



Online K-12 Teachers' Perceptions and Practices of Supporting Self-Regulated Learning

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Abstract

With growing interest in and popularity of online learning and lifelong learners, students' ability to be engaged in self-regulated learning (SRL) has become more important. Moreover, online learning is becoming an important feature of K-12 education. Although SRL is known to be important and teachable, little research has been conducted on teachers' practices and perceptions of SRL. Survey responses of 112 teachers who were teaching at K-12 online schools in the United States revealed that they perceived the importance of both their students' SRL and their own responsibility for teaching SRL to their students. However, the survey also showed that their practices for supporting SRL had a narrow focus concentrating on conventional teaching, which may have prevented their students from developing the full range of SRL abilities. Possible solutions, limitations, and implication of the study were also discussed.

Keywords

self-regulated learning, K-12, online learning, teacher practice

Imagine a middle school student taking courses in an online school. In a given course, she sets up her own goals for the course as well as goals for completing each task in the course. Before embarking on each task, she thinks about her past experiences related to the task, decides upon which strategies she will use to

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achieve the task goal, and decides what resources she has and will need to complete the task successfully. While working on a task, she keeps monitoring whether or not her initial strategies are working, whether or not she is accomplishing the task goal, and if she needs to make any changes. If necessary, she modifies her goals, tries different strategies, and changes resources to utilize or even changes the environments in which she studies. Once she completes the task, she assesses whether she has accomplished the goal, evaluates her entire learning process, and sets up goals for her future learning tasks.

The earlier description of a middle school student well exemplifies a self-regulated learner involved in the self-regulated learning (SRL) process. The description of SRL and a self-regulated learner may be different from what most readers have gone through and what they have experienced in their own school days, but SRL has recently become a major focus of education. In education, SRL refers to “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 in the environment” (Pintrich, 2000, p. 453).

Unlike in traditional educational settings, where learners are usually passive receivers of information provided by instructors, learners in the emerging information-age paradigm of education are active learners who have more control over their learning process (McCombs & Whisler, 1997; Reigeluth & Karnopp, 2013; Reigeluth et al., 2008). SRL was recently declared one of the major competencies for 21st century learners (Wolters, 2010), and the importance of SRL keeps increasing as people engage in online education and lifelong learning (Bhola, 1989).

By definition, it is reasonable to think that learners in online learning contexts need and experience SRL more than those in traditional face-to-face classrooms. One of the biggest reasons for a student to choose online over face-to-face is its flexibility (Harasim, 2000), and subsequently online learners have more control over their learning activities, such as when to study, what to study, and how to study. While online learning started in higher education and corporate training, it has gradually become one of the major delivery methods for K-12 education (Cavanaugh, Barbour, & Clark, 2009). For example, 29 states and Washington, DC, had statewide, full-time, online schools operating in the school year 2013–2014; and during the school year 2012–2013, approximately 310,000 students were enrolled in full-time, online schools (International Association for K-12 Online Learning [iNACOL], 2013; Watson, Murin, Vashaw, Gemin, & Rapp, 2013).

Although an abundance of research on SRL has been conducted in traditional face-to-face classroom contexts, SRL research in completely online learning contexts is relatively new and now gaining more attention as interest in distance education continues to grow. But little research has been done to examine teachers' practices for supporting their students to be more self-regulated in

online learning environments. Moreover, even less research has been conducted in K-12 online learning environments. Hence, the purpose of this study is first to explore the perceptions of the teachers at U.S. K-12 online schools on the importance of SRL and second, to explore their practices for developing students' SRL in the areas and the phases of SRL.

Literature Review

This section reviews literature that provides a conceptual framework for understanding and studying self-regulation. Then, it reviews the relationship between SRL and academic achievement. Finally, it reviews what is known about SRL in online learning environments.

Conceptual Framework

Since the concept of self-regulation was expanded to the context of education, efforts have been made to develop conceptual frameworks to better explain and understand the elements of SRL and the processes underpinning SRL (Boekaerts, 1996; Pintrich, 1999, 2004; Puustinen & Pulkkinen, 2001; Schunk, 1990; Zimmerman, 1986, 2002). Multiple perspectives to understand SRL include the social cognitive perspective, phenomenological perspective, volitional perspective, and others (Kvale, 1995). This study focuses on the social cognitive perspective of SRL, which is the most prevalent and comprehensive approach (Schunk, 2001; Zimmerman, 1998, 2000).

