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EXAMINING THE INFLUENCE OF PROFESSIONAL DEVELOPMENT AND PRE-SERVICE TRAINING ON THE USE OF SELF-REGULATION PEDAGOGICAL PRACTICES OF MIDDLE SCHOOL TEACHERS

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ABSTRACT

EXAMINING THE INFLUENCE OF PROFESSIONAL DEVELOPMENT AND PRE-SERVICE TRAINING ON THE USE OF SELF-REGULATION PEDAGOGICAL PRACTICES OF MIDDLE SCHOOL TEACHERS

Lauren Porter

Academic self-regulated learning (SRL) skills closely align with the 21st century skills that lead to student success. Research demonstrates that academic achievement is closely related to the use of SRL in the classroom and that teacher practices are fundamental in imparting these skills to their students. It is not clear, however, how teachers are acquiring these skills and/or how their knowledge of metacognition and SRL are generalized into their pedagogical practices. This quantitative study examined the relationship between use of SRL pedagogical practices and teacher exposure to pre-service training and professional development, as well as their years of teaching, subject matter, and race/ethnicity. Middle school (7th and 8th grade) participants were asked to complete a survey about their use of SRL pedagogical practices, which made available on Facebook professional networking sites. Independent *t*-tests, ANOVAs, and multiple regressions were used to analyze the resulting data. Training, both via pre-service and professional development experiences, was found to be strong predictor of use of SRL practices. The results of this study can guide decisions on the delivery of professional training initiatives that develop best instructional practices with the ultimate goal of improving student achievement.

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CHAPTER 1

Introduction

The essential skills that students need to succeed in the 21st century are widely recognized. The National Education Association established the Partnership for 21st Century Skills (P21) in 2002 and developed a framework in which these important skills were defined. This endeavor led to the publication of *Preparing 21st Century Students for a Global Society: An Educator's Guide to the Four C's* (n.d.), which outlined the essential 21st century skills–critical thinking, communication, collaboration, and creativity–that students need for when they leave educational institutions. In response to P21, many states revised their educational standards to adhere collectively to the Common Core State Standards (CCSS). These standards integrate cognitive learning and metacognitive skills into the core academic content in order to help students obtain a deeper understanding of the subject and apply critical thinking skills to real-world problems.

Zimmerman (1989) and Pintrich (2000) previously recognized the importance of these skills in their theories of self-regulated learning (SRL). Zimmerman and Pintrich defined self-regulated learners as those that are motivated to use their metacognitive skills, behavior, and environment to acquire knowledge and be active in their own learning process. Self-regulated students use critical thinking skills, communication with peers and teachers to access information and gather feedback, and creative problem-solving strategies to further their acquisition of knowledge. Moreover, there is substantial research on the importance of self-regulation skills and their positive correlation to

academic success (e.g., Dent & Koenka, 2016; Dignath & Büttner, 2018), underpinning the goal of embedding these into course curricula.

In order to impart these skills to students, educators must have the "knowledge and skills needed to develop and foster the critical thinking, problem solving, literacy and technological skills that students need to be successful in the 21st century" (New York State Professional Development Standards, 2009). While it is clear that efforts to develop students' self-regulation skills must begin with analyzing and developing teacher practices (Alismail & McGuire, 2015), little research has been conducted on how teachers can facilitate the development of these metacognitive and cognitive processes in the classroom (Dignath & Büttner, 2018; Donavan & Bransford, 2005; Huh & Reigeluth, 2017). For example, Dignath and Büttner (2018) questioned whether teachers are employing strategies that develop student self-regulation skills, while Hakkinen, Jarvela, Makitalo-Siegl, Ahonen, Naykki and Valtonen (2017) found teachers know less about how to teach these types of skills than they know how to teach subject content area knowledge. Examination of how teachers are being prepared or trained to embed these practices in the classroom and during content instruction is necessary.

Purpose of the Study

The present study seeks to examine the types of self-regulatory building practices teachers are using and the frequency in which they embed them in their teaching pedagogy. The study further seeks to examine the types and amount of training teachers have received, for example, either through professional development or pre-service education and whether the training has been associated with the use of SRL practices.

This research also looks at teacher characteristics and the relationship demographics may have with the delivery of SRL practices in the classroom.

To collect this data, a survey developed by Huh and Reigeluth (2018) was utilized. Based on Pintrich's theoretical framework of SRL, Huh and Reigeluth's survey used a 5-point Likert Scale with 1 being Never and 5 being Always and requested respondents to rate their classroom use of SRL practices in 4 separate Phases of self-regulation. The first Phase measured the use of strategies associated with the development of forethought, planning and activation. Phase 2 and Phase 3 assessed the use of SRL strategies that develop student monitoring and control, respectively. Lastly, respondents rated their use of Phase 4 strategies of reaction and reflection.

In addition, the survey collected teacher demographics, such as years teaching, race/ethnicity and subject taught. These teacher characteristics, although not exhaustive, are important variables to consider as they may help shape or strengthen the use of SRL practices. Respondents were also asked to report their professional development and pre-service training experiences that included SRL.

This research targeted a national sample of 250 7th and 8th grade middle school teachers and was posted on 5 professional networking sites on Facebook whose membership were primarily middle school teachers.

This quantitative cross-sectional survey research design was used to quantify and analyze teacher characteristics, types and amounts of training and the current use of SRL practices. Correlational analyses, *t*-tests, one-way between-subjects ANOVA, and multiple regressions were used to explore the relationships and associations between the variables.

Examining these relationships is important in informing administrators of opportunities for developing self-regulated skills in their community of teachers. As today's educational leaders are in pursuit of better student outcomes, having teachers who understand the importance of metacognition, possess strong pedagogical practices in SRL and who can transfer these skills to their students will ultimately help meet this goal.

Theoretical/Conceptual Framework

The social-cognitive theories of Bandura (1977), Zimmerman (1989), and Pintrich (2000) theorize that learning occurs within a dynamic process between a student, a model, and their environment. The classroom setting offers an environment in which there can be explicit teaching and modeling of skills that can lead to student success. As such, teachers play a vital role in the development of students' ability to regulate their learning and prepare them for 21st century demands.

In conceptualizing factors that would influence teachers' use of these skills, pre-service training and professional development stand out as key potential contributors. Both are fundamental avenues in which teachers learn and strengthen their use of best instructional practices (Alismail & McGuire, 2015). Generally, professional development has been called the single most accessible means that teachers have to develop the skills necessary to embed SRL skills in the learning environment for enhanced student performance (Guskey, 2003). Without effective training, teachers may not understand the benefits of teaching SRL practices nor how best to accomplish this. More importantly is the fact that it may take sustained training throughout a teacher's career for these practices to be implemented. In examining characteristics of effective professional development, Guskey (2003), identified initiatives that included 30 hours or

more with structured and consistent follow up to be the most effective in imparting changes to pedagogical practices.

However, the benefit of professional development varies greatly from teacher to teacher, with some even demonstrating no benefit (Zambak, Alston, Marshall & Tyminski, 2017). Moreover, many pre-service and professional development programs may not yet be focusing on teaching SRL skills.

This study also examines other factors that may be associated with teachers' ability to impart SRL skills. For instance, more experienced teachers may have 'naturally' developed these skills over time by observing 'what works' for their students. Subject-matter taught may also influence teachers' use of these skills, as some curricula may lend themselves to embedding SRL development. For example, training and implementation of inquiry-based instruction, which emphasizes student SRL skills, was found to show changes to a teacher's pedagogical practices and improved student outcomes in science (Zambak et al., 2017). Finally, ethnicity/race is examined to see if it was another predictor in the use of SRL practices. Although there is no theoretical basis found for this hypothesis, teachers of different race may come to their classroom with varying cultural experiences that may have shaped their pedagogy in the use of SRL practices.

Significance/Importance of the Study

Today's educational leaders are charged with preparing students for the demands of the 21st century and the provision of quality classroom instruction is one assurance school leaders must make to their constituents. In doing so, they must have a community of educators who are skilled at imparting essential SRL skills to their students.

Administrators must, therefore, focus their resources on initiatives that foster best practices among their teachers.

Garet et al. (2001) suggests, however, that there is relatively little systematic research on the effects of professional development on improved teaching practices. Therefore, examination of middle school teachers' SRL pedagogical practices and the relationship between professional development and pre-service training is significant for informing policy and practice within districts. Understanding the role and impact training has on the use of SRL practices can guide administrators' decisions with regard to the types of professional development that would be most beneficial in increasing the efficacy of their teachers' practices. For example, a finding that professional development programs are positively associated with teachers' use of SRL skills, but that many teachers have not attended professional development programs covering SRL would suggest that making these programs widely available to teachers and encouraging attendance could be fruitful.

Administrators can also gain a better understanding of the role teacher characteristics play in the delivery of effective SRL pedagogy and could use this information to facilitate purposeful initiatives that develop best instructional practices school wide. Leaders who can identify teachers who demonstrate best practices in SRL can provide leadership opportunities at a building level. These teachers can be invited to mentor new teachers, have open-door teacher rounds and/or provide turnkey coaching to colleagues in formats, such as learning circles. These shifts in focus and professional learning delivery will lead to improved student achievement and success as supported in the literature.

A positive finding that pre-service training improves SRL pedagogical practices could inform undergraduate programs of courses of training and student teaching experiences for pre-service teachers that could best develop a fundamental understanding of the importance of SRL skills and the need to impart these skills to their future students.

Examining the association of pre-service exposure to SRL and teacher practices could also help administrators vet potential teacher prospects during the hiring phase. Hiring those candidates who present with knowledge and experience with SRL practices may assist in cultivating a community of highly effective teachers.

Lastly, exploring the relationship of SRL skills and subject matter can assist in understanding if specific SRL skills vary by content taught. If subject matter is a predictor of SRL practices, leaders can consider concentrated training efforts by matching professional development with teachers of particular subject areas.

Research Questions

The central questions of this research study are:

1. What types of self-regulatory building practices are middle school grade level teachers using? Are certain types of self-regulatory building practices being employed more than others?

2. Does the use of self-regulatory building practices vary between those who have and have not had professional development on SRL?

3. Does the use of self-regulatory building practices vary by participation in pre-service training that included SRL? Does the use of SRL building practices vary by the amount of pre-service training received?

4. Does the use of these types of self-regulatory building practices vary by hours of professional development, pre-service training, years of teaching, race/ethnicity or subject matter?

Definition of Terms

Self-regulated learning: The 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.

Self-regulatory building practices: Pedagogical practice that are embedded in classroom lessons and the classroom environment that develop self-regulated learning (SRL).

Professional development: Professional learning for educators to develop the knowledge, skills, and practices they need to help students achieve higher educational outcomes.

Pre-service training: Coursework and experiential learning done in preparation for teacher certification.

21st Century Learning Skills: Cognitive and metacognitive skills, such as critical thinking, communication, collaboration, and creativity, that allow students to be successful in today's global community.

CHAPTER 2

Introduction

This chapter reviews the theoretical work underpinning the importance of SRL skills, a conceptual framework for how teachers' build those skills, and a review of empirical literature of teachers' use of SRL skills and their subsequent impact on students.

Social Cognitive Self-Regulated Learning Theories

Bandura and Zimmerman

Bandura (1977) laid the foundation for self-regulation as an essential component for learning. Unlike in his earlier research where he posited that learning occurred when behavior was reinforced by actions of an external source (i.e., when a child says "please" and is then given praise by an adult rendering it likely for this behavior to occur again), Bandura identified internal sources of reinforcement, such as self-efficacy, that shaped an individual's learning and behavior. He describes these internal processes as self-regulation. Bandura (1977) defined self-regulation as the process through which behaviors were maintained and reinforced, specifically by cognitive factors, motivation, and interest (Grusec, 1992; Bandura, 1977). Highlighting these three factors as interdependent processes, Bandura (1977) conceptualized a model of triadic reciprocal determinism. Self-regulated behavior becomes reinforced and maintained when the interplay of cognition, motivation, and interest produces what is perceived as a positive outcome by an individual (Grusec, 1992).

Zimmerman (1989) expanded on Bandura's seminal work of social learning and applied these principles to academic learning. He defined academic self-regulated

learners as those that are "metacognitively, motivationally and behaviorally active participants in their own learning" (Zimmerman, 1989, p. 329). Similarly, Zimmerman conceptualized that the person (self), their environment, and their behavior were three interdependent processes that can explain the development of self-regulated learning. More specifically, he focused on the inclusion of environmental and motivational variables that reinforce the development and maintenance of SRL skills (Zimmerman, 1989; 2000). Learning was described to occur to the degree a student can use their personal strategies to strategically regulate their learning environment and their behavior (Zimmerman, 1989).

Personal strategies are influenced by student knowledge, metacognitive processes, goals, and affect. Self-regulated learning behavior is influenced by self-observation, self-judgement, and self-reaction. Within this domain, students monitor their own performance, set goals, and systematically compare their performance to a standard or goal. Learners may change their behavior to optimize their learning strategies or improve the learning environment.

The environmental component of the triad is a particularly important variable in the present study. Zimmerman and Martinez-Pons (1990) suggest that self-regulated learners understand how the environment influences their personal and behavioral processes and how to improve their environment using SRL strategies. Self-directed learners often utilize direct assistance from teachers, peers, and other adults (Zimmerman and Martinez-Pons, 1986). Modeling and the structure of the learning context are key components in this development. The social cognitive approach links students' self-regulation process to learning activities and the reciprocal nature of learning between

teacher and student (Zimmerman, 1989). Furthermore, these processes are observable and teachable and are helpful in guiding educational practice and policy.

