

Self-regulated learning in online learning environments: strategies for remote learning

Strategies for
remote
learning

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Richard Allen Carter, Jr

*School of Counseling, Leadership, Advocacy and Design, University of Wyoming,
Laramie, Wyoming, USA*

Mary Rice

*Language, Literacy and Sociocultural Studies Faculty, University of New Mexico,
Albuquerque, New Mexico, USA, and*

Sohyun Yang and Haidee A. Jackson

Special Education, University of Kansas, Lawrence, Kansas, USA

Received 12 April 2020

Revised 9 May 2020

26 May 2020

1 June 2020

2 June 2020

Accepted 3 June 2020

Abstract

Purpose – Many teachers and students in the USA and various parts of the world are migrating some aspects of education online out of necessity. The purpose of this paper is to identify and describe strategies of the self-regulated learning (SRL) framework for K-12 students learning in online environments to support remote learning with online and digital tools during the COVID-19 pandemic.

Design/methodology/approach – The SRL framework (Zimmerman, 2008) has been used consistently to support students in learning to work independently. This framework highlights three phases: planning, performing and evaluating. Previous research in K-12 online learning has yielded specific strategies that are useful. The paper identified and described the strategies to an audience seeking answers on how to meet the needs of students in online learning environment.

Findings – The main types of strategies that have emerged from previous studies include asking students to consider how they learn online, providing pacing support, monitoring engagement and supporting families.

Originality/value – Although the social crisis of COVID-19 is unique, prior research in online learning may be useful for supporting teacher practice and suggesting future research. Developing SRL skills of students will ensure the effectiveness of online learning that the field of education may ultimately focus on in the future.

Keywords Online learning, Teachers, Families, Self-regulated learning (SRL), Evidence-based practices, Online strategies, Emergency remote learning, K-12 online learning, Promising online practices, Learner control

Paper type Research paper

When the Coronavirus disease (COVID-19) pandemic shuttered many school buildings across the globe, online instructional delivery gained attention (UNESCO, 2020). However, fully online learning in K-12 settings had already emerged as an alternative to in-person instruction in many states (Digital Learning Collaborative, 2019). Even so, as fully online



This article is part of the special issue, “A Response to Emergency Transitions to Remote Online Education in K-12 and Higher Education” which contains shorter, rapid-turnaround invited works, not subject to double blind peer review. The issue was called, managed and produced on short timeline in Summer 2020 towards pragmatic instructional application in the Fall 2020 semester.

learning has expanded for K-12 learners, there have been concerns about persistence and achievement (Ahn and McEachin, 2017; Freidhoff, 2018). In ensuring success for learners, it is necessary to consider learning designs that yield learning opportunities for all students. To that end, discourse in K-12 online learning has focused on making content accessible to students (Rice, 2018). During traumatic circumstances, such as a pandemic, the need to make online educational opportunities easy to access takes on new importance because many learners might not be in an emotional state to focus on learning. However, learners under duress may also find it more difficult than usual to be self-directed.

The purpose of this paper is to consider the tension between orientations to online learning that emerge from motivational theories advocating individualized learner control and choice making alongside cognitive theories that suggest structured course design is vital for supporting learning. We suggest using strategies that have emerged from previous research on self-regulation of learning (SRL) conducted in K-12 fully online learning settings to inform learning during the pandemic and beyond.

Motivation and learning control

Goal orientations to learning were initially considered *situated* orientations for action in an achievement task (Ames, 1992; Dweck, 1986; Nicholls, 1984). Instead of focusing on content outcomes, goal orientations consider how, why and under what environmental conditions people learn (Anderman and Maehr, 1994; Pintrich and Schunk, 2002). While the original definitions of goal orientations were linked to situated purposes for action, later definitions more closely resembled overarching dispositions towards engagement with learning in general (Nicholls, 1992). Across both of these conceptions, learners were regarded as capable of taking some responsibility for their engagement and subsequent achievement when the environment supports it (Kaplan and Maehr, 2007). Goal orientations might also be attractive to educators because they emphasize the personal accountability of individual learners.

When taking a goal orientation to learning, learning environments that consider affective aspects of learning such as learner motivation must be developed and supported (Ryan and Deci, 2000). For example, Self-determination theory (SDT) regards choice as a major contributing factor to learner success (Deci and Ryan, 2000). When attending to SDT, learning environments are structured to support motivation and overall success in learning.