Among SRL frameworks based on social cognitive theory, Zimmerman's (2000, 2002) framework gained much attention from SRL researchers in the early 2000s, even though it was not one of the earliest SRL frameworks. Earlier works by Schunk (1990) and Boekaerts (1996) mainly focused on the self-regulation part, whereas Zimmerman's included more contextual elements of learning with the identification and further division of the SRL process into three phases—forethought, performance, and self-reflection—which makes his framework unique. After Zimmerman, Pintrich (2004) developed his conceptual framework to cover the common elements identified by previous SRL frameworks. It is notable that Pintrich attempted to explain SRL processes by organizing them based on four phases and four areas of regulation. He also identified relevant SRL skills in this framework. Moreover, the behavioral aspect of regulation in the forethought phase also makes Pintrich's framework more comprehensive than Zimmerman's. Pintrich (2000, 2004) also introduced the notion of social context as one of the four areas for SRL, unlike previous conceptual frameworks, which implicitly or explicitly covered only three areas: cognition, motivation, and behavior aspects of regulation.

Pintrich's framework was utilized for this study because online learners can have more variety of tasks and contexts with online learning's flexible and

autonomous nature, and the context can have more significant relationships with other SRL elements in Pintrich's framework as well (see Table 1).

SRL and Academic Achievement

One fundamental reason why SRL has gained much attention in the field of education is that it has a positive relationship with learners' academic performance (Bandura, 1986; Puzziferro, 2008; Schunk, 1984; Zimmerman, 1983). In many research studies, high achieving learners are characterized as having high levels of SRL (Ablard & Lipschultz, 1998; Nota, Soresi, & Zimmerman, 2004; Purdie, Hattie, & Douglas, 1996), indicating more use of SRL strategies (Broadbent & Poon, 2015; Zimmerman & Martinez-Pons, 1986).

In the SRL literature, students' SRL is often characterized by how much they utilize SRL strategies in their learning. A line of research has focused on examining students' self-regulatory strategy use and its relationship with academic performance in various content areas, grade levels, and organizations. For example, Zimmerman and Martinez-Pons (1990) noted that students from 5th, 8th, and 11th grades showed a high positive correlation between their use of self-regulatory strategies and their academic mathematical efficacy and verbal efficacy. Moreover, a recent meta-analysis study showed a strong correlation between SRL and academic achievement across childhood and adolescence (Dent & Koenka, 2016). Similar results were also found in an introductory information systems course in a postsecondary education institution (Chen, 2002) and in software training for various organizational workers (Gravill & Compeau, 2008). In sum, students' use of SRL strategies has been a critical factor for academic success regardless of content area, grade level, and type of organization, including K-12 schools, postsecondary schools, and corporations.

Another line of research examined the relationship between the elements of SRL and academic outcomes. The elements of SRL include constructs such as motivation, goal orientation, self-efficacy, and self-reflection. College students' regulation of motivation was found to have a positive relationship with their SRL and academic outcomes (Wolters, 1998), and their goal orientation was also shown to have positive relationships with motivational belief, SRL, and academic outcomes (Wolters, Yu, & Pintrich, 1996). Similarly, motivation of college students was highly correlated with their SRL in online learning contexts (Samruayruen, Enriquez, Natakuaotoong, & Samruayruen, 2013) and students' motivation was shown to explain variance in achievement in higher education online math remedial courses (Cho & Heron, 2015). A correlational study with seventh graders also showed that self-efficacy and intrinsic value were positively related to their SRL and performance (Pintrich & De Groot, 1990). Furthermore, historically, self-efficacy has been related to academic performance in numerous research studies in education (Harrison, Rainer Jr, Hochwarter, & Thompson, 1997; Schunk, 1984, 1990; Schunk & Ertmer, 1999, 2000; Schunk &

Table 1. Pintrich's Conceptual Framework of Self-Regulated Learning.

Phases	Areas for regulation			
	Cognition	Motivation/Affect	Behavior	Context
Forethought, planning, and activation	Target goal setting Prior content knowledge activation Metacognitive knowledge activation	Goal orientation adoption Efficacy judgments Perception of task difficulty Task value activation Interest activation	Time and effort planning Planning for self-observation of behavior	Perceptions of task Perceptions of context
Monitoring	Metacognitive awareness and monitoring of cognition	Awareness and monitoring of motivation and affect	Awareness and monitoring of effort, time use, need for help Self-observation of behavior	Monitoring changing task and context conditions
Control	Selection and adaptation of cognitive strategies for learning and thinking	Selection and adaptation of strategies for managing motivation and affect	Increase or decrease effort Persist, give up Help-seeking behavior	Change or renegotiate task Change or leave context
Reaction and reflection	Cognitive judgments	Affective reactions	Choice behavior	Evaluation of task Evaluation of context

Zimmerman, 2007; Williams & Williams, 2010; Zuffianò et al., 2013). Overall, the studies have shown that major elements of SRL have close relationships with learners' overall SRL and academic performance.

In addition, a meta-analysis study on SRL in work-related training and educational attainment showed that SRL constructs, such as goals and self-efficacy, had the strongest effect on learning outcomes for adult learners who were 18 or older (Sitzmann & Ely, 2011). Another meta-analysis study on SRL in primary and secondary school students also showed positive effects of SRL on overall academic outcomes of the students (Dignath & Büttner, 2008).