Pintrich

Pintrich (2000, 2004) expanded on Zimmerman's (1989) definition of self-regulated learning. His theory also presumes that learners are active in their own learning by monitoring, regulating, and controlling their cognition, motivation and behavior; however, he highlighted that these processes are "guided and constrained by their goals and the contextual features in the environment" (Pintrich, 2000b, p. 453). Pintrich notably emphasized the motivational processes in academic self-regulation and the complex variables of a classroom context that can affect self-regulated processes (Schunk, 2005). The contextual factors in a classroom, including teacher influences, are instrumental in encouraging or discouraging the use of self-regulated learning strategies (Pintrich & Zusho, 2002). The present study seeks to explore some of these variables using Pintrich's theory as a basis for examination.

Pintrich (2002) conceptualized four areas of self-regulation: (1) cognitive process, (2) motivation, (3) behavior, and (4) social context (Huh & Reigeluth, 2017; Cetin, 2017; Schunk, 2005). In addition, he conceptualized four phases of self-regulation:
(1) forethought-planning-activation, (2) monitoring, (3) control, and
(4) reaction/reflection. Pintrich's conceptual framework is represented in Table 1 below.

Table 1

Pintrich's Conceptual Framework for Self-Regulation

| | | Areas of Self-Regulation * | | |
		Cognition	Motivation	Behavior	Context
	Forethought, Planning, Activation	goal setting	goal orientation	time management	note taking
	Monitoring	judgements on learning	judgements on motivation	monitor time and effort	monitor changes in environment
	Control	adhere to successful learning strategies	self-reinforcement	continued effort and assistance seeking	choose setting in which to work; choose with whom to collaborate
	Reaction, Reflection	assessment of learning strategies	assessment of motivation strategies	assessment of effort and emotions	assessment of contextual variables

Note. *****Strategies for each phase/area are examples.

(Note: "Phases of Self-Regulation" appears as a vertical label on the left side of the table.)

A person regulates their cognition, motivation, behavior, and context within each of these phases. As depicted in Table 1, the model, however, is not linear in nature. For example, a learner, dependent on the task, may engage in some phases more than others and/or more than one phase simultaneously (Pintrich, 2000b; Schunk, 2005).

In the forethought-planning-activation phase, learners may regulate their cognitive process by goal setting and activating prior knowledge and metacognitive knowledge. Motivational processes may be influenced by self-efficacy, ease of learning, task value, goal orientation, and interest. Learners in this phase may regulate their behavior through time management, effort planning, schedules, and rules for assessing

progress. Lastly, students can regulate the context within this phase by taking note of their environment, such as classroom features, types of tasks, features of the context that could hinder or aid in learning, teacher grading practices, perceived teacher helpfulness, and overall classroom climate (Pintrich, 2000; Schunk, 2005).

In the monitoring phase, learners regulate their cognitions by making judgements about their learning and adjust their behavior by assessing their time and effort and monitor their motivational processes by noticing their self-efficacy, interest, anxieties, values and their perceived causes of their academic outcomes. Learners in this phase monitor their context for any changes (Pintrich, 2000; Schunk, 2005).

In the control phase, learners attempt to control their cognition, motivation, behavior, and context based on information from the monitoring phase with the goal to improve their learning (Pintrich, 2000; Schunk, 2005). Learners may regulate their cognition by adhering to strategies they found successful. Motivational processes may be regulated by improving self-efficacy through positive self-talk and providing self-reinforcement for achieving positive academic outcomes. Behavior processes may be regulated by continued effort and seeking assistance. For instance, Schunk (2005) states that "good self-regulators do not seek help indiscriminately but rather selectively to understand a particular point and from a source they believe will be helpful" (p. 87). This highlights the importance role educators may take. Teachers, who undertake a facilitator or delegator role as opposed to the role of "expert" in the classroom, work cooperatively with their students and are viewed as approachable to consult effectively with students (Grasha, 1994). Students exercise contextual control when they can regulate their environment to make it more conducive to positive educational outcomes. Learners, for

example, may renegotiate task requirements with their teachers, choose peers with whom to collaborate, and choose settings in which to work (Pintrich, 2000; Schunk, 2005).

The last phase of Pintrich's (2000) conceptual model, reaction/reflection, includes the learner's judgements and self-evaluation of their performance. The learner assesses strategies used to regulate their motivation, behavior, and environment. The learner reflects on emotions, effort and task demands that either aided or hindered academic performance. Self-regulation changes are considered in effort to improve future learning outcomes (Pintrich, 2000; Schunk, 2005).

Pintrich's theory emphasizes the complexities of the educational context and the need to examine the relationship between variables in actual classroom settings (Schunk, 2005). "Self-regulation is not just afforded or constrained by personal cognition and motivation, but also privileged, encouraged, or discouraged by the contextual factors" (Pintrich & Zusho, 2002, p. 279). Teachers are arguably the most influential environmental factor that assist students in their academic SRL skills development. Since SRL skills are teachable and observable (Zimmerman, 1989), it is important to identify practices that teachers embed in their content lessons. Activities that teachers can use to promote cognitive, behavioral, and contextual decisions during Pintrich's SRL phases were identified in a survey developed by Huh and Reigeluth (2018). Supporting students' efforts to set goals and monitor and reflect on their own learning are a few activities teachers may engage in to impart SRL skills in their students. As diversity between and among learners and learning environments increase in today's world, so does the need to explore SRL skills and ascertain how they are being developed in today's educational classrooms.

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Conceptual Framework

      The motivation for this study is rooted in the theories of Bandura, Zimmerman, and Pintrich as described above. The conceptual framework used for this study is depicted in Figure 1. The end-goal of developing SRL is to help students develop skills required to meet the demands of the 21st century (Figure 1, right-most box) and to improve student outcomes (Dignath & Büttner, 2008; Dent & Koenka, 2016). Bandura (1977) theorized that learning these skills first occur when observing a model. This suggests that teacher pedagogy is an important variable in the development of student SRL (reflected in the middle box in Figure 1).

Figure 1

Conceptual Framework for this Study
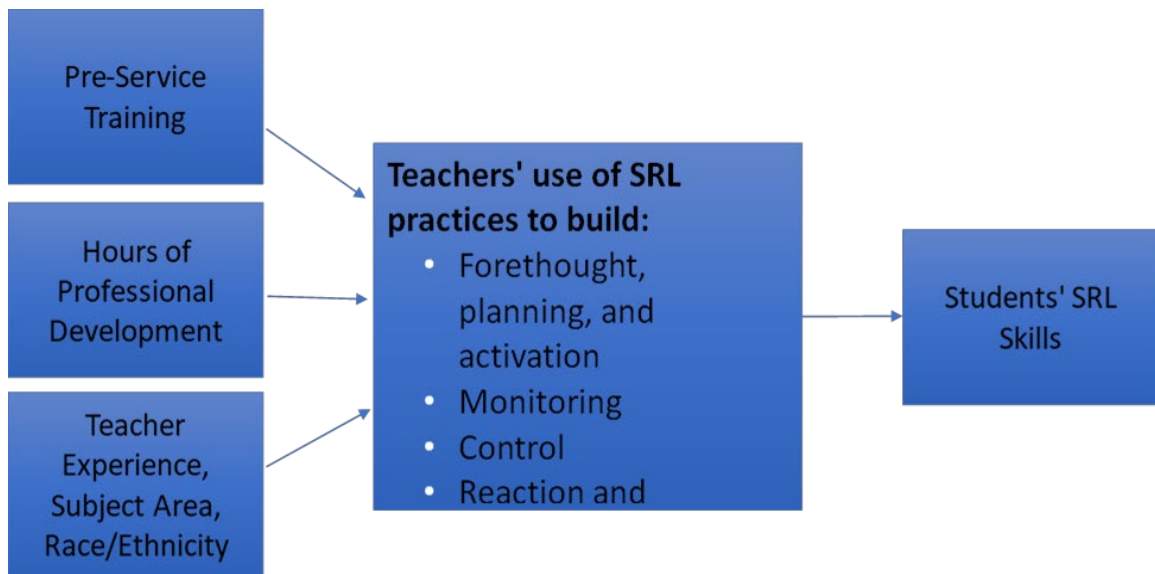
      Empirical research confirms that educators' explicit instruction of SRL strategies in a student-centered learning environment can aid in the development of these skills (Dignath & Büttner, 2008, 2018). However, educators may not have the skills necessary

to utilize these findings and create educational change (Dignath & Büttner, 2008). Professional development is one means teachers can further develop knowledge, skills, and instructional practice to meet the needs of students, and research supports specific characteristics of effective professional development (Guskey, 2003).

In an analysis of widely recognized published lists citing characteristics of effective professional development, Guskey (2003) identified the characteristics that most frequently improved pedagogical practices. A vital component identified in this analysis was helping teachers understand the ways that students learn (Guskey, 2003). A critical factor in effective professional training and initiatives is time itself, and positive effects are often noted when there are 30 or more contact hours. In addition to initial professional learning hours, teachers require significant amounts of structured and sustained follow-up to embed new instructional practices consistently and effectively into their curricula (Guskey & Yoon, 2009; Guskey, 2003; Garet, Porter, Desimone, Birman & Yoon, 2001).

Pre-service training is experiential and instructional learning that occurs to prepare students to obtain their teacher certification and lays the foundation for teachers' educational philosophies and pedagogical practices. With regard to pre-service training on SRL, Wilson and Bai (2010) emphasize that teacher programs should "implement practices that support an understanding in instructional routines that improve students' metacognition" (p. 285).

Figure 1 illustrates this study's hypotheses that teachers' professional development, participation in pre-service training, and teacher factors (e.g., experience, subject area, etc.) will all affect their use of SRL practices and subsequently a student's use of SRL skills and achievement. It is acknowledged that there may be other variables

that contribute to teacher SRL practices; however, the present study will look only to examine the effect of professional training, pre-service training and teacher factors. For example, the framework used in this study does not account for the quality of professional or pre-service training programs, and this variable could confound the associations observed. Likewise, if a teacher received pre-service training on SRL skills development but that training was superficial, it could appear that training did not affect the use of those practices. While that was a limitation of the current study, examination into the number of hours of professional development and the time pre-service teachers were instructed in SRL skills was analyzed as a means to understand how sustained the trainings were over time, as theory dictates that sustained professional development will be more impactful than one-time development at changing teacher practice.

Review of Related Literature

Teaching Self-Regulation and Students' Achievement and SRL Skills Development

On average, research demonstrates that teachers who use instructional practices that promote self-regulation skills have students who achieve higher academic achievement. Dignath and Büttner (2008) conducted a meta-analysis of 35 studies conducted with secondary school students. The researchers included studies of instructional practices that used theoretical models of self-regulation focusing on metacognition, cognition, or motivational strategies, and looked for differences in academic achievement and strategy use. The authors found a strong relationship between overall academic achievement and SRL instructional practices used by teachers at the secondary school level ($R^2 = 0.85$). With regard to specific content areas, Dignath and Büttner (2008) found the variation in mathematics achievement was largely explained by

the utilization of the SRL instructional practices employed by the teacher ($R^2 = 0.94$).

This is similar to the previously mentioned findings of the Zambak et al. (2017) study

where student growth in science achievement was dependent on teacher SRL practices

($R^2 = .254$, ES = .34). These findings support the examination of a subject area as an

important variable in this study, and lessons in certain content may lend itself to more

opportunities for teachers to engage in SRL practices.

Drilling into this finding, literature shows that it is the *explicit teaching* of SRL

skills that is most predictive of student outcomes. Kistner, Rakoczy, Otto, Ewijk, Büttner

and Klieme (2010) explored the relationship between student performance and the direct

promotion of self-regulatory practices. Direct promotion of self-regulatory skills included

implicit instruction (e.g., through modeling) or explicit instruction (e.g., modeling with

explanation of the importance of the strategy on learning). Using video data of

20 teachers and 538 secondary students in Germany, Kistner et al. found that teachers

used higher frequencies of implicit (85%) rather than explicit (15%) teaching strategies,

which equated to an average of 21 ($SD = 5.87$) implicit and 4 ($SD = 3.78$) explicit

instructions in a 45-minute class period. Although explicit instruction was used with less

frequency, a stronger relationship with academic outcomes was found, $r = .52$, $p = 0.01$.

Findings indicated that implicit strategy instruction had no significant correlation with

academic gain. The researchers concluded that "students should be informed about the

significance of a strategy and about how to employ, monitor, and evaluate this strategy"

(Kistner et al., 2010, p. 159).

Educators' use of these strategies has not only led to better student academic

outcomes but also the development of self-regulation skills among the students

themselves. Dignath and Büttner's (2008) meta-analysis found that strategy use among secondary students was positively associated with the use of SRL instructional practices by their instructor ($R^2 = 0.59$). Larger effect sizes were found for student strategy use when they were instructed by a researcher rather than by regular teachers ($\beta = 0.64$), which suggests that teachers may have had inadequate or insufficient training and propose further research into teacher training programs.

Conversely, students who do not demonstrate self-regulated learning strategies tend to have a lower academic achievement. McClintic-Gilbert, Corpus, Worthington and Haimovitz (2013) studied the relationship of middle school students' achievements and their use of learning strategies. The authors found that the use of superficial learning strategies was negatively correlated to GPA ($r = -.49$, $p < .01$). In the same study, however, intrinsic motivation to learn was found to be a strong predictor of conceptually rich learning strategies or self-regulated strategy use ($\beta = .72$, $p < .001$).

