 59–66, doi: 10.1007/978-3-031-56121-4_6.
- [58] J. van de Pol, M. Volman, and J. Beishuizen, "Scaffolding in teacher-student interaction: a decade of research," *Educational Psychology Review*, vol. 22, no. 3, pp. 271–296, 2010, doi: 10.1007/s10648-010-9127-6.
- [59] J. van de Pol, M. Volman, F. Oort, and J. Beishuizen, "The effects of scaffolding in the classroom: support contingency and student independent working time in relation to student achievement, task effort and appreciation of support," *Instructional Science*, vol. 43, no. 5, pp. 615–641, 2015, doi: 10.1007/s11251-015-9351-z.
- [60] F. Savasci and D. F. Berlin, "Science teacher beliefs and classroom practice related to constructivism in different school settings," *Journal of Science Teacher Education*, vol. 23, no. 1, pp. 65–86, 2012, doi: 10.1007/s10972-011-9262-z.
- [61] S. Kingir, Y. Tas, G. Gok, and S. S. Vural, "Relationships among constructivist learning environment perceptions, motivational beliefs, self-regulation and science achievement," *Research in Science and Technological Education*, vol. 31, no. 3, pp. 205–226, 2013, doi: 10.1080/02635143.2013.825594.
- [62] S. G. Paris and A. H. Paris, "Classroom applications of research on self-regulated learning," in *Educational Psychologist: Yesterday, Today, and Tomorrow: A Special Issue of Educational Psychologist*, B. J. Zimmerman and D. H. Schunk, Eds., New York: Routledge, 2001, pp. 89–101, doi: 10.1207/S15326985EP3602_4.
- [63] S. G. Paris and J. C. Turner, "Situating motivation," in *Student motivation, cognition, and learning: essays in honor of Wilbert J. McKeachie*, 1st ed., P. R. Pintrich, D. R. Brown, and C. E. Weinstein, Eds., New York: Routledge, 2020, pp. 213–237, doi: 10.4324/9780203052754-12.
- [64] A. Bandura, *Social foundations of thought and action: a social cognitive theory*, 2nd ed. Hoboken, NJ: Prentice-Hall, 1986.
- [65] M. M. Gebauer, N. McElvany, O. Köller, and C. Schöber, "Cross-cultural differences in academic self-efficacy and its sources across socialization contexts," *Social Psychology of Education*, vol. 24, no. 6, p. 1407, 2021, doi: 10.1007/s11218-021-09658-3.
- [66] D. H. Schunk and M. K. DiBenedetto, "Motivation and social cognitive theory," *Contemporary Educational Psychology*, vol. 60, p. 101832, 2020, doi: 10.1016/j.cedpsych.2019.101832.