Self-regulated learning (SRL) is a self-determined learner effort towards academic performance (Boekaerts, 1995; Winne and Hadwin, 2010; Zimmerman and Moylan, 2009). Within the SRL framework, learners use metacognitive skills in learning to proactively think, perform and self-reflect (Dignath and Büttner, 2008; Ergen and Kanadli, 2017). Most models of SRL have major components:

- forethought;
- performance; and
- self-reflection.

These elements are involved in different sub-processes in self-regulation. Learners set goals, anticipate obstacles and make plans (forethought phase). During learning, students use diverse strategies to help themselves learn and stay on task (performance phase). When an activity is complete, learners reflect on their performance and evaluate the learning process and outcome (self-reflection phase). While SRL has been widely advocated, it is worth noting that much early work in SRL was developed while studying university students who are a special population in terms of their age (they are older than K-12 learners) and other

motivational factors (including what learners must do to qualify for college and what they expect to achieve with a degree). Nevertheless, SRL has been applied in K-12 settings in the absence of theories of motivation more appropriate for young learners (Zheng, 2016).

Online learning, including online learning at the K-12 level has advocates who strongly support its use because of the potential for learner control. In fact, many parents enroll their children in online learning because they want decision-making power in their learning, and safety from affective threats such as bullying, rather than more structure in the content (Beck *et al.*, 2014). Such agency is regarded to be positive because it accounts for learner preferences and accommodates individual learner differences (Rose, 2000). Thus, the expectation for flexibility demands that some attention be paid to SRL in fully online learning. In times of pandemic, this expectation for learning, any time, any place, is unlikely to subside.

Cognition and structured learning

Research in cognitive load theory (CLT) challenges theories of self-directed learning, including SRL (Kirschner *et al.*, 2006). Specifically, CLT research suggests that choices can be confusing, distracting, and/or mentally taxing on learners' cognitive processing (Van Merriënboer and Sluijsmans, 2009). After all, learners who engage in self-regulation must not only focus on task completion to learn content. They must also self-assess their understanding and determine how to make changes when they are unsuccessful or when their goals shift (Ayres and Paas, 2009). This type of complex understanding might be especially difficult for young learners and learners who have not had appropriate co-regulation experiences with parents or other caregivers prior to coming to school (Hadwin *et al.*, 2016). Also, as learners are exposed to complex content, differences in background knowledge and prior experience lend themselves to differential abilities to participate in online courses without carefully structured materials and activities (Turkkila and Lommi, 2020).

Increased cognitive load due to the metacognitive demands of SRL might be moderated through scaffolding within a course. This could come as guided instruction (Mayer, 2004) or worked examples where learners are virtually guided through examples of problems in content areas (Sweller and Cooper, 1985). Addressing the complex relationship between the affective need for control and the cognitive need for structure seems vital to strong course design that leads to learner success in fully online learning under typical circumstances, but especially during the trauma of a global pandemic. This is because during such substantial social and economic disruption, commitments to schooling could shift dramatically.

Reconciling learner control and structure in K-12 fully online learning

In traditional school settings, scaffolding for SRL might come in the form of:

- teacher assistance in creating an effective learning environment;
- availability of tools to organize content and activities;
- self-evaluation through student reflection; and
- the development of self-monitoring skills from instructional feedback and encouragement (Ley and Young, 2001).

These strategies are focused on teachers as the major co-regulator of learning. In K-12 fully online learning, SRL support diminishes due to the absence of physical teacher presence. Also, teachers have far less control over curriculum materials (Archambault and Crippen, 2009; Rice *et al.*, 2019). Instead, supporting SRL must emerge as learning platform features

included in course design. An example of this is the provision of tools to organize content and activities. Other support might come from on-site mentors, which are adults who assist learners in person (Borup *et al.*, 2015). Most recently, virtual mentoring using artificial intelligence (AI) is being tested and offered to students. These AI coaching tools hold promise for helping learners and on-site mentors use content learning or SRL strategies. Some AI can even notice when learners have stopped working and offer help or send information to human mentors who can help the learners return to the task (Siemens, 2013).