In a later study, Dignath and Büttner (2018) found that primary school teachers provided learning environments that were more conducive to developing self-regulation skills than secondary school teachers. Specifically, the researchers found that secondary teachers exhibited a highly teacher-directed style of teaching, which left few opportunities for students to activate prior knowledge, engage in activities in which students could transfer their knowledge to real-life contexts, or take an active role in their learning. Similarly, Kistner et al. (2010) examined the components of the classroom that would afford students opportunities for self-regulated learning, such as constructivist learning, student self-direction, cooperative learning, and student transfer of knowledge

into real-life context. Results of the study showed that a supportive learning environment was strongly related to students' improvement in mathematical knowledge and skills.

While this literature shows that teaching SRL skills can benefit students academically, it also shows that teachers' usage varies. Specifically, it suggests variation in teachers' use of practices may be linked to subject-area and training (Dignath & Büttner, 2008). The next section explores evidence on how teacher training in SRL practices affects their use of those practices.

Teaching Self-Regulation and Teacher Training

Teachers tend to instruct based on prior beliefs, attitudes, and skills developed from their pre-service training (Dignath & Büttner, 2008; Butler, Lauscher, Jarvis-Selinger & Beckingham, 2004). The beliefs and practices of a pre-service teacher are typically developed first by observation of a full practicing teacher and then through taking on partial roles in a classroom. Over time, the inherent teaching style of the pre-service teacher, which includes construct knowledge, beliefs, attitudes, and skill, becomes shaped by the cultural and social mores of their placement (Butler et al., 2004). Cetin (2017) suggests that teacher candidates may be more focused on their own personal test performance needed for graduation rather than on engaging in reflective thought on their own learning, an important process needed for pre-service teachers to develop SRL pedagogical practices.

Even though research supports the significance of teaching self-regulated learning to students, there is less evidence to support that teachers have an explicit understanding of metacognition and, even if they do, how this understanding is then incorporated in pedagogical practices. Wilson and Bai (2008) explore the variations of teachers'

knowledge of metacognition in a study of 100 pre-service education students. Their mixed-method examination delineates the need for teachers to possess declarative knowledge (informing students about metacognition), conditional knowledge (instructing students how, why and when to use such strategies), and procedural knowledge (providing assignments that help students gain SRL skills) of metacognition before substantial changes to pedagogical practices of self-regulated learning can take place. Wilson and Bai (2008) found that teachers not only need to know that teaching metacognition is important but the conditions in which students should employ SRL skills and provide assignments in which students are asked to engage in SRL is also important. In support of this, results from their study showed teachers' conditional knowledge could significantly predict procedural knowledge ($y = .10$) of metacognition and significantly predict teachers' pedagogical knowledge as well ($y = .44$). On the other hand, a weak correlation was found between pedagogical practices and declarative knowledge of SRL ($y = .11$).

As noted above, Dignath and Büttner (2008) concluded that when teachers used SRL strategies in the classroom, the overall academic performance of their students improved. However, the effect size for overall academic performance was higher when the intervention was conducted by the researchers rather than by regular teachers. They suggested this difference was due to the researchers having training on SRL skills, whereas the teachers lacked "an overall instructional plan, the required preparation time for strategy instruction, support with implementing strategy instruction, as well as the necessary skills that teachers and managers need for effective implementation of those strategies" (Dignath & Büttner, 2008, p. 256). They concluded that teachers require

extensive training when preparing to use SRL practices in the classroom and that "the low effect of interventions conducted by teachers might be a consequence of inadequate or insufficient teacher training" (p. 256). Furthermore, the researchers indicate that today's educators are not implementing research findings into practice and that educators instructing the teacher should also have training that provides usable SRL tools for teachers (Wilson & Bai, 2010).

Butler, Lauscher, Jarvis-Selinger, and Beckingham (2004) examine the effects of collaborative communities of practice using strategic content learning strategies to promote self-regulated learning in both teachers and students. In the first year of the study, researchers and teachers engaged in collaborative efforts to introduce self-regulated learning strategies in their secondary classrooms. Initial professional activities included an introduction to these techniques followed by researchers modeling the techniques in the classroom. Case study data for all students included pre-test and post-test questionnaires that assessed students' perceptions about their learning as well as teachers' reflections on their interventions and their students' performance. The data results suggested that at the end of the first year, both the students and the teachers were thinking actively about their learning, which is an important factor in academic self-regulation.

Further findings indicated that these skills were sustained over the second year even after the support and modeling of the researchers faded. Teachers developed goals, constructed instructional strategies, reflected on their practices, and reported meaningful changes in their pedagogical practices based on the professional development and strategy implementation. Butler et al. (2004) further noted that all teachers identified

positive outcomes for the students. These positive changes included "improved confidence, understanding of task demands, strategies for learning, self-awareness, and self-direction, independence, responsibility, and/or control over their own learning process" (Butler et al., 2004, p. 450). The study by Butler et. al. (2004) provides support for the need for extensive collaborative training for the teacher to develop their own self-regulated abilities and reflection on their teaching practices. In turn, teachers use these practices to develop self-regulated strategies in their students.

Based on the assumption that teachers instruct based on pre-service experiences (Dignath & Büttner, 2008; Butler et al., 2004), these experiences must be enhanced so that strategies that promote self-regulation abilities become internalized and embedded in pedagogical practices (Schunk, 2008). It is strongly suggested that additional teacher training for those that train pre-service teachers should be investigated (Dignath & Büttner, 2008). Professional training for teachers educating pre-service teachers should be based on recent research and highlight shifts in pedagogical research-based best practices (Butler, Lauscher, Jarvis-Selinger, and Beckingham, 2004).

Conclusion

In sum, evidence of a positive relationship between teaching self-regulation with both academic outcomes and students' self-regulation skills has led to a push for educators to utilize these practices in daily instructional activities. However, teachers need to have pre-service training or professional development to effectively employ pedagogical practices that promote academic self-regulation in their students. Not enough is known about classroom teacher strategies for promoting SRL in the regular classroom (Dignath & Büttner, 2018). This study will explore teacher implementation of SRL

strategies in the middle school grades as well as factors related to that implementation. Specifically, it will provide further evidence of whether existing training is sufficient to help teachers use SRL strategies in their classrooms, how the use of SRL strategies and availability of SRL training vary, and whether other factors (such as subject-area, race/ethnicity and experience) are explicitly associated with the use of SRL strategies.

CHAPTER 3

Methods

The purpose of this study was to examine middle school teachers' use of pedagogical practices that related to the development of student self-regulation skills. Specifically, survey data was collected and quantitative analyses were used to investigate whether professional development, pre-service training, subject taught, ethnicity/race, and years of experience were associated with the use of pedagogical practices that promoted SRL in students. The details of the data collection, sample, and methods used in this study are included in this chapter.

Research Questions and Hypotheses

This study addressed four research questions. These questions, along with their statistical testing hypotheses, are detailed below.

Research Question 1. What types of self-regulatory building practices are middle school grade level teachers using? Are certain types of self-regulatory building practices being employed more than others?

H_0: There is no significant relationship between the mean Phase 1, 2, 3, and 4 scores, $\rho = 0$, for all pairs of Phases (e.g., Phase 1 and Phase 2, Phase 2 and Phase 3, etc.).

H_1: There is a significant relationship between the mean Phase 1, 2, 3, and 4 scores, $\rho \neq 0$, for at least one pair of Phases.

Research Question 2. Does the use of self-regulatory building practices vary between those who have and have not had professional development on SRL?

H_0: There is no significant difference in the mean scores for Phase 1, Phase 2,

Phase 3, Phase 4, and Overall between teachers who have had professional

development on SRL and teachers who have not had professional development on

SRL, $\mu_{PD} = \mu_{NPD}$ for all Phases and the Overall Score.

H_1: There is a significant difference in the mean scores for Phase 1, Phase 2,

Phase 3, Phase 4, and Overall between teachers who have had professional

development on SRL and teachers who have not had professional development on

SRL, $\mu_{PD} \neq \mu_{NPD}$ for all Phases and the Overall Score.

Research Question 3. Does the use of self-regulatory building practices vary by

participation in pre-service training that included SRL? Does the use of SRL building

practices vary by the amount of pre-service training received?

H_0: There is no significant difference in the mean scores for Phase 1, Phase 2,

Phase 3, Phase 4, and Overall between teachers who had pre-service training on

SRL and teachers who have not had pre-service training on SRL, $\mu_{PS} = \mu_{NPS}$ for

all Phases and the Overall Score.

H_1: There is a significant difference in the mean scores for Phase 1, Phase 2,

Phase 3, Phase 4, and Overall between teachers who have had pre-service training

on SRL and teachers who have not had pre-service training on SRL, $\mu_{PS} \neq \mu_{NPS}$

for all Phases and the Overall Score.

H_0: There is no significant difference in the mean scores for Phase 1, Phase 2,

Phase 3, Phase 4, and Overall between teachers who received none, rarely,

occasionally or often pre-service training, $\sigma_\mu^2 = 0$ for all Phases and the Overall

Score.

H_1: There is a significant difference in the mean scores for Phase 1, Phase 2,

Phase 3, Phase 4, and Overall between teachers who received none, rarely,

occasionally or often pre-service training, $\sigma_\mu^2 > 0$ for all Phases and the Overall

Score.

Research Question 4. Does the use of these types of self-regulatory building

practices vary by race/ethnicity, amount of pre-service training, hours of professional

development, years of teaching, or subject matter?

H_0: The use of Phase 1, Phase 2, Phase 3, Phase 4, and Overall SRL building

practices is not associated with race/ethnicity, amount of pre-service training,

hours of professional development, years teaching or subject matter, $R^2 = 0$.

H_1: The use of Phase 1, Phase 2, Phase 3, Phase 4, and Overall SRL building

practices is associated with race/ethnicity, amount of pre-service training, hours of

professional development, years teaching or subject matter, $R^2 > 0$.

Research Design

A cross-sectional survey research design was used for this study to collect data on

the characteristics and the current SRL practices of teachers. Quantitative analyses were

conducted to compare, predict, and identify correlational relationships between the

dependent and independent variables.

Reliability and Validity of the Study Design

Cross-sectional survey research provides data from a sample population at a

single point in time and is useful in examining the associations between the many

variables presented in the present study. However, this research design is correlational

and, therefore, cause and effect relationships cannot be made. Furthermore, all

associations found herein should be interpreted with caution as there are potential confounding variables that were not explored in the study, such as the quality of the training programs, state mandates, variations in curriculum, and size of schools. This correlational study, however, can offer preliminary data on patterns of SRL pedagogy and offers a basis for future research.

Recruitment and Data Collection

The population of interest was middle school (7th and 8th grade) teachers in the United States. The survey was posted to professional and private online networking groups on Facebook in which group members were primarily middle school teachers. One private group with middle school educators comprising the general membership and four private groups that represented middle school teachers engaged in various content areas were chosen as an adequate sampling pool.

The researcher was an approved member of these groups and, although moderated, was permitted to request other group members to participate in the survey. The researcher posted the survey to the following professional social networking groups:

1. Middle School Mania: a private group of approximately 2,000 members

2. ELA in the Middle School: a private group of approximately 14,000 members

3. Middle School Math Teachers: a private group of approximately 19,000 members

4. Middle School Science Teachers: a private group of approximately 13,000 members

5. Middle School Social Studies Teachers: a private group of approximately 9,000 members

A minimum sample of 250 7th and 8th grade teachers was targeted for the study. Although the membership of the subscribed Facebook groups included primarily middle school teachers, these sources were not exclusive to 7th and 8th grade teachers. Therefore, the posted survey asked the participants to identify which grade level they were currently teaching to ensure all the respondents were in the targeted population.

All data was collected via an online survey using Survey Monkey. The posts used to recruit participants included a short overview of the study, an estimate of the anticipated completion time, and notification that the participant can opt-in to enter a lottery for a gift card after completion of the survey (see Appendix B).

On the first page of the survey, participants were asked for their informed consent. Only those participants that gave informed consent were allowed access to complete the survey. There were no known risks to participating and all participants' responses remained anonymous and confidential. Survey Monkey was not set to record any participant's identifying information, including IP addresses, and no items on the survey requested any personally identifying information.

After completing the survey, participants had the option to enter a lottery to win a $100 VISA gift card. To do so, they provided their email address, which was collected in a separate form and not linked or associated with the survey data in any way. The data was only used to contact the raffle winner once the data had been compiled. The winner was picked using a random number generator and was emailed the gift card within 48 hours of the close of the survey. No emails were kept or stored after the gift card was disseminated.

SRL Survey Instrument

The survey (Appendix B) was composed of two parts: (1) demographic information and (2) SRL survey instrument. The first part collected the demographic information used in the study. These items included the participant's race/ethnicity, grade level taught, years teaching, and subject taught. In addition, the participants were asked to rate their experiences with professional development and pre-service training on SRL.

The second part, the SRL survey, was developed by Huh and Reigeluth (2018) to measure teachers' perceptions of the importance of SRL practices and to quantify the frequency of using these practices in an online class. Permission from the researchers to use this study can be found in Appendix B. The SRL survey consisted of 25 questions that asked participants to rate their responses on a 5-point Likert scale with a "1" being Never; "2" being Sometimes; "3" being Often; "4" being Almost Always; and "5" being Always.

