Literature Review of Self-Regulated Learning & Learner Readiness

in Online Learning Environments

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December 2010
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Nowadays, Internet-based learning or online education is finding increased use wildly, and may prove effective in facilitating advanced study coursework for both urban learners and rural area students. For instance, online learning can provide effective strategies for offering courses and field experiences in special education teacher preparation programs (Collins, Schuster, Ludlow, & Duff, 2002). Organizations apply online learning to employ a Web-based training in their training employees program (Gravill & Compeau, 2008). Majority of universities in the US are adding asynchronous Web-based instruction to their undergraduate degree programs (Bell & Akroyd, 2006; Chen, 2002; Lynch & Dembo, 2004; Miller & Lu, 2003). The use of Internet-based technology is embedded in most learning activities today. According to the US Department of Education as of the 2006/2007 academic year, 97% of all public two year degree granting institutions and 88% of public four year degree granting institutions offered college level distance classes (National Center for Educational Statistics, U.S. Department of Education, 2002). In a related finding Picciano and Seaman (2007) estimated that in the next few academic years, approximately one million K-12 students took an online class (Picciano & Seaman, 2007). Thus, it is important for students to learn new skills as technology changes or is introduced in their learning environments (Perry, Phillips, & Hutchinson, 2006). Learners are increasingly expected to assess and manage their own learning needs. Wageman (2001) stated that self-management is a disciplinary skill that offers benefits, and learners have to learn this particular skill. Also, Vonderwell and Savery (2004) suggested that students, especially in online learning environments, need to be prepared for changing demands related to online
situations with respect to technology, learning management, pedagogical practice and social roles.

Online learning environments are platforms where educational courses are delivered through the Internet, or using Web-based instructional systems either in real-time (synchronously) or asynchronously. Reid (2005) stated that a web-based instructional system or online learning is easy and inexpensive compared to traditional learning methods. Conformed to Moore and Kearsley (2005), web-based instructional can make extensive use of network technologies to incorporate a variety of organizational, administrative, instructional, and technological components, in offering flexibility concerning the new methodology of learning. Online learning is self-managed when an instructor provides the software programs and resources to transfer new skills while the learner controls the process to achieve their own objective to acquire those new skills (Gravill & Copeau, 2008). Therefore, the process of online learning is going to be implemented by the learner, and the learner will become an active controller instead of being a passive learner, which has been the norm in the past. Online learners need to understand the dynamics in an online setting (Voderwell & Savery, 2004). Learners need to know how online learning works, interactions, relations, perceptions, and role of learners. But are they ready for online learning environments?

Learner readiness influences most institutions in terms of their curricular development and pedagogies to entire academic divisions dedicated to Web-specific delivery (Blankenship & Atkinson, 2010). According to Hung and others (2010), online learner readiness involved in five dimensions; self-directed, motivation, self-efficacy in computer/Internet, self-control, and online communication self-efficacy (Hung, Chou, Chen, and Own, 2010). In particular, learners have realize their responsibility for guiding and directing their own learning for time management, for
keeping up with the class, for completing the work on time, and for being active contributors to instruction. Most of those activities are the important part of self-regulated learning, which become the answer for preparing novice online students to be successful learners in online learning environments. Self-regulated learning becomes a central topic in facilitating learning in online learning environments. Self-regulated learning strategies have been identified (Boekaerts & Corno, 2005; Dweck, 2002; Perry et al., 2006). Self-regulated learning is a learning behavior that is guided by 1) metacognition or thinking about one's thinking include planning, monitoring, and regulating activities; 2) strategic action such as organizing, time management, and evaluating personal progress against a standard; and 3) motivation to learn such as self-believe, goal setting, and task value (Boekaerts & Corno, 2005). Learners choose the best approach to learn the material and gain the skills they need, and then become their habits. These processes are called self-regulated learning strategies (Boekaerts & Corno, 2005; Dweck, 2002; Perry et al., 2006). To manage these self-regulated learning experiences effectively, individuals have to make self-directed choices of the actions they will undertake or the strategies they will invoke to meet their goals. Then, its will become learning habits when learners often use them as their learning strategies. Self-regulated learning strategies have the potential of becoming study skills and habits through repetitive use and behaviors. Individuals who are self-regulated learners believe that opportunities to take on challenging tasks, practice their learning, develop a deep understanding of subject matter, and exert effort will give rise to academic success (Perry et al., 2006). Given the background information toward self-regulated learning strategies in online learning environments, teachers could adapt self-regulation strategies to match their teaching styles; instructors might apply these strategies to develop their course activities effectively; researchers will use this review to be part of their secondary data and indicate them to find the
issues that need to be researched; and finally learners could apply the findings from research into their own learning strategies in order to improve their learning skills and the effectiveness of their online learning environments.