- [67] T. Honicke and J. Broadbent, "The influence of academic self-efficacy on academic performance: a systematic review," *Educational Research Review*, vol. 17, pp. 63–84, 2016, doi: 10.1016/j.edurev.2015.11.002.
- [68] S. Li and S. P. Lajoie, "Cognitive engagement in self-regulated learning: an integrative model," *European Journal of Psychology of Education*, vol. 37, no. 3, pp. 833–852, 2022, doi: 10.1007/s10212-021-00565-x.
- [69] Y.-E. Kim, C. D. Zepeda, and A. C. Butler, "An interdisciplinary review of self-regulation of learning: bridging cognitive and educational psychology perspectives," *Educational Psychology Review*, vol. 35, no. 3, pp. 1–24, 2023, doi: 10.1007/s10648-023-09800-x.
- [70] D. H. Schunk and P. A. Ertmer, "Self-regulation and academic learning: self-efficacy enhancing interventions," in *Handbook of Self-Regulation*, M. Boekaerts, P. R. Pintrich, and M. Zeidner, Eds., San Diego, CA: Academic Press, 2000, pp. 631–649, doi: 10.1016/B978-012109890-2/50048-2.
- [71] D. H. Schunk, "Self-regulated learning: the educational legacy of Paul R. Pintrich," *Educational Psychologist*, vol. 40, no. 2, pp. 85–94, 2005, doi: 10.1207/s15326985ep4002_3.
- [72] B. J. Zimmerman, "Self-regulated learning: theories, measures, and outcomes," in *International Encyclopedia of the Social & Behavioral Sciences*, 2nd ed., J. D. Wright, Ed., Amsterdam: Elsevier, 2015, pp. 541–546, doi: 10.1016/B978-0-08-097086-8.26060-1.
- [73] M. Boekaerts and M. Niemivirta, "Self-regulated learning: finding a balance between learning goals and ego-protective goals," in *Handbook of Self-Regulation*, M. Boekaerts, P. R. Pintrich, and M. Zeidner, Eds., San Diego, CA: Academic Press, 2000, pp. 417–450, doi: 10.1016/B978-012109890-2/50042-1.
- [74] P. H. Winne and A. F. Hadwin, "nStudy: tracing and supporting self-regulated learning in the internet," in *International Handbook of Metacognition and Learning Technologies*, 1st ed., R. Azevedo and V. Alevan, Eds., New York: Springer New York, 2013, pp. 293–308, doi: 10.1007/978-1-4419-5546-3_20.
- [75] E. Panadero, "A review of self-regulated learning: six models and four directions for research," *Frontiers in Psychology*, vol. 8, p. 00422, Apr. 2017, doi: 10.3389/fpsyg.2017.00422.
- [76] B. J. Zimmerman and A. R. Moylan, "Self-regulation: where metacognition and motivation intersect," *Handbook of Metacognition in Education*, D. J. Hacker, J. Dunlosky, and A. C. Graesser, Eds., New York: Routledge, pp. 299–315, 2009.
- [77] C. A. Stephenson, "Self-regulated learning tenets as predictors of academic achievement in undergraduate hard science learners: a quantitative study," Ph.D. dissertation, Capella University, Minneapolis, United States, 2022.
- [78] M. H. Mahmoodi, B. Kalantari, and R. Ghaslani, "Self-regulated learning (SRL), motivation and language achievement of Iranian EFL learners," *Procedia-Social and Behavioral Sciences*, vol. 98, pp. 1062–1068, 2014, doi: 10.1016/j.sbspro.2014.03.517.
- [79] H. Min and M. K. M. Nasir, "Self-regulated learning in a massive open online course: a review of literature," *European Journal of Interactive Multimedia and Education*, vol. 1, no. 2, p. e02007, 2020, doi: 10.30935/ejimed/8403.
- [80] B. J. Zimmerman, "Becoming a self-regulated learner: which are the key subprocesses?" *Contemporary Educational Psychology*, vol. 11, no. 4, pp. 307–313, Oct. 1986, doi: 10.1016/0361-476X(86)90027-5.
- [81] D. K. Khosa and S. E. Volet, "Productive group engagement in cognitive activity and metacognitive regulation during collaborative learning: can it explain differences in students' conceptual understanding?" *Metacognition and Learning*, vol. 9, no. 3, pp. 287–307, 2014, doi: 10.1007/s11409-014-9117-z.
- [82] Z. Wan, D. Compeau, and N. Haggerty, "The effects of self-regulated learning processes on e-learning outcomes in organizational settings," *Journal of Management Information Systems*, vol. 29, no. 1, pp. 307–340, 2012, doi: 10.2753/MIS0742-1222290109.
- [83] A. Littlejohn, N. Hood, C. Milligan, and P. Mustain, "Learning in MOOCs: motivations and self-regulated learning in MOOCs," *Internet and Higher Education*, vol. 29, pp. 40–48, 2016, doi: 10.1016/j.iheduc.2015.12.003.
- [84] R. S. Jansen, A. van Leeuwen, J. Janssen, L. Kester, and M. Kalz, "Validation of the self-regulated online learning questionnaire," *Journal of Computing in Higher Education*, vol. 29, no. 1, pp. 6–27, 2017, doi: 10.1007/s12528-016-9125-x.

BIOGRAPHIES OF AUTHORS



Cao-Tuong Dinh    is currently a Ph.D. researcher of Can Tho University in Vietnam. His current research interests span the application of online and blended teaching and learning modes to EFL/EFL students, and technology-based teaching and learning, with a particular focus on self-regulated learning and vocabulary development. He can be contacted at email: TuongDC@fe.edu.vn.



Hoang-Yen Phuong    is currently an associate professor at the School of Foreign Languages, Can Tho University, Vietnam. She carries studies on language teaching approaches, students' learning autonomy, self-regulated learning strategies, and teachers' professional development. She published articles in different journals and is the editor of one Scopus-indexed book on alternative assessment in language teaching. She can be contacted at email: phyen@ctu.edu.vn.