This survey was based on Pintrich's (2004) conceptual framework of self-regulated learning and incorporated four phases of self-regulation (forethought, planning & activation; monitoring; control; and reaction/reflection) and four areas of regulation (cognition; motivation/affect; behavior and context). Phase 1 assessed their application of techniques to help their students build academic self-regulation in the areas of forethought, planning, and activation of prior knowledge. Phase 2 assessed their usage of strategies to improve academic self-regulation skills, such as self-monitoring. Phase 3 assessed teachers' use of strategies that encouraged student control over their environment, motivation, and use of their own strategies for learning. Phase 4 assessed teachers' use of strategies to promote reflection and reaction in their students. An overall

score was computed as the combined phase scores, with higher scores indicating more use of practices that build SRL skills.

Reliability and Validity of Survey Instrument

Huh and Reigeluth (2018) tested face validity of the survey through expert review of the survey items. Five experts in the field of SRL reviewed the survey, and their suggested modifications to the questions were made. Pilot testing of the survey was then conducted to a small subset of the researchers' sample, and revisions were made each time the pilot test was conducted. No further validity or reliability information was available at the time of the study.

Data and Variables

The independent variables collected from the survey instrument are shown in Table 2. The dependent variables were constructed as composites (averages) of the corresponding survey items. The dependent variables collected from the survey instrument are shown in Table 3.

Table 2

Independent Variables from SRL Survey Demographic Questions

Independent Variables	Coding / Scale	Description
SRL Pre-service Training	0=yes 1=no	Exposure to pre-service training for developing SRL
SRL Pre-service Training Exposure	Never Rarely Occasionally Often	Reported exposure to pre-service training in SRL
SRL Professional Development	0=yes 1=no	Exposure to PD for developing SRL
Hours of SRL PD	0=1-5 1=6-10 2=11-15 3=16+	Hours of professional development received on SRL
Subject Taught	0=English/ELA 1=Math 2=Science 3=Social Studies 4=Other	Content area presently teaching
Years Teaching	0=0-5 years 1=5-10 years 2=10-15 years 3=16 + years	Years of teaching experience
Ethnicity: Hispanic, Latino or Spanish Origin	0=No 1=Yes	Reported ethnicity
Race	1=White or Caucasian 2=Black or African American 3=Hispanic or Latino 4=Asian or Asian American 5=American Indian or Alaska Native 6=Native Hawaiian or Other Pacific Islander 7=Other Race	Reported race

Table 3

Dependent Variables Constructed from SRL Survey Items

DV	Coding / Scale	Description
SRL Practices: Phase 1	Average of 5-point Likert type scale items: 1 = Never and 5 = Always	Forethought, planning, and activation Survey items: 10-19
SRL Practices: Phase 2	Average of 5-point Likert type scale items: 1 = Never and 5 = Always	Monitoring Survey items: 20-23
SRL Practices: Phase 3	Average of 5-point Likert type scale items: 1 = Never and 5 = Always	Control Survey items: 24-29
SRL Practices: Phase 4	Average of 5-point Likert type scale items: 1 = Never and 5 = Always	Reaction and reflection Survey items: 30-34
SRL Practices: Overall	Average of 5-point Likert type scale items: 1 = Never and 5 = Always	Overall SRL Practices: a composite of all SRL survey items: 10-34

Sample Statistics

Overall, there were 434 participants who responded to the survey. Data cleaning included removing participants that were not middle school teachers and the removal of incomplete responses. A total of 244 survey responses were used in the final data analyses. Based on the original power analyses that identify 250 participants as the goal, this sample size was deemed sufficient for the analysis. See Table 4 for descriptive statistics of the sample.

Descriptive analyses of teacher characteristics indicated that nearly 92% of all respondents were White/Caucasian. The remaining teachers were: 3% Black/African American; 3% Hispanic/Latino; 1% Asian/Asian American, and approximately 1% reported being American Indian, Alaska Native or another race. Most respondents reported teaching 16 years or more (43.4%).

The percentage of respondents teaching 0-5 years was 20.9%; 5-10 years was 19.3%, and 10-15 years was 16.4%. Teachers who reported teaching Mathematics represented 39.8% of the respondents; 25% reported teaching English/ELA; 20.1% reported teaching Social Studies; 12.3% reported teaching Science; and less than 3% reported teaching other subjects. Included in the "other subjects" were STEAM, gifted/talented, computer application, emotional support, world languages, special education, and those teaching all subject areas. There were only seven respondents who reported they taught "other" subjects.

Table 4

Teacher Characteristics

		Frequency	Percent
Race			
	White or Caucasian	224	91.8
	Black or African American	7	2.9
	Hispanic or Latino	7	2.9
	Asian or Asian American	3	1.2
	American Indian or Alaska Native	1	0.4
	Another race	2	0.8
Experience			
	0-5 years	51	20.9
	5-10 years	47	19.3
	10-15 years	40	16.4
	16+ years	106	43.4
Subject Taught			
	English/ELA	61	25
	Math	97	39.8
	Science	30	12.3
	Social studies	49	20.1
	Other	7	2.9

Participants were also asked to include the hours of professional development they had received on SRL building practices during the 2018-2019 school year. Over 65% of the participants indicated that they had not received any professional development on SRL practices. Approximately 23% indicated they had received 1-5 hours, 8% had received 6-10 hours, 2% had received 11-15 hours, and a little over 1% had received 16 or more hours of professional training on SRL. See Table 5 below.

Table 5

Frequency Distribution by Hours of Professional Development

	Frequency	Percent
0 hours	160	65.6
1-5 hours	57	23.4
6-10 hours	20	8.2
11-15 hours	4	1.6
16 or more hours	3	1.2

Note. All teachers reporting "no professional development" were assigned zero hours of professional development.

Finally, respondents were asked to report if they had any pre-service training on SRL building practices and the frequencies are noted in Table 6 below. If they responded yes, they provided how much exposure they had by indicating rarely, occasionally, or often. Of the 244 participants, 60.2% indicated that they had no pre-service training on SRL practices. Of the approximately 40% of the sample that reported SRL pre-service training, 6.6% reported having rarely received SRL training, 23.4% reported occasional training, and 9.8% reported having often training.

Table 6

Frequency of Pre-service Training Exposure Levels

	Frequency	Percent	Valid Percent	Cumulative Percent
No Pre-service	147	60.2	60.2	60.2
Rarely	16	6.6	6.6	66.8
Occasionally	57	23.4	23.4	90.2
Often	24	9.8	9.8	100.0
Total	244	100.0	100.0	

Note. Teachers reporting any amount greater than "no pre-service training" were included as having at least some pre-service training.

Data Analysis

Research Question 1

To understand what types of SRL-building practices middle school teachers were using, descriptive statistics were estimated for the sample. These provide insight into the frequency of use of these types of practices. Correlations were then estimated to understand how the use of practices that build Phase 1, Phase 2, Phase 3, and Phase 4 skills are related to one another; for example, whether teachers who tend to use more Phase 1 practices also tend to use more Phase 2 practices, and so on. The significance of these correlations was evaluated.

Research Question 2

To understand whether the use of self-regulatory building practices differed between those who had and not had professional development on SRL, five independent *t*-tests were conducted. The dependent variables in these *t*-tests were mean scores for

Phase 1, Phase 2, Phase 3, Phase 4 and Overall SRL. The independent variable was whether teachers reported having any professional development in SRL or had no SRL professional development.

Research Question 3

To understand whether the use of self-regulatory building practices differed between teachers who had and not had pre-service training that included SRL, five independent t-tests were conducted. The dependent variables in these t-tests were mean scores for Phase 1, Phase 2, Phase 3, Phase 4 and Overall SRL. The independent variable was the indicator of whether teachers reported having any pre-service training in SRL or had no SRL pre-service training.

Additionally, a one-way between subjects' analysis of variance (ANOVA) was completed to examine the Phase 1, Phase 2, Phase 3, Phase 4, and Overall mean score differences of those teachers who reported having pre-service SRL training at various exposure levels. Participants were asked to report their level of pre-service exposure of either: none, rarely, occasionally, or often. The mean SRL scores for these four groups were compared.

Research Question 4

To understand whether the use of these types of self-regulatory building practices can be predicted by the number of hours of professional development in SRL building practices, the level of pre-service training exposure in SRL building practices, the years of teaching, ethnicity/race, subject matter taught, a series of five multiple regressions were estimated. The dependent variables in these regressions were mean scores for

Phase 1, Phase 2, Phase 3, Phase 4 and Overall SRL. An example regression is shown below:

$$srl_i = \beta_0 + XB + e_i$$

srl_i is the SRL outcome (Phase 1, Phase 2, Phase 3, Phase 4, Overall) for teacher $i;$ and **X** is a vector of covariates. These covariates included hours of SRL professional development, exposure to pre-service training, years of teaching, ethnicity/race, and subject matter taught.

Conclusion

The results of these analyses are discussed in the following chapter. As noted earlier, the data has been obtained from a survey research design and thus all results are correlational. No causal effects can be assumed from the data. Although no inferences can be made with regard to whether a specific professional development or pre-service program is effective at increasing teachers' use of SRL building practices, these results can provide insight into the trends and patterns of use of SRL practices and the factors that are related to their use in a national, albeit non-representative sample.

CHAPTER 4

Results

      This chapter summarizes the results of the analyses by research question. The sample studied included 244 middle school teachers who teach in 7th and/or 8th grade and who completed the survey on academic self-regulation building practices. In the survey, teachers were asked to provide their demographic information, exposure to pre-service and professional development that included self-regulatory building practices and reported usage of the various self-regulatory building practices.

      The practices were divided into four phases, analyzed separately and together, in this section. Respondents were asked to rate their actual practice in each SRL phase using a Likert scale (1 = Never; 2 = Sometimes; 3 = Often; 4 = Almost Always; and 5 = Always). Phase 1 assessed their application of techniques to help their students build academic self-regulation in the areas of forethought, planning, and activation of prior knowledge. Phase 2 assessed their usage of strategies to improve academic self-regulation skills, such as self-monitoring. Phase 3 assessed teachers' use of strategies that encouraged student control over their environment, motivation, and use of their own strategies for learning. Phase 4 assessed teachers' use of strategies to promote reflection and reaction in their students. An overall score was computed as the combined phase scores, with higher scores indicating more use of practices that build SRL skills.

Research Question 1

      The mean and standard deviations of Phase 1, Phase 2, Phase 3, and Phase 4 mean scores were examined to understand teachers' level of use of these SRL practices and are reported in Table 7 below. The mean scores and standard deviations were similar for

each phase indicating that, on average, respondents use of SRL practices in their classroom falls between "sometimes" to "often" regardless of phase. There is substantial variability, however, in reported use, with standard deviations of 0.76 to 0.88 depending on the phase. Overall, this suggests that teachers are, on average, using SRL practices in their classroom; however, this varies substantially in the same from ones who never use SRL practices to those who use them all the time.

Table 7

Descriptive Statistics of Phase Means and Overall Composite Mean

	Phase 1	Phase 2	Phase 3	Phase 4	Overall
Mean	2.63	2.66	2.61	2.44	2.58
Median	2.60	2.50	2.50	2.40	2.51
Mode	2.40	2.00	2.33	2.00	2.00
SD	0.78	0.88	0.77	0.86	0.76
Minimum	1.00	1.00	1.00	1.00	1.08
Maximum	5.00	5.00	5.00	5.00	5.00

Note. Sample size is 244 for all variables. SD = Standard Deviation.

Pearson correlations were used to estimate the relationship between the types of teacher SRL building practices as measured by their mean scores on Phase 1, Phase 2, Phase 3, and Phase 4 questions. Prior to estimating the correlations, histograms for the mean scores on each phase were analyzed for normality. A scatterplot for each pair of phases was examined to ensure linearity and homoscedasticity of the association. All assumptions for normality, linearity, and homoscedasticity were determined to be met. Overall, the results indicated that teacher usage of any one phase of academic self-

regulation building practice was significantly and positively related to the use of all other

phases of SRL building practices. Between any two phases, the correlations were

approximately the same magnitude (.78 to .82). In other words, teachers who tend to use

any one SRL practice are likely to also use another SRL practice, regardless of phase

(forethought, planning and activation, monitoring, control, and reaction/reflection). The

highest correlation was observed between Phase 1 and Phase 2 scores, $r(242) = .82$, $p <$

.001, and the lowest correlations between Phase 1 and Phase 3 scores, $r(242) = .79$, $p <$

.001, and Phase 2 and Phase 3 scores, $r(242) = .79$, $p < .001$. All correlations are shown

in Table 8.

Table 8

Correlations Among SRL Phase Mean Scores

	Phase 1	Phase2	Phase 3	Phase 4
Phase 1	1	0.82***	0.79***	0.80***
Phase 2		1	0.79***	0.81***
Phase 3			1	0.80***
Phase 4				1

Note. ***$p<$.001. The sample size for all correlations is 244.

Research Question 2

To analyze the effect of professional development on the use of SRL building

practices in the classroom, five independent *t*-tests were performed to compare the mean

scores of academic self-regulation building practices as measured by Phase 1, Phase 2,

Phase 3, Phase 4, and Overall Phase scores between those who received SRL professional

development and those who did not. The mean scores and standard deviations are noted in Table 9. Prior to the conducting the t-test, the assumptions were evaluated. The Shapiro-Wilk Test of Normality was used to assess whether normality assumption was met. The test was failed ($p < .05$) for the group with no professional development for all phases and the professional development group for Phase 4. The histograms, however, showed the data to be mostly normal with only a slight positively skew in each of these cases. The assumption of homogeneity of variances were met for both groups in all phases ($p > .05$).