The purpose of this review is to provide educational researchers, instructors, practitioners, and online learners with an understanding of extant research and theories on academic self-regulated learning and its influence on learner success in online education. This review will address the applicability of employing a theoretical framework of self-regulation for understanding learner success in an online learning environment, including gaps in the literature and suggestions for future inquiry.

What is Self-Regulated Learning (SRL), and how is it useful?

The term self-regulated learning became popular in the 1980’s because it emphasized the emerging autonomy and responsibility of students to take charge of their own learning (Bandura, 1986). In Pintrich’s study, self-regulated learning (SRL), has been defined as, “an active, constructive process whereby learners set goals for their learning and then attempt to monitor, regulate, and control their cognition, motivation, and behavior, guided and constrained by their goals and the contextual features of the environment” (Pintrich, 2000, p. 453). Self-regulation occurs when individual uses personal (self) processes to strategically motivate, monitor, and control his or her behavior and the environment. Furthermore, even if an individual is already exhibiting self-regulation, these processes can be enhanced to better support learning, motivation, and performance (Pintrich, 2000). Zimmerman and Pons (1988) defined SRL as actions directed at acquiring information or skill that involves agency, purpose, goals, and instrumentality self-perceptions by a learner. They also pointed out that SRL seeks to explain student differences in motivation and achievement based on a common set of processes. In
particular, self-regulated learners are cognizant of their academic strengths and weaknesses, and they have a repertoire of strategies they appropriately apply to tackle the challenges of academic tasks. These learners hold incremental beliefs about intelligence and attribute their successes or failures to factors, such as effort expended on a task, and effective use of particular SRL strategies within their control (Artino, 2007; Dweck, 2002; Zimmerman, 1989).

According to Barry Zimmerman (2002), self-regulated learning involves the regulation of three general aspects of academic learning. First, self-regulation of cognition involves the control of various cognitive strategies for learning, such as the use of deep processing strategies; planning, monitoring, and regulating, which refer to awareness, knowledge, and control of cognition that result in better learning and performance. Second, self-regulation of behavior involves the active control of the various resources students have available to them, such as their time, their study environment, the place in which they study, and their use of others help seeking such as peers and teachers to help them learn effectively. Third and finally, self-regulation of motivation and affect involves controlling and changing motivational beliefs such as self-efficacy, task value, control beliefs, and goal orientation, so that students can adapt to the demands of a course. In addition, students can learn how to control their emotions and affect of anxiety in the ways that improve their learning. Many researchers have agreed with the importance of self-regulated learning for students at all academic levels, and self-regulation can be taught, learned and controlled (Pintrich & Garcia, 1991; Pintrich, Smith, Garcia, & McKeachie, 1993). In fact, Zimmerman (1989, 1990), an expert in this area, has found evidence of many different types of self-regulation that are explained in the following section. In Zimmerman's studies, successful students reported that the use of self-regulated learning strategies accounted for most of their success in school.
In short, SRL is regarded as a valuable term because it emphasizes how the “Self” was the agent in establishing learning goals and tactics and how each individual’s perceptions of the self and task influenced the quality of learning that ensued. Thus, Self-regulated learners are generally characterized as active participants who efficiently control their own learning experiences in many different ways, including establishing a productive work environment and using resources effectively; organizing and rehearsing information to be learned; maintaining positive emotions during academic tasks; and holding positive motivational beliefs about their capabilities, the value of learning, and the factors that influence learning (Schunk & Zimmerman, 1998).