The abovementioned studies have shown that SRL has a positive influence on overall academic performance; however, they have been conducted mainly in classroom instruction (Fuchs et al., 2003; Perels, Gürtler, & Schmitz, 2005; Schunk & Ertmer, 1999, 2000; Schunk & Zimmerman, 1998).

SRL in Online Learning Environments

Despite their seeming popularity in recent years, online courses have consistently shown a high dropout rate, which has been one of the biggest concerns among online learning educators and institutions (Levy, 2007; Patterson & McFadden, 2009). Frankola (2001) noted that the dropout rate for online courses was more than 20% higher than that for traditional face-to-face courses, and another study also compared attrition of online and residential students and showed that online students were significantly more likely to drop out compared with residential students (Patterson & McFadden, 2009). Moreover, research in online learning even showed that students who experienced dropout felt frustrated and had lower confidence in their learning (Poellhuber, Chomienne, & Karsenti, 2008).

Research studies on factors influencing learners' decisions to drop out or persist in online learning indicated that (a) learner characteristics, (b) external factors such as scheduling conflicts, family issues, financial problems and so on, and (c) internal factors such as social integration, academic integration, technological issues, and lack of motivation were potential factors for learners to decide to drop out (Levy, 2007; Park & Choi, 2009). Many such factors were derived from the unique characteristics of online learning and also can be addressed by learners' self-regulated learning ability. For example, self-regulated learners can regulate their time and effort in order not to have scheduling conflicts, regulate their motivation by setting up goals and rewards, or seek appropriate help to solve issues in technology.

In addition, the importance of learners' SRL in an online learning environment has been much emphasized due to the autonomous nature of online learning and lack of ongoing and interactive support that instructors in face-to-face learning environments can easily provide (Azevedo, Moos, Greene, Winters, & Cromley, 2008; Dabbagh & Kitsantas, 2004). Moreover, a recent study that

examined the differences between persistent and dropout students enrolled in an online course showed that persistent students had higher levels of academic locus of control and metacognitive self-regulation skills than dropout students (Y. Lee, Choi, & Kim, 2013). Also, according to Broadbent and Poon (2015), who systematically examined 12 studies published between 2004 and 2014, SRL strategies were proven to be correlated with students' academic achievement in online higher education settings. Kizilcec, Pérez-Sanagustín, and Maldonado (2017) also found the positive relationship between students' SRL and their goal attainment in massive open online courses. Thus, SRL can be one solution to solve high dropout issues in online learning and subsequently to bring online learners better learning experiences.

Along with the notion that online learning environments require learners to be more self-regulated to be successful, the nature of the online learning environment encourages learners to utilize more exploration, elaboration, and activation of prior knowledge because of its inherent nonlinear design (Azevedo & Cromley, 2004; Dabbagh & Kitsantas, 2004; Kramarski & Michalsky, 2009; Narciss, Proske, & Koerndle, 2007). However, learners in online learning environments often feel difficulties in managing and regulating their learning, albeit that they have more opportunities to do so (A. R. Artino & Stephens, 2009; H. S. Lee, Shen, & Tsai, 2008).

A recent study revealed that motivational elements of college students who were enrolled in online or hybrid courses showed high positive correlations with their use of SRL strategies (Samruayruen et al., 2013). Kauffman (2004) conducted an intervention study in which students in different groups received different note-taking formats, self-monitoring prompts, and self-efficacy-building feedback in Web-based instruction (specifically, a Web Quest), and found that those SRL-related interventions showed modest effects on academic outcomes. Azevedo and Cromley (2004) also investigated whether training on SRL facilitates students' learning in computer-based hypermedia environments. They found that students in the SRL training condition demonstrated significantly greater learning gains in learning tasks of a circulatory system than did students in the control group.

Although many research studies have been conducted on SRL in online, computer-based, or Web-based learning environments, insufficient attention has been paid to teachers' practices and on which areas and in which phases of SRL teachers' practices focus. Moreover, it is hardly possible to find research studies on teachers' practices of supporting SRL in completely online learning contexts and especially in K-12 online environments.

Teacher's Role in Promoting SRL of Students

Researchers who have expertise in SRL, such as Zimmerman (2002) and Boekaerts (1997), have argued that SRL is a teachable skill, and historically,

researchers have attempted to teach SRL skills to learners using different instructional strategies and approaches, including direct instruction, modeling, reciprocal teaching, project-based learning, and others.