Table 10 below shows the full *t*-test results. Teachers who received professional development used Phase 1 strategies of developing forethought and planning and activation in their students ($M = 2.82$, $SD = 0.80$) significantly more than did teachers who had no professional development ($M = 2.53$, $SD = 0.75$), $MD = 0.29$, $t(242) = 2.82$, $p = .001$; $d = .38$. Similarly, those in the professional development group reported using significantly more Phase 2 strategies of building self-monitoring skills ($M = 2.87$, $SD = .083$) than teachers who were not in the group that had professional development ($M = 2.54$, $SD = 0.88$), $MD = 0.33$, $t(242) = 2.79$, $p = .001$; $d = .38$. Compared to those who reported no professional development in SRL, teachers who had professional development in SRL practices reported using significantly more Phase 3 self-regulation building practices of developing students' control over their own learning, motivation and environment, $MD = 0.32$, $t(242) = 3.17$, $p = .000$; $d = .43$ and Phase 4 strategies of building SRL student strategies in reaction and reflection, $MD = 0.27$, $t(242) = 2.33$, $p = .02$; $d = .31$.

Table 9

Distributions of Phase and Total Scores by Professional Development Group

		Descriptive Statistics			Shapiro-Wilk Test of Normality	
		N	Mean	SD	Statistic	p-value
Phase 1	PD	84	2.82	0.80	0.99	0.46
	No PD	160	2.53	0.75	0.97	0.00
Phase 2	PD	84	2.87	0.83	0.97	0.08
	No PD	160	2.54	0.88	0.96	0.00
Phase 3	PD	84	2.82	0.80	0.99	0.50
	No PD	160	2.49	0.73	0.95	0.00
Phase 4	PD	84	2.62	0.90	0.96	0.02
	No PD	160	2.35	0.83	0.94	0.00
Overall	PD	84	2.78	0.77	0.98	0.24
	No PD	160	2.48	0.73	0.96	0.00

Note. PD = Received professional development; No PD = received no professional development.

Table 10

t-test Results Comparing Mean Outcomes by Professional Development

	Mean Difference	df	t	p
Phase 1	0.29	242	2.82	0.01
Phase 2	0.33	242	2.79	0.01
Phase 3	0.32	242	3.17	0.00
Phase 4	0.27	242	2.33	0.02
Overall	0.30	242	3.00	0.00

Note. For all *t*-tests, the Levene's test of homogeneity of variances was met. For Phase 1, $F(1,242) = 0.37$, $p = 0.54$. For Phase 2, $F(1,242) = 0.55$, $p = 0.46$. For Phase 3, $F(1,242) = 1.12$, $p = 0.48$. For Phase 4, $F(1,242) = 0.49$, $p = 0.48$. For Overall Mean, $F(1,242) = 0.23$, $p = 0.63$.

Overall phase scores were significantly higher for teachers who reported having professional development ($M = 2.78$, $SD = 0.77$) than for those teachers who had no professional development ($M = 2.48$, $SD = 0.73$), $MD = 0.30$, $t(242) = 3.00$, $p = .000$; $d = .40$. In other words, teachers who reported having professional development used significantly more SRL building practices in their classrooms than those teachers who have had no training in this area. Based on Cohen's (1988) convention, these effect sizes are considered small ($d = 0.2$-0.5). Important to note, however, is that this comparison does not control for how much professional development a teacher received, nor does it control for the quality of that professional development. If these factors were included, it is possible that these effects would be larger.

Research Question 3

To examine the exposure of pre-service training on the use of SRL building practices among middle school teachers, five independent *t*-tests were performed to compare the differences in mean scores of Phase 1, Phase 2, Phase 3, Phase 4 and Overall scores between teachers who had pre-service training and teachers who reported having no pre-service training in SRL practices. The means and standard deviations are shown in Table 11. Prior to conducting the *t*-tests, the assumptions were evaluated. Levene's tests of homogeneity of variances were checked and satisfied for each phase. The Shapiro-Wilk Test of Normality was used to assess whether the normality assumption was met. The test was failed ($p < .05$) for the no pre-service training group for all phases and pre-service training group for Phase 2 and Phase 4. The histograms, however, showed the data to be sufficiently normal with only a slight positively skew in each of these cases.

The difference in mean Phase 1 scores between teachers who reported having pre-service training and those who did not was found to be non-significant, $t(242) = 1.82$, $p > .05$. The analysis of Phase 2 scores indicates that teachers who had pre-service training ($M = 2.80$, $SD = 0.85$) utilized SRL strategies of monitoring more than the group of middle school teachers who had no pre-service training ($M = 2.56$, $SD = 0.88$), $t(242) = 2.09$, $p = .04$; $d = .24$. The pre-service group also had significantly higher Phase 3 ($M = 2.81$, $SD = 0.77$), $t(242) = 3.46$, $p = .000$; $d = .45$ and Phase 4 scores ($M = 2.60$, $SD = 0.86$), $t(242) = 2.34$, $p = .02$; $d = .31$, indicating that teachers in this group use more strategies to build student control and reaction/reflection than the comparison group.

Table 11

Distributions of Phase and Total Scores by Pre-service Group

		Descriptive Statistics			Shapiro-Wilk Test of Normality	
		N	*Mean*	*SD*	*Statistic*	*p-value*
Phase 1	No PS	147	2.56	0.80	0.96	0.00
	PS	97	2.74	0.74	0.98	0.15
Phase 2	No PS	147	2.56	0.88	0.96	0.00
	PS	97	2.80	0.85	0.97	0.03
Phase 3	No PS	147	2.47	0.74	0.95	0.00
	PS	97	2.81	0.77	0.99	0.42
Phase 4	No PS	147	2.34	0.86	0.95	0.00
	PS	97	2.60	0.86	0.95	0.00
Overall	No PS	147	2.48	0.76	0.96	0.00
	PS	97	2.74	0.74	0.98	0.11

Note. PS = Received pre-service training; No PS = received no pre-service training.

Overall scores (*M* = 2.74, *SD* = 0.74) were also significantly higher for the middle school teachers who reported having pre-service training in SRL practices, $t(242) = 2.61$, $p = .01$; $d = 0.34$. Although the effect sizes are small according to Cohen's (1988) convention, results indicate that teachers who have had pre-service training report using significantly more SRL building practices in their classroom with regard to developing student monitoring, control, and reaction/reflection. See Table 12. Again, these analyses do not control for either the amount or quality of the pre-service training. As such, these

effects may be an underestimate of the connection between pre-service training and use of SRL practices.

Table 12

t-tests Comparing Mean Outcomes by Pre-service Training

	Mean Difference	df	t	Sig.
Phase 1	0.19	242	1.82	0.07
Phase 2	0.24	242	2.09	0.04
Phase 3	0.34	242	3.46	0.00
Phase 4	0.26	242	2.34	0.02
Overall	0.26	242	2.61	0.01

Note. For all *t*-tests, the Levene's test of homogeneity of variances was met. For Phase 1, $F(1,242) = 1.23$, $p = 0.27$. For Phase 2, $F(1,242) = 0.06$, $p = 0.81$. For Phase 3, $F(1,242) = 0.55$, $p = 0.46$. For Phase 4, $F(1,242) = 0.01$, $p = 0.92$. For Overall Mean, $F(1,242) = 0.05$, $p = 0.82$.

To compare the effect of the amount of exposure of pre-service training on the delivery of various SRL building practices in the classroom, a one-way between-subjects ANOVA was conducted. Results of these analyses are seen in Tables 13 and 14 below. Phase 1, Phase 2, Phase 3, Phase 4, and Overall score means were analyzed and compared by the pre-service training exposure reported by the participant. Pre-service rating amounts included never, rarely, occasionally, and often. The assumption of normality was not met with $p < .05$ on the Shapiro-Wilk Test for the no pre-service group

and occasionally pre-service group for all phases. The assumption for normality was also

not met with $p < .05$ for the Phase 2 scores in the pre-service group receiving training

often. The histograms, however, showed a slightly positive skew and the data to be

sufficiently normal to proceed with analysis. The Levene's Tests of Homogeneity of

Variances were conducted, and assumptions of homogeneity were met for each group.

Table 13

Distribution of Phase and Total Scores by Pre-service Exposure Levels

		Descriptive Statistics			Shapiro-Wilk Test of Normality	
		N	Mean	SD	Statistic	p-value
Phase 1	No PS	147	2.56	0.8	0.96	0.00
	Rarely	16	2.53	0.69	0.97	0.81
	Occasionally	57	2.63	0.7	0.95	0.03
	Often	24	3.14	0.72	0.98	0.81
Phase 2	No PS	147	2.56	0.88	0.96	0.00
	Rarely	16	2.58	0.67	0.94	0.31
	Occasionally	57	2.66	0.86	0.95	0.02
	Often	24	3.28	0.78	0.89	0.02
Phase 3	No PS	147	2.47	0.74	0.95	0.00
	Rarely	16	2.67	0.73	0.95	0.46
	Occasionally	57	2.62	0.69	0.96	0.05
	Often	24	3.35	0.74	0.95	0.29
Phase 4	No PS	147	2.34	0.86	0.95	0.00
	Rarely	16	2.4	0.68	0.96	0.58
	Occasionally	57	2.42	0.76	0.94	0.01
	Often	24	3.15	0.97	0.97	0.55
Overall	No PS	147	2.48	0.76	0.96	0.00
	Rarely	16	2.54	0.61	0.98	0.98
	Occasionally	57	2.58	0.7	0.95	0.02
	Often	24	3.23	0.71	0.97	0.66

Table 14

One-way ANOVA Comparing Phase Scores and Levels of Pre-Service Training

		Sum of Squares	df	Mean Square	F	Sig.
Phase 1	Between Groups	7.18	3	2.39	4.09	0.01
	Within Groups	140.62	240	0.59		
	Total	147.8	243			
Phase 2	Between Groups	10.8	3	3.60	4.92	0.00
	Within Groups	175.66	240	0.73		
	Total	186.46	243			
Phase 3	Between Groups	16.21	3	5.40	10.15	0.00
	Within Groups	127.7	240	0.53		
	Total	143.9	243			
Phase 4	Between Groups	13.73	3	4.58	6.54	0.00
	Within Groups	167.91	240	0.70		
	Total	181.65	243			
Overall	Between Groups	11.63	3	3.88	7.25	0.00
	Within Groups	128.4	240	0.54		

Note. For all *t*-tests, the Levene's test of homogeneity of variances was met. For Phase 1, $F(3, 240) = 0.86$, $p = 0.46$. For Phase 2, $F(3, 240) = 0.74$, $p = 0.53$. For Phase 3, $F(3, 240) = 0.14$, $p = 0.94$. For Phase 4, $F(3, 240) = 1.61$, $p = 0.19$. For Overall Mean, $F(3, 240) = 0.59$, $p = 0.63$.

There was significant variation in the means between the groups with different amounts of pre-service training on usage of Phase 1 strategies, $F(3, 240) = 4.09$, $p = .01$. Post hoc comparisons using the Tukey HSD test indicated that the mean score for the often condition ($M = 3.14$, $SD = 0.72$) was significantly different than the never condition ($M = 2.56$, $SD = 0.80$). There was also a significant mean score difference between the often condition and the occasionally condition ($M = 2.63$, $SD = 0.72$). However, the rarely condition ($M = 2.53$, $SD = 0.69$) did not significantly differ from the never, occasionally, or often conditions. While the rarely condition did not significantly differ from the often condition, the small sample size in the rarely group (n = 16) most likely contributed to an underpowered test. These results suggest that having been often exposed to pre-service training, teachers use more SRL building strategies in the area of forethought and planning and activation.

There was significant variation in the means between the groups with different amounts of pre-service training on usage of Phase 2 strategies, $F(3, 240) = 4.92$, $p = .000$. Post hoc comparisons using the Tukey HSD test indicated that the mean score for the often condition ($M = 3.28$, $SD = 0.78$) was significantly different than the never condition ($M = 2.56$, $SD = 0.88$), the rarely condition ($M = 2.58$, $SD = 0.67$), and the occasionally condition ($M = 2.66$, $SD = 0.86$). These results suggest that having been often exposed to pre-service training, teachers use more SRL building strategies in the area of monitoring in their classroom practice.

There was significant variation in the means between the groups with different amounts of pre-service training on usage of Phase 3 strategies, $F(3, 240) = 10.15$, $p = .000$. Post hoc comparisons using the Tukey HSD test indicated that the mean score

for the often condition ($M = 3.35$, $SD = 0.74$) was significantly different than the never condition ($M = 2.47$, $SD = 0.74$), the rarely condition ($M = 2.67$, $SD = 0.73$), and the occasionally condition ($M = 2.62$, $SD = 0.69$). These results suggest that having been often exposed to pre-service training, teachers use more SRL building strategies in the area of control in their classroom practice.

There was significant variation in the means between the groups with different amounts of pre-service training on usage of Phase 4 strategies, $F(3, 240) = 6.54$, $p = .000$. Post hoc comparisons using the Tukey HSD test indicated that the mean score for the often condition ($M = 3.15$, $SD = 0.97$) was significantly different than the never condition ($M = 2.34$, $SD = 0.86$), the rarely condition ($M = 2.40$, $SD = 0.76$), and the occasionally condition ($M = 2.42$, $SD = 0.76$). These results suggest that having been often exposed to pre-service training, teachers use more SRL building strategies in the area of developing student reaction and reflection in their classroom practice.