**How does SRL involve teachers and learners?**

What is important for teachers and learners is that self-regulated learning (SRL) can help describe the ways that teachers and learners approach problems, apply strategies, monitor their performance, and interpret the outcomes of their efforts. From this perspective, three characteristics of SRL can be identified; (a) awareness of thinking, (b) use of strategies, and (c) sustained motivation (Paris & Winograd, 1990).

**Awareness of thinking:** Part of becoming self-regulated involves awareness of effective thinking and analyses of one’s own thinking habits. This is known as metacognition, or thinking about thinking, that Brown & Campione (1990) and Flavell (1978) first described. They showed that children from 5-16 years of age become increasingly aware of their own personal knowledge states, the characteristics of tasks that influence learning, and their own strategies for monitoring learning. Paris and Winograd (1990) summarized these aspects of metacognition as children’s developing competencies for self-appraisal and self-management and discussed how these aspects of knowledge can help direct students’ efforts as they learn. They tried to emphasize that
the educational goal was not simply to make children think about their own thinking but, instead, to use metacognitive knowledge to guide the plans they make, the strategies they select, and the interpretations of their performance so that awareness leads to effective problem-solving. This approach is consistent with Bandura (1986) who emphasized that self-regulation involves three interrelated processes; self-observation, self-evaluation, and self-reaction. Understanding these processes and using them deliberately is the metacognitive part of SRL.

**Use of strategies:** A second part of SRL involves a person’s growing repertoire of strategies; for learning, studying, controlling emotions, pursuing goals, and so forth. However, this review wants to emphasize that the concern is with “being strategic” rather than “having” a strategy. It is one thing to know what a strategy is and quite a different thing to be inclined to use, to modify it as task conditions change, and to be able to discuss it and teach it. According to Paris and Winograd (1990), there are three important aspects of strategies, often referred to as declarative strategy (what the strategy is), procedural strategy (how the strategy operates), and conditional strategy (when and why a strategy should be applied). Knowing these characteristics of strategies can help students to discriminate productive from counterproductive tactics and then to apply appropriate strategies. When students are strategic, they consider options before choosing tactics to solve problems and then they invest effort in using the strategy. These choices embody SRL because they are the result of cognitive analyses of alternative routes to problem-solving.

**Sustained motivation:** The third aspect of SRL is motivation because learning requires effort and choices. SRL involves motivational decisions about the goal of an activity, the perceived difficulty and value of the task, the self-perceptions of the learner’s ability to accomplish the task, and the potential benefit of success or liability of failure. Awareness and
reflection can lead to a variety of actions depending on the motivation of the person. Zimmerman (2002) has characterized SRL as a positive set of attitudes, strategies, and motivations for enhancing thoughtful engagement with tasks. In class, teachers need to understand students’ motivation in order to understand how they learn, what tasks they choose, and why they may display persistence and effort or, conversely, avoidance and apathy. Because teachers need to be diagnostic about their students’ learning styles and orientations, it is helpful to analyze students’ meta-cognitive, use of strategies, and their motivations.

How do SRL strategies support learner readiness?

Research found that self-regulation is an important aspect of learning and achievement in academic contexts (Puzziferro, 2008; Whipp & Chiarelli, 2004). Vonderwell and Savery (2004) stated that successful online learners who are learner readiness need to be self-regulated or in the process of learning how to become self-regulated learners. Self-regulated learners know how to learn, how they learn, how to reflect on their learning, how to initiate learning and how to use time management skills efficiently. Students who are self-regulating are much more likely to be successful in school, to learn more, and to achieve at higher levels. Self-regulated learning will result in student achievement and scores as presented in many standardized tests (Puzziferro, 2008). Although many studies have been written about self-regulated learning (SRL) in traditional classroom, there have been few that researched how to improve self-regulated learning skills in online environments (Terry & Doolittle, 2006). There are, however, studies emerging that begin to examine the impact of SRL in distance and distributed learning environments; specifically, whether SRL strategies should be implemented in a similar fashion to those that are implemented within traditional classroom environments, and whether there is a
need to develop and recommend additional SRL strategies (Whipp & Chiarelli, 2004; Kitsantas & Dabbagh, 2004). Those studies begin to provide general evidence SRL can be facilitated in online learning environments. They also begin to provide guidance on general web-based pedagogical tools that can facilitate such learning outcomes. Whipp & Chiarelli (2004) describe findings from case study research that investigated the general question of how SRL strategies could be translated to online environments and attempted to identify whether SRL strategies recommended for traditional classroom instruction could be applied to online learning environments or if different strategies were needed. They concluded that some traditional SRL strategies were directly applicable to the online learning environments. Specifically, students cited the need for careful time management, utilizing traditional methods such as calendars and goal setting.