According to Paris and Paris (2001), promoting students' SRL can be done in three ways: (a) indirectly through experience; (b) directly through instruction; or (c) through elicited practice either indirectly or directly. Regarding the first, students can develop SRL by inducing SRL skills from authentic and repeated experiences. They can develop their knowledge and skills of SRL from observing such others as teachers, peers, or even family members. Regarding the second, students can develop their SRL knowledge and skills by direct instruction. Teachers can provide students with explicit instruction on specific skills of SRL or on what those skills of SRL are and why those skills are important, in order to raise students' awareness. For example, teachers can explain what goal setting is, including why it is needed and why it is important, can demonstrate goal setting activities with examples and non-examples, and can have students practice goal setting themselves and provide them with immediate feedback on the practice. Regarding the third, students' SRL can be promoted by engaging students in practice whereby SRL is integrated into the nature of a task. For example, in collaborative learning, students need to be involved in various aspects of SRL, such as monitoring and changing strategies or using time and resource management when engaging in group work. And in project-based learning, SRL elements, such as goal setting and choice of strategies, can be integrated into the project as guidelines or steps of the project activities.

Despite the high potential of teachers in promoting students' SRL, few research studies have been conducted examining their thoughts on the importance of SRL as well as their practices, especially in online K-12 settings, and how their practices are divided into the areas and phases of SRL based on the Pintrich's SRL conceptual framework. Hence, answers to the following research questions were explored in this study.

- How do the teachers in U.S. K-12 online schools perceive the importance of SRL for their students?
- How do the teachers in U.S. K-12 online schools perceive the importance of their teaching the students SRL skills?
- How frequently do the teachers in U.S. K-12 online schools provide their students with supports to develop their students' SRL skills in each area and at each phase of SRL?

Methods

This study utilized a survey research methodology (Babbie, 1990) using an online questionnaire. A survey is "a systematic method for gathering information from

(a sample of) entities for the purpose of constructing quantitative descriptors of the attributes of the larger population of which the entities are members” (Groves et al., 2009, p. 2). In this study, an online survey was administered to gather information about teachers’ practices in U.S. K-12 online schools.

Instrument

The survey instrument was developed based on the conceptual framework of Pintrich (2004). There was a total of 37 questions in the survey, and 25 of them were intended to measure teachers’ practices related to developing students’ SRL. In his conceptual framework, Pintrich introduced four areas for regulation, four phases of SRL, and desired SRL activities according to each area and phase (see Table 1). Each activity was translated into a survey question so that teachers could indicate whether they provided such supports to their students in promoting those activities (see Appendix). In addition, there were 12 questions to gather demographic information on the survey participants. Thus, questions such as types of school, experience in online and face-to-face teaching, subject areas, grade levels, and so on were also added to the survey to explore possible relationships. The survey was constructed in and hosted by an online survey system provider called Qualtrics.

To ensure face validity of the survey questions, expert reviews of the survey items were conducted. An email soliciting expert opinions on the survey items was sent out to a total of nine experts in the field of SRL. As a result, five experts replied to the request and provided the authors their expert feedback on the survey. Based on the expert feedback, the survey questions were modified. In addition, a pilot testing of the survey was conducted with a small subset of the sample from an organization called the iNACOL. iNACOL is a leading professional organization in the K-12 online learning industry, and the vice president of iNACOL provided the authors with email addresses of 24 teacher members for pilot testing. An invitation to participate in the pilot test was sent out three times, and three teachers agreed to participate in the test, but only two of the three ended up participating. As an incentive, each teacher who participated in the pilot test received a \$20 Amazon gift card. The pilot tests were conducted virtually using virtual conferencing software, Adobe Connect, and the participants were asked to think aloud while completing the online survey so their thinking process was captured as they were trying to understand and answer the questions. The survey instrument was revised each time the pilot test was conducted, so the revisions could be tested.

Participants

iNACOL is an international nonprofit organization, and it has more than 4,600 members, including 3,340 educators (A. Powell, personal communication,

April 13, 2015). Its educator members include teachers, staff, and administrators who work in public, private, charter, and independent schools. For this study, only teacher members were included because the target population were all teacher members of iNACOL. The sampling frame was the email listserv for the teacher members at the time of data collection.

During the 2-week period of data collection, a total of 256 responses were received. Among them, 205 respondents agreed to participate in the survey and fully completed the survey; 148 respondents out of the 205 identified themselves as teachers, and 144 of them indicated that they were teaching in the United States. Among those 144 U.S. teachers, 114 indicated that their practice was completely online, and 5 out of 23 who indicated their practice as blended identified their online portion as higher than 80% of their total blended learning practice. Finally, among the 119 teachers (114 online and five blended with more than 80% of online practice), seven responses were deleted before survey data analysis because of the inconsistency of their responses. For example, the participants indicated they were teaching at the high school level in one question but indicated they were not teaching at the high school level in another question. In the end, there were 112 valid teacher responses for the survey data analysis to answer research Questions 1 and 2. For assessing the frequency of the teachers' practice of supporting SRL, another six cases who were not currently providing any support for students' SRL and four cases who had missing data were deleted, which left 102 responses for analysis for research Question 3.