While many sophisticated technological solutions are emerging for supporting content learning and SRL, these are far from universal. Instead, major types of strategies that have emerged from previous research in SRL in K-12 online environments include the following:

- asking students to consider how they learn online;
- providing pacing support;
- monitoring engagement with instructional materials; and
- supporting families.

In the sections that follow, we will share these strategies. Then, we will evaluate these in the context of the tension between learner control and the need for cognitive structure.

Asking students to consider how they learn in online spaces

SRL requires learners to think about how they learn (Harris *et al.*, 2020). Online teachers have focused on helping students understand what it means to learn *online* in contrast to learning in a traditional setting (Rice and Carter, 2016). Strategies for illustrating this contrast have included explanations and strategic questioning about what type of strategies might have been required in the traditional setting, and how learners expect that it might be different online. Directly asking learners about their expectations seems like a useful strategy. However, learners will still likely need some guidance in setting appropriate expectations for online learning. This might require assistance in problematizing thinking about ideas such as, “online learning is going to be easier than traditional learning because I can do it at home.”

Alongside providing information about cognition and learning online, teachers have developed questioning strategies common in traditional literacy instruction where learners generate questions, decide what online sources to use or what search terms would be helpful, do the searching and then report (Harris *et al.*, 2020). The assigned reports do not just include responses, but narrations of how responses were achieved. The challenges with this strategy are likely to emerge when learners lack faith in their ability to pose questions, fail repeatedly to generate search terms that yield useful results, sustain attention while searching, determine what to record for their report and even compose the report (Kirschner *et al.*, 2006). Instructional design structures that might be useful include sample questions or a bank of questions from which to choose, links to resources that address the suggested questions, organizers or guides for recording information, worked examples and models of reports (Mayer, 2004; Sweller and Cooper, 1985).

Providing pacing support

For appropriate planning to occur, expectations for learning must be clear, and concise (Zimmerman, 2008). These communicated expectations might be about materials, time or decorum. When learners have this information, it is supposed to support pacing as they perform.

Many online learning programs and courses offer pacing flexibility (Allday and Allday, 2011; Rice and Carter, 2015; Rice and Carter, 2016). This flexibility emerged as additional time in these cases. While pacing support has been reported by online teachers as a strategy for supporting students with disabilities, there may not be a difference in student needs for pacing in online learning between students with and without disabilities (Allday and Allday, 2011).

Support for appropriate pacing might be particularly important during emergency remote schooling. This pacing is important because for some students, the days might blend into one another or they may become captivated by staying online for long periods. Differences in access to the internet and type of device might also cause fatigue for some learners. For example, learners moving through lessons on a cellular phone or a slow internet connection may be able to complete less work in the same period as a person with a laptop and high-speed internet. Another possibility is that students might be overwhelmed by the cognitive demands of the content and potentially complex digital interfaces. Being overwhelmed for extended periods could be detrimental to learners' long-term achievement as well as their self-efficacy as online learners (Rice *et al.*, 2019). Overall, pacing is an individualized negotiation that will require vigilance from those supporting the learners (e.g. teachers and on-site mentors).

Previous research pacing support has come in the form of a guide where students have due dates (even if they are soft) for submitting work or reporting on progress (Rice and Carter, 2016). While these guides may be useful for some learners, they may not provide sufficient support for others. Further, when learners take personalized pathways, standardized pacing guides may not be adequate (Mayer, 2004). Finally, some learners may not be able to make sense of using the guides without practice and support from a teacher or an adult on-site mentor (Rice and Carter, 2016).

Monitoring student engagement with instructional materials

When students suddenly stop attending or when their performance declines, those may be signs of affective disruption. Also, learners who do not understand tasks or feel they lack the skills or resources to complete it may avoid the task (Madjar *et al.*, 2011). One salient strategy from research in online teaching and learning has been to closely monitor student participation in and engagement with instructional materials (Archambault *et al.*, 2013; Rice and Carter, 2015; Rice and Carter, 2016). Such strategies leverage technologies to capture learners' usage of instructional materials in terms of how many times and for how long.

This monitoring has been achieved in numerous ways. Some teachers have used dashboards through an LMS (Rice and Carter, 2016). In some cases, parents may also have access to a dashboard (Borup *et al.*, 2019a). These dashboards provide information about whether and when learners are logging on and completing assignments. Online teachers looked for patterns. Were learners turning in assignments late at night? Only on the weekends? Only after class meetings or check-ins? This information was useful for developing pacing support.