Much of the research on self-regulation in online education assumed that effective self-regulation depends on students’ confidence in their ability to attain designated types of performances (Bandura, 1986; Zimmerman, 2002). According to Schunk and Zimmerman (1998), “self-regulated learners are more self-efficacious for learning than are students with poorer self-regulatory skills; the former believe that they can use their self-regulatory skills to help them learn” (p. 87). As such, researchers interested in using a social cognitive view of self-regulation to understand student performance in online settings have studied, more than any other construct, self-efficacy and its relations to other variables. Overall, results have revealed that when compared to their counterparts with lower perceived self-efficacy, efficacious students report more use of learning strategies (Artino & Stephens, 2006; Joo, Bong, & Choi, 2000; Bell & Akroyd, 2006); greater satisfaction with their learning experience (Artino, 2007; Lim, 2001); increased likelihood of enrolling in future online courses (Artino, 2007; Lim 2001); and superior
academic performance (Bell & Akroyd, 2006; Hsu, 1997; Joo et al., 2000; Lee, 2002; Lynch & Dembo, 2004; Wang & Newlin, 2002). For example, in one of the more comprehensive studies of self-efficacy and its relationship to academic performance, Bell and Akroyd (2006) surveyed 201 undergraduates enrolled in a variety of asynchronous online courses and found that students’ self-efficacy for learning and performance was among the three most powerful predictors of final course grade ($\beta = 1.65, p < .001$). Moreover, the researchers found that an interaction term (college grade point average [GPA] X self-efficacy) was also a significant individual predictor of final course grade ($\beta = -2.35, p < .001$), indicating that self-efficacy beliefs had a greater effect on course grade for students with lower GPAs (Bell & Akroyd, 2006).

Although investigators have given some attention to the relationships between several motivational components of self-regulation and various academic outcomes (e.g., satisfaction, academic performance, and choice behaviors), very little research has been conducted on how these motivational components relate to students’ academic behaviors, such as their use of cognitive and metacognitive learning strategies. Two exceptions are the studies conducted by Artino and Stephens (2006) and Joo et al. (2000). For example, using path analytic techniques, Joo et al. (2000) found that academic self-efficacy and self-efficacy for SRL both significantly and positively predicted students’ self-reported use of cognitive and metacognitive learning strategies. However, contrary to expectations, neither cognitive nor metacognitive strategy use was related significantly to performance outcomes. Thus, the researchers failed to confirm their hypothesis that learning strategy use mediates the relationship between self-efficacy and student performance. Based on these results, the authors questioned the usefulness of self-reports of strategy use. Furthermore, they recommended that future studies employ more direct, behavioral indicators of learning strategy use to help clarify how students’ motivational characteristics relate
to their capacity to apply learning strategies in online environments.

From the research findings, correlational studies indicating that students’ motivational beliefs about a learning task are related to positive academic outcomes. The existing research in this area, however, suffers from several limitations. For instance, results are strictly correlational in nature; therefore, one cannot infer causality from the observed relationships. Although, overall, the results suggest moderate to strong relations between motivational components and adaptive outcomes, the direction of influence between the variables is sometimes ambiguous. For example, although many of the study designs imply that academic performance results from students’ motivational beliefs, these causal relations could be reversed. Hence, additional research is needed before the exact direction of operation of these social cognitive components can be fully understood.