There was a significant variation in the means between the groups with different amount of pre-service training on usage of Overall SRL, $F(3, 240) = 7.25$, $p = .000$. Post hoc comparisons using the Tukey HSD test indicated that the mean score for the often condition ($M = 3.23$, $SD = 0.71$) was significantly different than the never condition ($M = 2.48$, $SD = 0.76$), the rarely condition ($M = 2.54$, $SD = 0.61$), and the occasionally condition ($M = 2.58$, $SD = 0.70$). These results suggest that having been often exposed to pre-service training, teachers use more SRL building strategies overall in their classroom practice. However, there is a large increase in use of practices between those who covered the material often during their training and all other groups, suggesting teachers who experience the most exposure to pre-service training are utilizing all phases of self-

regulated learning strategies more consistently and more frequently into their pedagogy. This highlights the importance of pre-service training in the development of SRL strategies in teachers and supports previous research findings.

Research Question 4

Five multiple regressions were used to investigate whether teachers' race, amount of pre-service training, years teaching, subject taught, and hours of professional development significantly predicted their usage of SRL building practices as measured by Phase 1, Phase 2, Phase 3, Phase 4 and Overall Phase scores. A visual inspection of scatterplots for each independent variable indicated a normal distribution. The Durbin-Watson Test scores ranged from 2.0-2.2, indicating that there was no multicollinearity between independent variables. Regression outcomes are reported in Table 15 below.

The first multiple regression was used to test if the independent variables significantly predicted participants' Phase 1 scores of academic self-regulation skills for forethought, planning, and activation. The results of the multiple regression indicated that the model explained 12% of the variance in Phase 1 scores, $R^2 = .123$, $F(13, 230) = 3.615$, $p < .001$. Relative to teachers with no exposure to SRL in pre-service training, teachers who had exposure to SRL often during their pre-service training reported more frequent use of Phase 1 SRL practices ($\beta = 0.52$, $p < .001$). Similarly, relative to teachers who did not have any professional development in SRL skills, those who received professional development of 6 or more hours ($\beta = 0.35$, $p = .04$) reported significantly more use of SRL Phase 1 practices and those who received 1 to 5 hours of professional development reported marginally higher use of SRL Phase 1 skills ($\beta = 0.22$, $p = .06$). Combined, these results suggest that any amount of training can lead to more use of

Phase 1 practices, but more training results in more use of practices. The subject taught and years of experience were also found to be significant predictors of Phase 1 SRL use in this model. Relative to teachers who taught Mathematics, ELA teachers ($\beta = 0.45$, $p = .000$) and Social Studies teachers ($\beta = 0.25$, $p = .05$) reported more use of Phase 1 SRL skills. Finally, more experienced teachers, those reporting 16 or more years of experience, reported marginally higher use of Phase 1 SRL skills ($\beta = 0.26$, $p = .05$) than those with 1 to 5 years of experience.

The second multiple regression was used to test if the independent variables significantly predicted participants' Phase 2 scores of academic self-regulation skills for monitoring. The results of the multiple regression indicated that the model explained 9% of the variance and that the model was a significant predictor of Phase 2 scores, $R^2 = .091$, $F(13, 230) = 2.87$, $p = .001$. Relative to teacher with no exposure to SRL in pre-service training, teachers who had exposure to SRL often during their pre-service training reported more frequent use of Phase 2 SRL practices, ($\beta = 0.58$, $p = .01$). Similarly, relative to teachers who did not have any professional development in SRL skills, those who received professional development of six or more hours ($\beta = 0.39$, $p = .04$) reported significantly more use of SRL Phase 2 practices. Similar to the first model, these results suggest any amount of training can lead to an increase in usage of Phase 2 practices, but more training results in more use of practices. The subject taught was found to be a significant predictor of Phase 2 SRL use in this model. Relative to teachers who taught Mathematics, ELA teachers ($\beta = 0.35$, $p = .01$) reported more use of Phase 2 SRL skills. Years of teaching, race, and subjects other than ELA were not significant predictors.

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The third multiple regression was used to test if the independent variables significantly predicted participants' Phase 3 scores of academic self-regulation skills for control. The results of the multiple regression indicated that the model explained 15% of the variance and that the model was a significant predictor of Phase 3 scores, $R^2 = .147$, $F(13, 230) = 4.22$, $p = .00$. Relative to teachers with no exposure to SRL in pre-service training, teachers who had exposure to SRL often during their pre-service training reported more frequent use of Phase 3 SRL practices ($\beta = 0.78$, $p = .00$). Likewise, relative to teachers who did not have any professional development in SRL skills, those who received 6 or more hours of professional development ($\beta = 0.37$, $p = .03$) reported significantly more use of SRL Phase 3 practices. The subject taught was again found to be a significant predictor of Phase 3 SRL use in this model. Relative to teachers who teach Mathematics, ELA teachers ($\beta = 0.31$, $p = .01$) and Social Studies teachers ($\beta = 0.27$, $p = .04$) reported more use of Phase 3 SRL skills. Years of teaching, race, and subjects other than ELA and Social Studies were not significant predictors of Phase 3 SRL skills.

The fourth multiple regression was used to test if the independent variables significantly predicted participants' Phase 4 scores of academic self-regulation skills for reaction and reflection. The results of the multiple regression indicated that the model explained 11% of the variance and that the model was a significant predictor of Phase 4 scores, $R^2 = .107$, $F(13, 230) = 3.25$, $p = .000$. Relative to teachers with no exposure to pre-service training, teachers who had exposure to SRL practices often during their pre-service training reported significantly more use of Phase 4 SRL practices ($\beta = 0.68$, $p = .00$). Relative to teachers who had no professional development in SRL practices,

those having 6 or more hours of professional development reported marginally higher use of SRL practices ($\beta = 0.33$, $p = .08$). Similar to the previous models, subject taught was found to be a significant predictor of SRL practices. ELA teachers ($\beta = 0.36$, $p = .01$) and Science teachers ($\beta = 0.48$, $p = .01$) reported significantly more use of Phase 4 SRL practices relative to teachers who taught Mathematics. Years of teaching, race, and subjects other than ELA and Social Studies were not significant predictors of SRL use.

The last multiple regression was used to test if the independent variables significantly predicted participants' Overall scores of academic self-regulation skills for all phases of academic self-regulation practices. The results of the multiple regression indicated that the model explained 13% of the variance and that the model was a significant predictor of Overall Phase scores, $R^2 = .134$, $F(13, 230) = 3.89$, $p = .000$. Relative to teachers who had no pre-service training, teachers who had exposure to SRL training often during their pre-service training ($\beta = 0.64$, $p = .000$) reported more frequent use of Overall SRL practices. Relative to teachers who had no professional development in SRL, those having 6 or more hours of professional development ($\beta = 0.36$, $p = .03$) reported significantly more frequent use of Overall SRL practices. Subject taught was found to be a significant predictor of Overall SRL practices. Relative to teachers who taught Mathematics, ELA teachers ($\beta = 0.37$, $p = .00$) reported significantly more Overall SRL practices and those teaching Science ($\beta = 0.31$, $p = .04$) and Social Studies ($\beta = 0.21$, $p = .10$) reported marginally higher use of Overall SRL skills. Years teaching and race were not significant predictors.

Table 15

Multiple Regression Outcomes

	Phase 1	Phase 2	Phase 3	Phase 4	Overall
Intercept	2.10***	2.29***	2.1***	1.97***	2.11***
	(0.14)	(0.16)	(0.14)	(0.16)	(0.14)
PD Hours 1 to 5	0.22+	0.24+	0.19+	0.18	0.21+
	(0.12)	(0.13)	(0.11)	(0.13)	(0.11)
PD Hours 6+	0.35*	0.39*	0.37*	0.33+	0.36*
	(0.17)	(0.19)	(0.16)	(0.19)	(0.16)
PS Rarely	0.18	0.11	0.10	0.04	0.06
	(0.20)	(0.23)	(0.19)	(0.22)	(0.19)
PS Occasionally	0.09	0.08	0.15	0.08	0.10
	(0.12)	(0.14)	(0.12)	(0.13)	(0.12)
PS Often	0.52***	0.58**	0.78***	0.68***	0.64***
	(0.18)	(0.21)	(0.18)	(0.20)	(0.18)
Social Studies	0.25+	0.09	0.27*	0.23	0.21+
	(0.13)	(0.15)	(0.13)	(0.15)	(0.13)
Other Subjects	0.96***	0.92**	0.80**	0.87**	0.89***
	(0.29)	(0.34)	(0.29)	(0.33)	(0.28)
Science	0.23	0.25	0.27+	0.48**	0.31*
	(0.16)	(0.18)	(0.15)	(0.17)	(0.15)
ELA	0.45***	0.35**	0.31**	0.36**	0.37***
	(0.12)	(0.14)	(0.12)	(0.14)	(0.12)
5-10 Years Exp	0.15	0.08	0.19	0.11	0.09
	(0.15)	(0.17)	(0.15)	(0.17)	(0.15)
10-15 Years Exp	0.13	0.04	0.03	0.05	0.02
	(0.16)	(0.18)	(0.16)	(0.18)	(0.16)
16+ Years Exp	0.26+	0.13	0.16	0.15	0.18
	(0.13)	(0.15)	(0.13)	(0.15)	(0.13)
Non-White	-0.02	0.01	0.12	0.11	0.06
	(0.17)	(0.20)	(0.17)	(0.19)	(0.17)
Adjusted R^2	0.12	0.14	0.15	0.11	0.13

Note. Standard errors in parentheses. $+p \leq .10$, $*p \leq .05$, $**p \leq .01$, $***p < .001$.

PD = Professional Development. PS = Pre-service Training. Omitted variables include

indicators of No Professional Development, No Pre-service Training, Mathematics,

0-5 Years of Experience, and White.

In sum, professional development and pre-service training remained strong predictors of teacher utilization of SRL building practices when controlling for other teacher characteristics. Across all models, teachers who reported having professional development and pre-service training incorporate significantly more SRL practices in their classroom pedagogy. In addition, teachers who had more pre-service training and professional development consistently reported using more SRL building practices. ELA, and to some extent, Social Studies and Science teachers, used more SRL building practices than Mathematics teachers. Finally, although years teaching was found to have a marginal significance in the usage of forethought, planning and activation, this variable, along with race, were not found to be significant predictor factors on the use of other SRL practices in the classroom.

CHAPTER 5

Implications of Findings

There are three key findings that merit in-depth discussion. First, professional development and pre-service training that covered SRL were related to teacher's use of SRL practices. Second, subject area was associated with teacher's use of SRL practices. Third, teacher demographics were unrelated to their use of SRL practices.

Training and SRL Practices

The results showed that professional development and pre-service training were demonstrated to be important factors in developing teachers' ability to integrate SRL teaching strategies into their classrooms. In addition, the degree to which these strategies are employed have a direct relationship with the amount of professional development and pre-service training a teacher has been exposed to. The more training a teacher receives (whether in pre-service or through professional development), the more likely they are to use SRL practices. Of important note here is that even though past research, current standards, and the present results support the importance of training for SRL development, 60% of respondents in this study reported receiving no pre-service training and 66% reported receiving no professional development in the area of SRL. This finding implies that more, concerted effort is needed to make SRL training a key part of the teachers' experiences.

Moreover, years of teaching was not a consistent significant predictor of SRL pedagogy, suggesting that SRL practices do not simply and naturally develop over time and experience in the classroom. SRL building strategies need to be both explicitly taught to teachers, who can then model and teach them to students in the classroom. In other

words, in so much as SRL is a priority for our students–as evidenced in the standards set by states–we need to ensure that teachers have access to pre-service and professional development programs that teach these skills. Without explicit training on SRL, teachers are not equipped to build these skills among their students.

Notably, however, pre-service and professional development programs (along with other factors) explained less than 15% of the variance in teacher's use of SRL practices (across all Phases). Moreover, as noted in the results, even though teachers who received professional development and pre-service training incorporated SRL practices more frequently into their classrooms, they reported using them, on average, only sometimes or often. One hypothesis for why these factors explained little of the variance in use is that I could not control for the quality of these experiences. A second is that training is one of many potential factors contributing to teacher's use of SRL practices in the classroom. Regardless of the source, there continues to be a disparity between understanding the importance of SRL skills and the actual consistent delivery of SRL building practices in the classroom. Even when teachers were afforded pre-service training and professional development, they do not always embed these strategies in their classroom pedagogy.

Subject Matter and SRL Practices

Subject matter was found to predict teachers' use of SRL practices in the classroom. ELA teachers consistently used more SRL practices than Mathematics teachers, with marginal differences also observed in Social Studies and Science. In considering the types of activities students are required to perform in ELA, Science, and Social Studies, it may best be explained that some content area activities naturally lend

themselves to the embedding of SRL strategies than others. For example, inherent in ELA activities, in which students are asked to read and produce written responses, they use forethought, activate prior knowledge and plan, monitor, and control their work in addition to reacting and reflecting on peer and teacher feedback. Social Studies and Science activities, which may include exposure to charts, graphs, and experiments, may naturally embed other SRL strategies, such as cognitive strategy, control, and reflection.

Variability in the use of practices by subject-area should be considered as part of developing training programs and curriculum. We need to take a critical lens to identify what types of SRL skills are leaned on more heavily based on content area and to focus training initiatives on these practices. From the results of this study, it seems this is particularly important in the area of Mathematics, for example, as these teachers did not report significant use of SRL skills. This may be a lack of appropriate training or professional development, or relate to the restrictions placed on teachers via curriculum requirements.

Teacher Demographics and SRL Practices

Race was not found to be a significant predictor of teacher use of SRL practices. Given there was little theoretical motivation to believe that there would be differences by teacher race, this is a logical finding. However, it should be noted that the sample of participants were predominantly White/Caucasian and that these sample characteristics may have led to underpowered tests of differences across racial groups.