Other support for students came through asynchronous embedded supports in the course materials themselves (Rice and Carter, 2016). One example in research was a help video that automatically popped up for learners. Where this type of assistance could not be built directly into the curriculum, learners were provided with helpful sites, such as content-specific glossaries, short topical review videos or general question engines (Dembo and Eaton, 2000; Rose, 2000). The likely challenges come in helping learners know when to use these tools, ensuring they are written at independent reading levels for all learners and determining when using these supports should be required rather than optional (Rice, 2018).

Providing social and emotional support for families

Learners need to perceive that they have on-site support for SRL in online learning (Sha *et al.*, 2012). Before the COVID-19 pandemic, online teachers relied heavily on parents or other mentors to help with SRL, including monitoring student progress, providing encouragement, communicating information about tasks and achievement and even providing instructional support (Borup *et al.*, 2019a, 2019b; Rice and Carter, 2015; Rice and Carter, 2016; Sorenson, 2019). Considering the different perceptions, expectations and capabilities parents or other on-site mentors might bring to online work, establishing consistent communication patterns about how to provide support for SRL seems vital to successfully transitioning to online work (Carter *et al.*, 2016). What course designers should consider is that learners may not have access to parents or other on-site mentors that are willing and able to support their learning. This is especially likely to be true as the pandemic wears on. This introduces a new problem where these adults who are supporting young learners also need support embedded into the course for them to be successful. Such circumstances make salient strategies like worked examples necessary for on-site mentors as well as students (Sweller and Cooper, 1985). In addition, these adult mentors may have avoidance strategies that they had already developed or in response to the shock of the pandemic (Madjar *et al.*, 2011). Either way, parents and other adults are users with needs that are cognitive and affective as well as socioeconomic.

Conclusion

The COVID-19 pandemic has brought new challenges to teaching and learning for teachers, students and families. These challenges reverberate within the extant tension between what it means to support learners from an affective standpoint through choices and control and what it means to provide sufficient structure within a course. Instructional design during the pandemic and beyond might consider how to support K-12 learners concerning both goal orientations and the need for structure. Further, it will be important to consider the agency of the child alongside the desires and capability of parents or other adult decision-makers for the child's learning. Important decisions that are out of the learners' hands include whether online learning happens in a virtual school or in a public one outfitted for distance learning, whether the learning will occur on a traditional school calendar and whether the online learning will alternate with traditional learning.

Previous research found that much of what was being done to support SRL online involved recruiting parents or other adults to co-regulate learners by pacing and monitoring. Even before the pandemic, but especially during it and through the aftermath, the strategy to offload most types of learner support to parents and on-site mentors was not a good plan. Leveraging AI for some of this work might hold some promise, but there is still much research to be conducted about what strategies are useful for young people of different ages in various subjects and how to present them. AI applications potentially require additional technological devices to access. As such, families face socioeconomically stratified opportunities to benefit from AI and distance learning in general. These issues of access may be ameliorated if local and national governments invest in internet infrastructure, device allocation and training for their use. However, access could also become worse because of economic collapse or a failure on the part of lawmakers and leaders to prioritize technological access. Learning scientists then will have to design interfaces with choice-enabled structures for an array of devices operating at various internet speeds.

While some strategies, such as worked examples might still be useful, choosing which examples, presenting them and assessing understanding afterward may shift dramatically for young online learners (Sweller and Cooper, 1985). Special populations such as English

learners, students with disabilities, or other learners representing cultural or socioeconomic diversity might also need different types of examples and access to new forms of support (e.g. translation, screen readers, captions, leveled reading, etc.).

Another need within the field of learning science is to develop models of SRL that meaningfully consider children's capacity for forethought, performance and evaluation (Zimmerman, 2008). There might also be other elements important for young learners that have yet to be uncovered, particularly in models that account for differences in cognition and motivation in the presence of advanced technologies. We hope that the strategies highlighted here provide a starting point for research on implementing online and distance learning. Although the pandemic caught most of us unaware and led to substantial disruption, by considering previous research and making reasonable inferences about the future, the work of online schooling can improve for young learners.

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Corresponding author

Richard Alan Carter Jr can be contacted at: rcarter8@uwyo.edu

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