According to the answers from the 102 teachers, the average years of online teaching at their current schools was 4.15 years ($N=96$), and 91 of them indicated that they had an average of 10 years previous face-to-face teaching experience. In addition, 64 of them were teaching at regular public schools, 25 at public charter schools, 8 at private schools, and 5 at other types of schools. Finally, Table 2 shows the grade levels in which the 102 teachers were teaching at the time of survey participation.

Table 2. Grade Level Distribution of Teachers' Practice.

Grade levels	Number of teachers
Elementary (Exclusive)	10
Middle (Exclusive)	11
High (Exclusive)	52
Elementary and middle	3
Middle and high	23
All (Elementary, middle, and high)	3
Total	102

Procedure

To administer the online survey, the vice president of iNACOL was contacted, and she agreed upon distributing the survey on behalf of this study. An email containing an invitation for the study and a link to the online survey was sent to the vice president, and she drafted an email announcement based on our original email and sent it to all 3,340 educator members of iNACOL who had identified themselves as a teacher or an educator through its email listserv. The survey was open for 2 weeks to receive as many responses as possible. An email reminder for the survey was sent out to solicit more last-minute participation. Moreover, in order to encourage more participation of the teachers, an email invitation also included information about the incentives they could get from participation in the survey. Among the teachers who participated in the survey, 15 were randomly selected to receive a \$20 Amazon electronic gift card.

Survey Data Analysis

Since there were no open-ended questions (see Appendix) except for a question for those who indicated they were not providing any supports for their students to develop SRL skills, only quantitative data were gathered from the survey. In line with the research questions, these data were analyzed primarily using descriptive statistics such as mean and frequency. However, for research Question 1, regarding teachers’ perceptions of the importance of students’ SRL and the importance of teachers’ teaching SRL skills to students, the mean scores on each survey question for each of the three groups of teachers—elementary, middle, and high—were compared using the analysis of variance technique. Table 3 summarizes how the questions to assess SRL are grouped based on the phases and areas of self-regulation.

Table 3. Questions for Each Phase and Area of Self-Regulated Learning.

	Cognition	Motivation or affect	Behavior	Context
Forethought, planning, and activation phase	Q12, Q13, Q14	Q15, Q16, Q17	Q18, Q19	Q20, Q21
Monitoring phase	Q22	Q23	Q24	Q25
Control phase	Q26	Q27	Q28, Q29	Q30, Q31
Reaction and reflection phase	Q32	Q33	Q34	Q35, Q36

Table 4. Teachers' Perceptions of the Importance of Self-Regulated Learning.

	<i>N</i>	Mean	<i>SD</i>
Elementary	19	3.63	.684
Middle	43	3.65	.650
High	86	3.79	.437
Total	148	3.73	.542

Results

Research Question 1: Importance of SRL in Online Learning

The first research question of this study was “How do the teachers in U.S. K-12 online schools perceive the importance of SRL for their students according to the different grade levels (including elementary, middle, and high school) they teach?” One survey question asked, “For your online students, how important do you think self-regulated learning skills are for their learning?” The participants were asked to answer the question for the level of schooling that they were currently teaching. For example, the teachers who were teaching in middle schools only answered for their middle school students, whereas those who were teaching in all three levels of schooling answered for their students for each level separately. The answers from the teachers who were teaching in multiple levels were counted separately because their perceptions of SRL for their online students could vary based on their students' levels. Thus, even though the number of survey responses was 112, the number for this specific question was 148, including 19 for elementary, 43 for middle, and 86 for high school.

With a Likert scale of 1 to 5, one being very unimportant and five being very important, the mean scores for each group's perceptions were calculated (see Table 4). In general, the mean scores of the teachers' perceptions for each level of schooling showed a slight increment going from elementary to middle, and high schools. However, as noted in the analysis of variance table (see Table 5), the mean differences for each level were not statistically significant.

Research Question 2: Importance of Teaching SRL Skills

The second research question of this study was “How do the teachers in U.S. K-12 online schools who participated in the survey perceive the importance of their teaching the students SRL skills?” Pertinent to the research question, one of the survey questions asked, “In an online learning environment, how important is it for teachers to teach their students self-regulated learning skills?” For this question, teachers were not asked to rate their perceptions separately based

Table 5. Analysis of Variance Table for Teachers’ Perceptions of the Importance of Self-Regulated Learning.

	Sum of squares	df	Mean square	F	Sig.
Between groups	.768	2	.384	1.313	.272
Within groups	42.421	145	.293		
Total	43.189	147			

Table 6. Teachers’ Perceptions of the Importance of Teaching Self-Regulated Learning Skills.