Relationship to Prior Research

Pintrich's (2000, 2004) contribution to Bandura (1977) and Zimmerman's (1989) social learning theories is noted in his focus on the contextual factors that teachers and

classrooms bring to the reinforcement of self-regulated learning strategy use. As noted, these skills are strongly correlated to student achievement (Dignath & Büttner, 2008; Dent & Koenka, 2016) and the skills necessary for success in the 21st century.

Since it has been identified that self-regulation academic skills are teachable and observable (Zimmerman, 1989), teachers are arguably the most influential conduit by which SRL skills can be transferred to students. Explicit instruction of SRL strategies can develop these skills in both students and teachers (Dignath & Büttner, 2008, 2018), and development of these skills in teachers is effectively done through professional development activities and pre-service training. The results found in this study align with those from prior work showing that training in SRL can lead to more use of the practices.

For example, Butler et al. (2004) showed that when teachers received professional development in SRL they were able to make substantial improvements to their pedagogical practices, which ultimately led to academic improvement in their students. Consistent with Butler et al., results of this study indicate that teachers who had professional development reported significantly more use of SRL practices than teacher who did not. However, some researchers argue that merely having professional development does not give rise to substantial changes in practices and conclude that time spent on effective professional development is the critical factor in effecting pedagogical change (Guskey & Yoon, 2009; Guskey, 2003; Garet, Porter, Desimone, Birman & Yoon, 2001). The current findings support this as not only did teachers who receive professional development report more use of SRL practices, but the teachers who spent the most time on professional development reported significantly more use of SRL practices.

Dignath and Büttner (2008) and Cetin (2017) posited that there is insufficient pre-service training on SRL skills, and Wilson and Bai (2010) suggested that teacher preparation and pre-service training programs need to offer opportunities to learn about how students learn and develop SRL skills. This understanding is essential if teachers are to make lasting changes to their instructional practice. In the present study, teachers who received pre-service training in SRL reported significantly more use of SRL practices. Similar to professional development, those pre-service teachers that were instructed often on SRL reported significantly more use of these practices. This further supports that the time spent on learning about SRL is an important factor in the actual use of SRL.

Furthermore, as Wilson and Bai (2010) state, it is not enough to know that SRL strategies are important, it is necessary to understand how to instruct students on how, why and when to use SRL strategies and for teachers to provide assignments that reinforce these skills. It stands to reason then that examining content area is of particular importance when looking to develop SRL practices in teachers. Although previous studies showed significant differences in achievement when SRL practices were used in Mathematics and Science (Dignath & Büttner, 2008; Zambak et al., 2017), the present study indicated that Science teachers' use of SRL practices was only significant in the area of reaction/reflection while teaching Mathematics did not significantly predict use of SRL practices across any phases of regulation. Since students rely on some SRL skills more than others, based on the demands of the subject matter, examining what SRL skills are used most in specific content area is important. Professional development and pre-service training should be focused on establishing SRL skills that are consistent with

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content specific activities. This supports the need for educators to have a critical

understanding of metacognition and self-regulated learning.

Limitations of the Study

This research study had several limitations. Although 244 participant responses

were used in the quantitative analyses, the desired sample size of 250 respondents was

not met, which would limit the statistical power of the analyses reported above.

Moreover, there were significant differences in the sizes of the groups being compared

which may have led to underpowered comparisons. For example, most of the teachers

self-reported as White/Caucasian with few in each of the other racial groups. The uneven

group sizes diminished the power of the t-test and ANOVA comparisons used throughout

and this was evident in some comparisons of small groups.

Examination into geographical location of the teachers was an intended

component of the study; however, the question asking where the respondents were from

was inadvertently omitted from the survey. Analysis of how geography, and of how

related factors like state policies, may relate to SRL was, therefore, not possible.

Therefore, this study was unable to speak to how potential differences in state training

and standards related to teacher's use of SRL practices.

Other limitations of the study include threats to external validity as middle school

teachers who were more engaged with SRL practices may have been more likely to

respond to a survey on SRL creating a bias in the sampling population. In addition, the

majority of teachers who responded to the survey, reported 16 or more years of teaching

experience. The pre-service experience for these teachers may not have included any

instruction on SRL and the overall training between these teachers and new teachers may

have varied considerably. This, in addition to sample size, limits the researcher's ability to generalize these results to the larger middle school teacher population or larger teacher population as a whole. In other words, the teachers who responded may report systematically higher use of SRL practices relative to the general teaching population. This limitation would suggest that perhaps the average use of SRL practices observed in this study is higher than we would see in the general teacher population, underscoring the need to increase SRL training for all teachers.

Recommendations for Future Research

Future research in the area of SRL building practices is recommended. Examining the SRL building practices of teachers at all grade levels is important in identifying gaps in effective SRL pedagogy to assist in identifying where professional development may be needed. As primary classrooms may be more conducive to developing SRL practices than secondary classrooms (Dignath & Büttner, 2018), further exploration into these factors should be considered. Although this study focused on Grade 7 and 8 teachers, which did not allow for grade-level comparisons, the significant finding that subject area was associated with teachers' use of SRL practices underscores the need to examine how constraints of the teaching environment impact teachers' use of SRL practices. For example, understanding why Mathematics teachers did not report significant use of SRL skills compared to other teachers would be important in determining if Mathematics teachers are not being introduced to SRL practices in the same manner or frequency as teachers in other subjects. Examining the specific self-regulated skills required for different Mathematics courses offered at the different levels may be beneficial in explaining the differences. For example, Algebra and Geometry focus on computational

mathematics and use of operations which may make embedding SRL practices more difficult. Examining these factors would be particularly important as STEAM is quickly becoming a recognized domain in which students' mastery is expected under state standards.

In addition, the present study focused on middle school teachers using a self-report survey measure, therefore, it is difficult to account for sampling and response bias. An observational study of real-time teacher practices could corroborate actual practices with the self-reported practices in this study. Observing teachers in their natural classroom setting could glean data on when and how actual SRL practices are delivered. Observers who are experienced with SRL can provide feedback to teachers to improve instructional practices. Follow up interviews with teachers could also help validate these results. Focused questions on the topic of SRL can elicit detailed information regarding background, prior training, opinions, beliefs and actual SRL practices.

Moreover, it would be useful to see how students perform in these teachers' classrooms, as well, to ensure that the desired effects are translating to them. Examining the differences in student performance between teachers who simply model SRL strategies and teachers who explicitly teach SRL strategies may provide further support for the latter. Student performance at various grade levels should also be examined as it is unclear whether developmental factors of children and their readiness to learn SRL strategies impacts teachers' use of practices. Understanding this could also assist in targeting professional development for appropriate grade level teachers.

While this study was able to demonstrate that more training led to more use of SRL practices, it was unable to explore the quality of those trainings. Since not all

trainings are of the same quality, examining professional development initiatives to ensure they provide explicit training methods in SRL could improve best practice for all teachers. In keeping with Guskey's (2003) characteristics of quality professional development, these training should incorporate structured initial training with consistent follow up of 30 hours or more. It is important to develop and deliver these types of quality professional development programs to effect pedagogical change in educators. For example, models that offer sustained coaching vs. one-and-done models may be more effective at ensuring that teachers use these practices consistently. As found in this study, SRL practices do not naturally develop with experience, therefore, quality training programs in SRL are needed to develop teacher skill and subsequently student achievement.

Finally, further research into other factors that affect SRL use is recommended. For example, teacher characteristics beyond those reviewed herein is suggested. As geographic indicators were not identified in this study, exploring whether the use of SRL practices is more commonly used in certain geographic locations may shed light on patterns regarding pre-service training or professional development opportunities. Understanding these patterns could help inform pre-service training and professional development at the undergraduate levels as well as K-12 schools. In addition, understanding patterns of teacher SRL use by geographic location may assist in identifying relationships between state policy/standards and training on SRL or use of SRL practices among teachers.

Moreover, although race was not found to be a predictor in the use of SRL, the sample of respondents for this study were predominantly White/Caucasian. Due to the

low response of races other than White/Caucasian, direct comparison of race groups was not possible. Further investigation into the use of SRL practices across a more diverse sampling is indicated as teachers from various cultural backgrounds may have different experiences and understanding of SRL that shape their classroom pedagogy.

Recommendations for Future Practice

One practical implication that can be drawn from the findings is a better understanding that experience itself does not necessarily improve pedagogical practices. In an age where leaders are charged with the responsibility of advancing their professional communities of teachers to meet the demands of higher standards, teacher efficacy, and improved student achievement, it is imperative that leaders provide effective, high-quality professional development. Administrators should focus on how professional development can aid in improving middle school teacher pedagogy by providing purposeful initiatives that assist teachers in learning about students' metacognition and SRL building practices. As supported by this study and previous research, initiatives that are comprehensive and provide consistent follow-up with teachers is important in the development and maintenance of SRL practices. Furthermore, these initiatives should be comprehensive in training teachers how to model and explicitly teach SRL skills while embedding these practices in their activities. As Wilson and Bai (2008) suggest, teachers need to possess declarative knowledge, conditional knowledge and the procedural knowledge of SRL. The provision of quality trainings that strive to meet these outcomes is important to deliver to today's educators.

One way to assist in uncovering purposeful initiatives can be to identify those teachers who demonstrate best practices in SRL. Leadership opportunities can be created

for these teachers at a building level with turnkey coaching to colleagues in formats, such as learning circles or collaborative trainings. These shifts in focus and professional learning delivery can lead to improved student achievement and success as supported in the literature.

Pre-service training programs should develop classes/experiences that shape teachers' understanding of metacognition. They should provide learning tools to develop SRL building practices so that teachers are ready to meet the learning demands of the 21st century learner when they first enter the classroom. These experiences may include observations of teachers known to demonstrate effective SRL strategies in the classroom or specific classes in which SRL practices are explicitly taught. Student teachers should be paired with supervising teachers and college leaders who can further develop or reinforce SRL practices. In addition, an effort to train teachers who educate pre-service teachers on SRL is beneficial in preparing new educators to have these skills prior to working in a classroom.

Administrators may also inquire about pre-service experience in SRL skills when assessing teacher candidates. Teacher candidates that are familiar and have experience with SRL building practices may prove to have more effective classroom practices than those that have not. Electing to hire teachers who already have a fundamental understanding and/or experience with SRL skills can help cultivate a community of highly effective teachers who share common educational philosophies and pedagogical practices.

Conclusion

Today's educational leaders are charged with shaping a vision of academic success for students. Components of this vision include the provision of quality instruction and effective research-based practices in a positive learning climate that can cultivate leadership in others (Grissom, Egalite & Lindsay, 2021). The research shows the need to develop 21st century skills in our students for academic and real-world success. The development of self-regulated learning skills in our students is fundamental in meeting this demand. Teachers provide the means in which students can access these skills by modeling and explicitly teaching SRL skills.

Teachers themselves, however, require explicit instruction and training to understand metacognition and to develop transferable SRL practices. In the present study, teachers who received pre-service training and professional development in SRL reported significantly more use of SRL practices in the classroom. The majority of respondents, however. reported never receiving pre-service or professional development in SRL practices. Moreover, experience alone did not improve pedagogical practices of SRL skills in the classroom. Teachers require substantial pre-service and professional development to learn how to embed SRL skills into their classroom pedagogy. And the results of this study suggest that perhaps tailored supports are needed by subject area taught.

As we move forward, it is necessary for colleges and/or universities to develop instruction for future educators on the importance and delivery of SRL practices. Leaders should provide professional development that explicitly teaches about SRL practices and examine potential teacher candidates' experience with SRL. Cultivating a professional

community of teachers with effective SRL pedagogy can lead to the development of

student use of self-regulated learning which will allow them to meet the demands of the

21st century and to be successful in their real-world endeavors.

APPENDIX A

IRB Approval

St. John's University

Federal Wide Assurance: FWA00009066

Dec 14, 2020 9:16:42 AM EST

PI: Lauren Porter
CO-PI: Erin Fahle
Dept: Ed Admin & Instruc Leadership

Re: Initial - IRB-FY2021-220 *EXAMINING THE INFLUENCE OF PROFESSIONAL DEVELOPMENT AND PRE SERVICE TRAINING ON MIDDLE SCHOOL TEACHERS' USE OF SELF-REGULATION PEDAGOGICAL PRACTICES*

Dear Lauren Porter:

The St John's University Institutional Review Board has rendered the decision below for *EXAMINING THE INFLUENCE OF PROFESSIONAL DEVELOPMENT AND PRE SERVICE TRAINING ON MIDDLE SCHOOL TEACHERS' USE OF SELF-REGULATION PEDAGOGICAL PRACTICES*.

Decision: Exempt

PLEASE NOTE: If you have collected any data prior to this approval date, the data must be discarded.

Selected Category: Category 2.(i). Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording).
The information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects.

Sincerely,

Raymond DiGiuseppe, PhD, ABPP
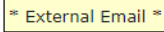Chair, Institutional Review Board
Professor of Psychology

Marie Nitopi, Ed.D.
IRB Coordinator

APPENDIX B

Permission to Use Survey

YH Yeol Huh <yhuh@emporia.edu>
Thu 10/24/2019 1:59 PM
To: Lauren Porter

* External Email *

Dear Lauren

Thanks for your inquiry.
I am currently attending a conference right now, so I just wanted to give you a quick answer that you surely can use the part of my survey.

I will get back to you with more information later next week when I return to my office.

Thanks.