**What did learners do in applying SRL to their learning strategy?**

Children become students when they move into formal schooling but throughout their careers in education, they gain other identities. Those identities are sometimes evident in labels and sometimes they are more covert, evident only by participation in prescribed activities of the group whether that is consistent with teachers’ educational goals or not. This means that learners (students) use SRL for different ends, depending on their identities. If they believe that getting good grades is inappropriate for their group, they may avoid effective SRL techniques such as doing homework with plan fully. If their identity is consistent with a college-bound or intellectually curious person, then they may engage in positive aspects of SRL appropriately (Lave & Wegner, 1994).

In online environments, some researchers have examined how student differences and how characteristics of the online environment interact with each other to influence learning. In
many ways, those investigations reflect the Aptitude-Treatment Interaction (ATI) studies, which have been conducted by Cronbach and Snow since 1977, and were designed to determine which instructional strategies are more or less effective for particular individuals with specific abilities (Cronbach & Snow, 1977). As a theoretical framework, ATI posits that optimal learning results when the instruction is closely matched to the aptitudes of the learner. Using an ATI framework, Eom and Reiser (2000) examined the effects of SRL strategies use on achievement and motivation in 37 middle school students taking a computer-based course. Essentially, the authors were trying to determine how varying the amount of learner control within the computer-based course might effect the achievement and motivation of students who rated themselves as either high or low in SRL skills. Using a self-report instrument, students were classified as being either high or low self-regulated learners and then were randomly assigned to either a learner-controlled or program-controlled version of a computer-based course. Results revealed that, regardless of how students rated their SRL skills, “learners in the program-controlled condition scored significantly higher on a posttest than did learners in the learner-controlled condition” (Eom & Reiser, 2000, p. 247). Additionally, the researchers found that poorer performance in the learner-controlled condition was particularly evident in the students who rated themselves as low self-regulated learners. In fact, students who rated themselves as low in SRL skills scored higher on the posttest (approximately 76.4% higher) when taking the program-controlled condition as compared to the learner-controlled condition. The trend supported the researchers’ hypothesis that students with low SRL skills are not as able to learn from computer-based courses that provide high quantities of learner control as students with high self-regulating skills.

Another ATI-type investigation, McManus (2000) attempted to determine what combinations of online course non-linearity and the use of advance organizers would work best
for 119 undergraduates reporting different levels of self-regulation. Students’ declarative knowledge was measured by a 12-item, multiple-choice test, and their procedural knowledge was measured by a 20-item, performance assessment. Although the researcher found no significant main effects or interactions, results revealed a near significant interaction between non-linearity and self-regulation ($p = .054$). According to McManus (2000), “these results suggest that highly self-regulating learners learn poorly in mostly linear Web-based hypermedia learning environments, where they have very few choices, while medium self-regulating learners learn poorly in highly non-linear environments where they are given too many choices” (p. 219). Despite the non-significance of this interaction, the results are promising in that they suggest the ATI framework may be a useful approach that allows researchers to study how individual learner differences and features of the online environment interact with each other to influence learning and performance.

However, both studies of Eom and Reiser (2000) and McManus (2000) reviewed here attempted to study online instruction by utilizing instruments, ATI, developed for traditional classrooms since 1977. Although some measurement instruments may work equally well in classroom and online environments, considering the differences between the two learning environments, the instrument that works well in the classroom may not be valid in online or computer-based learning situations.

**How can instructors apply SRL to online learning environments?**

Experts in SRL believe that online learning environments require the learner to assume greater responsibility for the learning process (Artino, 2007; Dabbagh & Kitsantas, 2005; Schunk & Zimmerman, 1998). Furthermore, many of these same experts argue that self-regulatory skills are essential for success in these highly autonomous learning situations and that the development
of these skills can be supported by Web-based pedagogical tools (WBPT) (Azevedo, Cromley, & Seibert, 2004; Dabbagh & Kitsantas, 2005; Kramarski & Gutman, 2006). Accordingly, several researchers have attempted to determine the characteristics of effective WBPT, as well as the extent to which various self-regulatory skills might be supported or enhanced by these tools. For example, Kramarski and Gutman (2006) randomly assigned 65 ninth graders to one of two online learning environments designed to teach mathematics: one with self-regulatory support (SRS) in the form of metacognitive questioning and the other without explicit support for self-regulation. Results showed that when pre- and post-test scores were compared, students in the SRS group significantly outperformed their counterparts in the non-supported group on all outcome measures, including performance on mathematical explanations, procedural and transfer tasks, and use of SRL strategies. In terms of effect sizes, post-test improvements in the SRS group were moderate on SRL strategies use (d = .45) to large on mathematical explanations (d = 2.24).