N	Mean	SD
112	4.47	.72

on grade level, but to have one representative rating for their perceptions. The mean score of the 112 participants’ answers was 4.47, with one being very unimportant and five being very important (see Table 6). Descriptive statistics showed that the mean score of teachers’ perceptions of the importance of teaching SRL skills to students (i.e., 4.47) was higher than those of the importance of SRL skills for their online students’ learning (i.e., 3.73).

Research Question 3: Frequency of the Teachers’ Practices of Supporting SRL

The third research question of this study was “How frequently do the teachers in U.S. K-12 online schools who participated in the survey provide their students with supports to develop their students’ SRL skills in each area and at each phase of SRL?” There were 25 questions in the survey to assess teachers’ supports for their students to develop SRL skills. The survey questions asked the teachers about the frequency of their practice that was pertinent to each of the four phases and areas of SRL (see Table 1 and Appendix for more information). For analyzing the survey responses, out of 112 responses used for the analysis in the previous sections, six participants indicated that they were not currently providing any support for their students to develop SRL skills, so they were deleted, and a listwise deletion was performed on an additional four cases with missing data. Thus, 10 cases were removed and 102 responses were used for analysis. Table 7 shows the mean scores of the frequency of the teachers’ practice based on each phase and area of SRL. The questions were based on a 5-point Likert scale with 1 being never and 5 being always.

Table 7. Frequency of Teachers' Practices in Supporting Students' Self-Regulated Learning Development.

	Areas of SRL			
	Cognition	Motivation	Behavior	Context
Planning phase	3.71 (.71)	3.60 (.84)	3.75 (.92)	3.32 (1.04)
Monitoring phase	3.88 (.81)	3.56 (.97)	4.04 (.82)	3.39 (1.09)
Controlling phase	3.91 (.79)	3.78 (.97)	3.71 (.86)	3.85 (.78)
Reflecting phase	3.47 (.97)	2.98 (1.15)	3.39 (1.02)	3.13 (1.08)

Table 8. Frequency of Teachers' Practices by Phases and Areas of Self-Regulated Learning.

	Phase				Area			
	Plan	Monitor	Control	Reflect	Cog.	Motiv.	Behav.	Cont.
Mean	3.61	3.72	3.80	3.22	3.73	3.52	3.73	3.43
SD	.75	.77	.70	.91	.62	.80	.69	.83

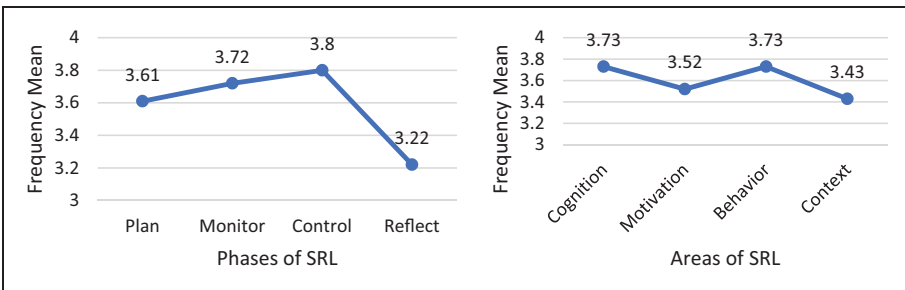


Figure 1. Frequency average comparisons by phases and areas of SRL.

More specifically, Table 8 shows how the frequencies of the teachers' SRL-supporting practices were distributed based on the phases and the areas of SRL, such as what the mean frequency was throughout the planning phase regardless of areas of regulation or what the mean frequency was throughout the area of cognition regardless of the phases (see Table 8 and Figure 1).

The results showed that the frequency of the teachers' support was high in general and their support was generally equally distributed over all four phases

and all four areas of SRL. The results also showed some variations, in that the teachers who participated in the survey were more frequently providing some support for their students to develop their SRL abilities in regulating behaviors in the monitoring phase, cognition in the controlling phase, and cognition in the monitoring phase, whereas they were less frequent in providing supports for their students in regulating motivation in the reflecting phase, and context in the reflecting phase. Based on Table 8 and Figure 1, the teachers seemed to provide their students with some supports to develop their SRL less frequently in the reflection phase compared with the planning, monitoring, and controlling phases. In addition, their answers to the survey showed less frequent practices of supporting students' SRL in the areas of motivation and context compared with those in the areas of cognition and behavior.

Discussion

This study was based on the notion that the importance of self-regulated learning (SRL) was growing in the current information-age paradigm of education where instruction has become more learner-centered rather than teacher-centered (Reigeluth & Karnopp, 2013). In learner-centered instruction, learners inevitably have more control over their learning, so it is essential for them to self-regulate their learning to have more successful learning experiences. Moreover, with the current emphasis on and trend toward lifelong learning (Bhola, 1989), learning does not stop at the P-12 or P-16 level, but is an ongoing, never-ending effort. Thus, being a self-regulated learner is a necessary characteristic of learners who are living in this era. So the authors' hypothesis that teachers in online K-12 schools would also acknowledge the importance of their students' SRL in online learning environments was supported by the data. In addition, another hypothesis was that high school teachers might perceive SRL as more important to their students than elementary and middle school teachers did, given that SRL skills and abilities include higher order thinking skills and management skills, which are more difficult for young students to develop. This hypothesis was not supported.