Best,

YH

LP Lauren Porter
Wed 10/23/2019 9:23 AM
To: yhuh@emporia.edu
Bcc: Lauren Porter

Good morning,

I am presently a doctoral canditate student at St. John's University in New York and am seeking permission to use a portion of your survey from your research publication:

Huh, Y., & Reigeluth, C. M. (2018). Online K-12 Teachers' Perceptions and Practices of Supporting Self-Regulated Learning. *Journal of Educational Computing Research*, *55*(8), 1129–1153. Retrieved from https://search-ebscohost-com.jerome.stjohns.edu/login.aspx?direct=true&db=eric&AN=EJ1162205&login.asp&site=ehost-live

My dissertation research will be focused on teacher practices that support self-regulated learning. I would like to use items 12-37 of the survey.

I would also like to inquire if there is any additional information that could be provided with regard to the validity and reliability of the survey that was not included in the publication.

Thank you very much for your consideration.

Sincerely,
Lauren Porter

APPENDIX C

Recruitment Email

My name is Lauren Porter and I am in an Ed.D. program at St. John's University in New York. My dissertation project seeks to add to our understanding of how professional development may shape teacher practices. I am inviting you to participate. The survey is for middle school teachers, grades 7th and 8th, in any content subject area. As you might imagine, doing research during Covid-19 is quite a challenge, so please consider participating in the survey and/or forwarding to other teachers! The link for the survey is below and takes less than 10 minutes. The survey data is completely anonymous. All participants are eligible to enter a $100 gift card drawing for completing the survey!

APPENDIX D

Professional Development and Instructional Practices of SRL Skills Survey

Demographic Information

1. I teach the following grade(s) (check all that apply):
   a. 1st ☐
   b. 2nd ☐
   c. 3rd ☐
   d. 4th ☐
   e. 5th ☐
   f. 6th ☐
   g. 7th ☐
   h. 8th ☐
   i. 9th ☐
   j. 10th ☐
   k. 11th ☐
   l. 12th ☐

2. Ethnicity:
   Are you of Hispanic, Latino, or Spanish origin?
   a. Yes
   b. No

3. Please indicate your race:
   a. White or Caucasian
   b. Black or African American
   c. Hispanic or Latino
   d. Asian or Asian American
   e. American Indian or Alaska Native
   f. Native Hawaiian or other Pacific Islander
   g. Another race
   h. Prefer not to answer

4. How many years have you been teaching?
    a. 0-5 years
    b. 5-10 years
    c. 10-15 years
    d. 16 + years

5. Please check the content subject area that you are teaching. If you are teaching more than one subject, please choose the content area in which you spend the most time teaching.
    a. English/ELA
    b. Math
    c. Science
    d. Social studies
    e. Other (Please specify:)

6. Did you receive pre-service teacher training that included information on practices for developing self-regulated learning for students? These practices may have, for example, included ways to develop critical thinking, problem solving, self-monitoring, and goal setting skills.
    a. Yes
    b. No

6a. If you responded yes, would you say your exposure to this pre-service training was provided:
    a. Rarely
    b. Occasionally
    c. Often

7. During the 2018-2019 school year, were you provided professional development from administration regarding best practices for developing self-regulated learning for students? These professional development trainings may have, for example, included ways to develop critical thinking, problem solving, self-monitoring, and goal setting skills.
    a. Yes
    b. No

7a. If you responded "yes" to question 7:
How many hours of training did you take on the topic of self-regulated learning?
    a. 1-5
    b. 6-10
    c. 11-15
    d. 16 or more

Self-regulated learning** skill development

**''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''

8. How important do you think self-regulated learning skills are for your student learning?
        a. Very Important
        b. Important
        c. Neither Important or Unimportant
        d. Unimportant
        e. Very Unimportant

9. Are you currently providing your students with any supports* for them to develop their self-regulated learning skills?
*''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
        b. No

Skills during each phase of SRL

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 non-instructional supports (e.g., rewards, encouragement etc.)

All the following questions are based on the 5-point Likert type scale: 1 being Never and 5 being Always

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

Phase 1: Forethought, planning, and activation

10. Set their own subgoals for accomplishing the task

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

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

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

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

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

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

17. Plan on their own how they will monitor their learning behavior

18. Think on their own about how they perceive the task

19. Think on their own about how they perceive the study environment

Phase 2: Monitoring

20. Self-monitor how well they are learning

21. Self-monitor how motivated they are to accomplish the task or how they feel about their learning

22. Self-monitor their effort, time use, and need for help

23. Self-monitor changes in the task and the study environment conditions

Phase 3: Control

24. Use (on their own) cognitive strategies for learning

25. Use (on their own) strategies for managing motivation or affect

26. Decide (on their own) which things to devote more or less effort to

27. Decide (on their own) when, why and from whom to seek help

28. Change or renegotiate (on their own) the task when needed

29. Change or leave (on their own) the study environment when appropriate

Phase 4: Reaction and reflection

30. Self-reflect on how well they did in accomplishing their subgoals

31. Self-reflect on the reasons for their emotional reactions to the outcomes

32. Choose (on their own) if and when to do an additional task

33. Self-evaluate how effective the task was for accomplishing their subgoals

34. Self-evaluate how effective the study environment was

Thank you for completing the survey!

If you would like to enter a lottery for a chance to win a $100 dollar gift card, please enter your email information below. The lottery winner will be selected at random, where all entrants have an equal possibility of winning. The raffle winner will receive the gift card via email within 48 hours of the close of the survey window.

Email: _____

Your email information will not be connected to any of your survey responses and your address will not be kept or stored after the drawing.

REFERENCES

NYS Next Generation Learning Standards. (n.d.). Retrieved from

    http://www.nysed.gov/next-generation-learning-standards

Professional Development Done Right. (2020). Retrieved from

    nsba.org/ASBJ/2020/August/professional-development-done-right

Alismail, H. A., & McGuire, P. (2015). 21 St Century Standards and Curriculum: Current

    Research and Practice. *Journal of Education and Practice*, *6*(6), 150–155. Retrieved

    from http://files.eric.ed.gov/fulltext/EJ1083656.pdf

Butler, D. L., Lauscher, H. N., Jarvis-Selinger, S., & Beckingham, B. (2004).

    Collaboration and self-regulation in teachers' professional development. *Teaching*

    and Teacher Education, *20*, 435–455.

Cetin, B. (2017). The influence of Pintrich's Self-Regulated learning model on

    elementary teacher candidates in a life science course. *Journal of Education and*

    Training Studies, *5*(8), 30–36.

Darling-Hammond, L., Hyler, M. E., & Gardner, M. (2017). *Effective Teacher*

    Professional Development. (June), 1–2. Retrieved from

    learningpolicyinstitute.org/sites/default/files/product-

    files/Effective_Teacher_Professional_Development_REPORT.pdf

De Corte, E., Verschaffel, L., & Masui, C. (2004). The CLIA-model: A framework for

    designing powerful learning environments for thinking and problem solving.

    European Journal of Psychology of Education, *19*(4), 365–384.

    https://doi.org/10.1007/BF03173216

Dent, A. L., & Koenka, A. C. (2016). The Relation Between Self-Regulated Learning and
Academic Achievement Across Childhood and Adolescence: A Meta-Analysis.
Educational Psychology Review, *28*(3), 425–474. https://doi.org/10.1007/s10648-
015-9320-8

Dignath, C., & Büttner, G. (2008). Components of fostering self-regulated learning
among students. A meta-analysis. *Metacognition and Learning*, *3*, 231–264.
Retrieved from https://search-proquest-
com.ezp.lib.rochester.edu/docview/219915434?pq-origsite=summon

Dignath, C., & Büttner, G. (2018). Teachers' direct and indirect promotion of self-
regulated learning in primary and secondary school mathematics classes – insights
from video-based classroom observations and teacher interviews. *Metacognition and
Learning*, *13*(2), 127–157. https://doi.org/10.1007/s11409-018-9181-x

Eom, W., & Reiser, R. A. (2000). The effects of self-regulation and instructional control
on performance and motivation in computer-based instruction. *International Journal
of Instructional Media*, *27*(3), 247–260.

Fabriz, S., Ewijk, C. D. Van, Poarch, G., & Büttner, G. (2014). Fostering self-monitoring
of university students by means of a standardized learning journal - A longitudinal
study with process analyses. *European Journal of Psychology of Education*, *29*(2),
239–255. https://doi.org/10.1007/s10212-013-0196-z

Garcia, T., & Pintrich, P. R. (1995). Assessing Students' Motivation and Learning
Strategies: The Motivated Strategies for Learning Questionnaire. *Learner
Perceptions of Self-Regulatory Competence: From Self-Schemas to Self-Efficacy*,
1-18.

Garet, M. S., Porter, A. C., Desimone, L., Birman, B. F., & Yoon, K. S. (2001). What

Makes Professional Development Effective? Results from a National Sample of

Teachers. *American Educational Research Journal*, *38*(4), 915–945.

Grasha, A. (n.d.). A Matter of Style: The Teacher as Expert, Formal Authority, Personal

Model, Facilitator, and Delegator. *College Teaching*, *42*(4), 142–149. Retrieved

from http://www.jstor.org/stable/27558675

Grusec, J. E. (1992). Social Learning Theory and Developmental Psychology- the

Legacies of Robert Sears and Albert Bandura.Pdf. *Developmental Psychology*,

28(5), 776–786.

Guskey, T. R. (2003). No Title. *National Association of Secondary School Principals

Bulletin*, *87*(637), 4–20.

Guskey, T. R., & Yoon, K. S. (2009). What Works in Professional Development? *Phi

Delta Kappan*, (March), 498–500.

Hakkinen, P., Jarvela, S., Makitalo-Siegl, K., Ahonen, A., Naykki, P., & Valtonen, T.

(2017). Preparing teacher-students for twenty-first-century practices (PREP21): a

framework for enhancing collaborative problem-solving and strategic learning skills.

Teachers and Teaching, *23*(1), 25–41.

https://doi.org/10.1080/13540602.2016.1203772

Huh, Y., & Reigeluth, C. M. (2018). Online K-12 Teachers' Perceptions and Practices of

Supporting Self-Regulated Learning. *Journal of Educational Computing Research*,

55(8), 1129–1153.

Kistner, S., Rakoczy, K., Otto, B., Dignath-Van Ewijk, C., Büttner, G., & Klieme, E.

(2010). Promotion of self-regulated learning in classrooms: investigating frequency,

quality, and consequences for student performance. *Metacognition and Learning*, *5*, 157–171. https://doi.org/10.1007/s11409-010-9055-3

Leon, J., Nunez, J. L., & Liew, J. (2015). Self-determination and STEM education: Effects of autonomy, motivation, and self-regulated learning on high school math achievement. *Learning and Individual Differences*, *43*, 156–163. https://doi.org/http://dx.doi.org/10.1016/j.lindif.2015.08.017

Masui, C., & De Corte, E. (2005). Learning to reflect and to attribute constructively as basic components of self-regulated learning. *British Journal of Educational Psychology*, *75*(3), 351–372. https://doi.org/10.1348/000709905X25030

McClintic-Gilbert, M. S., Henderlong Corpus, J., Wormington, S. V., & Haimovitz, K. (2013). The Relationships Among Middle School Students' Motivational Orientations, Learning Strategies, and Academic Achievement. *Middle Grades Research Journal*, *8*(1), 1–12.

Pintrich, P. R. (2000). The role of goal orientation in self-regulated learning. In *Handbook of self-regulation* (M. Boekaer, pp. 451–502). San Diego, CA: Academic.

Pintrich, P. R., & Zusho, A. (2002). Development of achievement motivation. In *The development of academic self-regulation: The role of cognitive and motivational factors* (A. Wigfiel, pp. 249–284). San Diego, CA: Academic.

Schunk, D. H. (2005). Self-regulated learning: The educational legacy of Paul R. Pintrich. *Educational Psychologist*, *40*(2), 85–94. https://doi.org/10.1207/s15326985ep4002_3

Van Roekel, D. (n.d.). An Educator's Guide to the "Four Cs." Retrieved from Preparing

    21st Century Students for a Global Society website:

    http://www.nea.org/assets/docs/A-Guide-to-Four-Cs.pdf

Wilson, N. S., & Bai, H. (2010). The relationships and impact of teachers' metacognitive

    knowledge and pedagogical understandings of metacognition. *Metacognition*

    Learning, *5*, 269–288.

Zambak, V. S., Alston, D. M., Marshall, J. C., & Tyminski, A. M. (2017). Convincing

    Science Teachers for Inquiry-Based Instruction: Gusky's Staff Development Model

    Revisited. *Science Educator*, *25*(2), 108–116.

Zimmerman, B. (1989). A Social Cognitive View of Self-Regulated Academic Learning.

    Journal of Educational Psychology, *81*(3), 329–339.

Zimmerman, B. J., & Martinez-Pons, M. (1988). Construct Validation of a Strategy

    Model of Student Self-Regulated Learning. *Journal of Educational Psychology*,

    80(3), 284–290. https://doi.org/10.1037/0022-0663.80.3.284

Zimmerman, B., & Martinez-Pons, M. (1990). Student Differences in self-regulated

    learning: relating grade, sex, and giftedness to self-efficacy and strategy use. *Journal*

    of Educational Psychology, *82*(1), 51–59.

Zimmerman, B., & Martinez-Pons, M. (1986). Development of a structured interview for

    assessing student use of self-regulated learning strategies. *American Educational*

    Research Journal, *23*, 614–628.

Vita

Name	*Lauren Porter*
Baccalaureate Degree	*Bachelor of Science*, *State University of New York at Geneseo, Geneseo* *Major: Psychology*
Date Graduated	*May, 1989*
Other Degrees and Certificates	*Master of Science, St. John's University, Queens, Major: School Psychology*
Date Graduated	*May, 1992*