What does this mean for instructors? Often teachers are unprepared to work with students who have backgrounds substantially different from their own. They need to consider how students’ differences influence the likelihood that they will be responsive to teaching about SRL. For example, instructors who are sensitive to multicultural values and non-academically oriented families may understand why some students actively avoid deep engagement in virtual classroom discussion while others embrace it. These experiences will help novice instructors understand how their peers as well as their students might resist new learning strategies and motivational appeals but might work diligently for other types of SRL that are consistent with their characteristics, groups, and aspirations.

Other results from many research have been promising and suggest the following
practical and theoretical implications for instructors to apply using in online learning environments: (1) Web-Based Pedagogical Tools (WBPT) can be an effective way to support and/or enhance students’ self-regulatory skills (Azevedo et al., 2004; Dabbagh & Kitsantas, 2005; Kramarski & Gutman, 2006; Niemi, Nevgi, & Virtanen, 2003); (2) adaptive scaffolding appears to be more effective in supporting students self-regulatory processes and academic performance than fixed or no scaffolding (Azevedo et al., 2004); (3) different types of WBPTs support different self-regulatory processes (Dabbagh & Kitsantas, 2005; Kramarski & Gutman, 2006); and (4) WBPTs may be more effective for novice learners with under-developed self-regulatory skills than for veteran learners with more advanced SRL skills (Niemi et al., 2003). In terms of research quality, these self-regulatory scaffolding studies tended to use superior research methods when compared to the empirical work on self-regulation in online education. For example, in the majority of WBPT studies, researchers randomly assigned participants to treatment and control/comparison groups, thereby enhancing the internal validity of their experiments and improving their ability to establish causal relationships (Shadish, Cook, & Campbell, 2002). Additionally, all of the investigators used multiple outcome measures and employed both qualitative and quantitative methods to analyze their data. Taken together, these studies have taken a positive step toward improving the methodological quality of research in online distance education (Abrami & Bernard, 2006; Bernard et al., 2004).

**Conclusions**

Obviously, online learning environments afford greater opportunities for individualization and flexibility, thereby creating and increased demand for SRL. The variety of tools now contained within most Learning Management Systems (LMS) provides instructors and learners in online environments with a wide array of options for facilitating SRL skills in order to
develop and improve an online learner readiness. From group posting areas to collaborative tools and beyond, learners can be engaged in rich instructional experiences in online learning environments that provide them with the scaffolds and experiences needed to their learning strategies and become self-regulated learners. Also, some research in online learning environments seems to indicate that providing students with self-regulatory scaffolding can be effective instructional method. Additionally, it appears that highly self-regulated learners may have more success in learner-controlled their personal thinking, behaviors, and environments than their peers with poorer self-regulatory skills.

Instructors who create and facilitate online need to be aware that traditional courses do not necessarily prepare students for the level of interdependence, but an online course always requires the independent learning. He or she should provide an active learning environment in which learners take ownership for their learning. Preparing learner readiness is an important factor in helping learners achieve their goals, increase skill development, and produce higher learning satisfaction.

Learners need to learn to become active learners and seek active learning strategies in their learning. Learner autonomy as well as collaborative strategies needs to be negotiated for the effectiveness of learning. Recognition of online learning tools’ capabilities and limitations, self-efficacy, and effective communication can help to develop an active learning and learning readiness in online learning environments.

Several types of measure tools for self-regulation and motivation have been used in both traditional and online environments. Most of them that used for measure SRL in online environments, however, have been adapted from the measure tools of traditional classrooms. Hence, future research should continue to create and invent an appropriate tool for measuring the
level of SRL of learners in online environments. Despite the limitations of research methodologies, most of the studies reviewed here seem to support the linkages between students’ self-regulatory skills about metacognition, strategies used, and motivation. More well-designed research is needed on self-regulated learning and its influence on student success in online learning environments.
References