Given the results that the teachers on average thought SRL was important for their online students regardless of their grade levels, and thought it was even more important for them to teach all their students SRL, it is meaningful to examine how they were teaching such skills and how their teaching practices were distributed across the SRL conceptual framework.

According to the survey, some of the combinations between areas and phases of SRL which received higher ratings included behavior in the monitoring phase ($m = 4.04$), cognition in the controlling phase ($m = 3.91$), cognition in the monitoring phase ($m = 3.88$), and context in the controlling phase ($m = 3.85$). In addition, examining the areas and the phases of SRL separately showed that teachers' practices of supporting students' SRL were more focused on cognition

and behavior in the various areas of SRL as well as monitoring and controlling in the various phases of SRL.

One possible explanation for this discrepancy can be teachers' lack of knowledge about self-regulated learning (Dignath, Buettner, & Langfeldt, 2008). According to researchers (Pintrich, 2004; Zimmerman, 2002), self-regulated learning is a complex yet very systemic process where each element of SRL is seamlessly connected and affecting each other. For example, the results of the reflection phase, such as what strategies worked or what types of learning environments were ideal, should feed to the future planning phase, such as planning on strategy use or learning environments for future learning tasks. But the teachers might not have had sufficient knowledge and understanding of the systemic nature of SRL and just focused on conventional learning elements, such as utilizing, monitoring, and changing cognitive learning strategies. In addition, previous studies on SRL interventions showed that teachers generally spent little time on explicit SRL strategy instruction (Hamman, Berthelot, Saia, & Crowley, 2000; Kistner et al., 2010; Moely et al., 1992), and if taught, most of that teaching took place in an implicit way (Kistner et al., 2010). Thus, it is highly probable that students do not receive balanced supports to develop their SRL skills, and subsequently they may not be able to develop all aspects of SRL effectively, which may hinder them from becoming successful lifelong learners.

To solve this discrepancy in the teachers' SRL support, one possible and more fundamental solution could be having the researchers teach online teachers sufficient knowledge about SRL processes as a part of their professional development, emphasizing its systemic nature and the importance of having balanced supports for their students to develop the full range of SRL abilities. Dignath et al., (2008) once noted that, based on his meta-analysis study on SRL interventions, the effect of SRL training was stronger when researchers delivered the training to the students compared with when teachers delivered it. However, if teachers can develop their own knowledge of SRL through professional development, it can be more manageable and efficient to utilize teachers for SRL training rather than depending on limited availability of researchers who are capable of delivering SRL training. In addition, it can also be beneficial to identify some of the best teachers in supporting SRL in K-12 online schools and examine what they do and how they do it to develop their students' SRL abilities. The knowledge and experience gathered from those teachers can serve as exemplary practices for other online K-12 teachers, and it can also be introduced as a part of professional development.

Limitations and Implication for Future Research

Every research study has to acknowledge its limitations no matter how well it was designed and implemented and how satisfactory the results were. Thus, the

authors would like to highlight a few limitations of this study to better assess its results and conclusions.

First of all, the sample for the study was limited in that the results cannot be generalized or applied to the entire population of K-12 online teachers. The sampling frame was an email listserv of a professional organization’s educator members. Although iNACOL is the leading organization in the K-12 online learning industry, it is unlikely that the sample is a perfect match with all teachers in U.S. K-12 online schools. In addition, the teachers in the survey were asked to rate the frequency of their practice of supporting their students’ SRL skill development, which can contain self-report bias (Groves et al., 2009). Moreover, a survey was the only source of data, and it is advisable to have multiple sources of data to triangulate the findings (Creswell, 2013).

Despite the limitations, the findings of the study present some implications for future research. As one of the limitations was lack of multiple sources of data for triangulation, a meaningful follow-up study might be an in-depth case study where the researchers can obtain consent from every stakeholder, have access to every material that teachers and students use, and utilize multiple data collection methods including survey, interview, focus group, observation, and document analysis. Moreover, examining the kinds of supports the teachers are providing to their students to support their SRL and how they implement those supports would also be a useful follow-up study.

In addition, since another limitation of the study was a limited sample, a national level study involving a more comprehensive sample might be an interesting follow-up study. A more comprehensive sample of K-12 online schools and subsequently teachers at those schools can be developed by such methods as content analysis from each State Department of Education Website, snowball sampling from the industry personnel, and so on.

Appendix. An Inventory of the Survey Questions

Demographic information

- 1 I am a:
 - a. Teacher
 - b. Staff—Please name your position (e.g., technology coordinator):
 - c. Administrator—Please name your position (e.g., principal):
 - d. Other—Please specify:
 - 2 My school is:
 - a. In the United States
 - b. Outside the United States—Please name the country:
-

(continued)

Continued

-
- 3 I work in a:
- Public school (Paid for by taxpayers)
 - Private school (Paid for by the students' parents)
 - Charter school
 - Other (Please specify:)
- 4 The context of my teaching practice is:
- Online
 - Blended
 - Face-to-face (Residential)
 - Other (Please specify:)
- 4-1 (If option "Blended" is chosen for Q. 4) How is your blended teaching divided between online and face-to-face? (Sums up to 100%)
- Online ()%
 - Face-to-face ()%
- 5 How many years have you been teaching completely online? (excluding blended)
- At the current school: () years
 - Before joining the current school: () years
- 6 Have you had *face-to-face* teaching experience? If so, how many years?
- Yes: () years
 - No
- 7 Please check the subject area(s) that you are teaching online. Select all that apply.
- English (ELA)
 - Math
 - Science
 - Social studies
 - Health/PE
 - Foreign language
 - Visual arts
 - Technology
 - Others (Please specify:)
- 8 Please check the grade level(s) in which you are teaching. Select all that apply.
- Elementary (K to Grade 5)
 - Middle (Grades 6 to 8)
 - High (Grades 9 to 12)

Self-regulated learning skill development (In order to answer the following questions more effectively, please read the definition of self-regulated learning first from the box below and proceed to answering the questions)

"Self-regulated learning refers to an active, constructive process whereby students set goals for their learning and then attempt to monitor, regulate, and control their own cognition, motivation, and behavior, and the contextual features in the learning environment to achieve goals"

(continued)

Continued

9 For your online students, how important do you think self-regulated learning skills are for their learning?

	I am not teaching this grade	Very Unimportant	Unimportant	Neither Important nor Unimportant	Important	Very Important
Elementary						
Middle						
High						

10 In an online learning environment, how important is it for teachers to teach their students self-regulated learning skills in addition to content knowledge?

(5-point Likert type scale will be provided; 1 being *Very Unimportant* and 5 being *Very important*).

11 Are you currently providing your students with any supports for them to develop their self-regulated learning skills? Here "supports" include any kinds of both instructional (e.g., lecture, demonstration, modeling, discussion etc.) and non-instructional supports (e.g., rewards, encouragement etc.)

a. Yes (Go to the next section)

b. No (Skip logic to 11-1)

11-1 (If option b is chosen for Q.11)

"Could you briefly explain the reason why you are not providing supports for your students to develop self-regulated learning skills?"

Skills during each phase of SRL (All the following questions are based on the 5-point Likert type scale; 1 being *Never* and 5 being *Always*)

The following statements are based on the elements of self-regulated learning

and how self-regulated learning operates in the classroom. Please choose the one that best describes your actual practice. Here "supports" include any kinds of both instructional (e.g., lecture, demonstration, modeling, discussion etc.) and noninstructional supports (e.g., rewards, encouragement etc.)

I provide my students with some supports so that they can do the following activities *by themselves*.

Phase I: Forethought, planning, and activation

12 Set their own subgoals for accomplishing the task

13 Think on their own about their prior content knowledge related to the task

14 Think on their own about their past learning experience related to the task

15 Think on their own about the value they can get from accomplishing the task

16 Judge on their own how confident they are for accomplishing the task

17 Think on their own about how much they are interested in the task

18 Plan on their own how they will use time and effort to accomplish the task

19 Plan on their own how they will monitor their learning behavior

20 Think on their own about how they perceive the task

21 Think on their own about how they perceive the study environment

(continued)

Continued

Phase 2: Monitoring

- 22 Self-monitor how well they are learning
- 23 Self-monitor how motivated they are to accomplish the task or how they feel about their learning
- 24 Self-monitor their effort, time use, and need for help
- 25 Self-monitor changes in the task and the study environment conditions

Phase 3: Control

- 26 Use (on their own) cognitive strategies for learning
- 27 Use (on their own) strategies for managing motivation or affect
- 28 Decide (on their own) which things to devote more or less effort to
- 29 Decide (on their own) when, why and from whom to seek help
- 30 Change or renegotiate (on their own) the task when needed
- 31 Change or leave (on their own) the study environment when appropriate

Phase 4: Reaction and reflection

- 32 Self-reflect on how well they did in accomplishing their subgoals
 - 33 Self-reflect on the reasons for their emotional reactions to the outcomes
 - 34 Choose (on their own) if and when to do an additional task
 - 35 Self-evaluate how effective the task was for accomplishing their subgoals
 - 36 Self-evaluate how effective the study environment was
 - 37 Please type your email address so that we can contact you for clarification, if necessary. Email: ()
-

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