PROFESSIONAL DEVELOPMENT IN SELF-REGULATED LEARNING:

EFFECTS OF A WORKSHOP ON TEACHER KNOWLEDGE, SKILLS, AND SELF-

EFFICACY, AND THE DEVELOPMENT OF A COACHING FRAMEWORK

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Abstract

A review of the existing literature indicates a lack of high quality quantitative and qualitative research in the field of teacher professional development (PD), as well as a disconnect between teachers' PD needs and their actual experiences. This is particularly apparent in the area of self-regulated learning (SRL), as such skills have been empirically linked to student learning and achievement. The current project was conducted to address two primary objectives. First, a single group pretest-posttest design was used to evaluate the effectiveness of a previously developed SRL PD workshop on three variables: (a) teacher knowledge of SRL, (b) teacher application of SRL, and (c) teacher self-efficacy beliefs. Second, qualitative data was collected through individual interviews with a small subgroup of teachers who participated in the workshop. The purpose of the interviews was to gather information regarding teachers' reactions to and evaluations of the workshop, additional needs for implementing learned SRL strategies in the classroom, perceptions of the characteristics of a feasible and effective coaching model, and barriers to implementation. A total of nine teachers from a suburban middle school and high school participated in the three-hour workshop, and four teachers participated in the interviews. Paired-samples t-tests indicated statistically significant increases in teachers' knowledge of SRL and application of SRL, but not in teachers' self-efficacy beliefs for using SRL strategies in the classroom, despite a measured medium effect size. Interview data was assessed using classical content analysis. It is recognized that this study was underpowered in nature and lacked a control group, and these factors impact the ability to detect significant effects, make causal attributions, and generalize results. Implications for future research include the need for larger scale studies that include the use of a control group and random assignment to evaluate of the effectiveness of PD programs on teachers' knowledge, authentic skill implementation, and self-efficacy.

Dedication

This dissertation is dedicated to my grandfather, Dr. Merle F. Allshouse, who passed away before the completion of this project. A pilot and sailor, photographer, philosopher, a college professor and president, an advocate and mentor for children in foster care, he had an insatiable desire to learn, to make a difference, and to experience as much as possible within the limit of a lifetime. Grandpa, you have served as my academic role model throughout my life, and I would not have had the opportunity to embark on this journey without your continuous dedication to my education. Your enthusiasm for the pursuit of knowledge remains a constant source of inspiration and motivation in setting and achieving my goals, and I can only hope to do justice to the legacy you have left behind.

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Introduction

The art of teaching is not a profession that requires a finite set of knowledge and skills, but is rather a dynamic process that involves ongoing learning, practice, development, and adaptation. Teachers must employ classroom techniques that enable them to fully understand their students, address their needs, and support them in becoming successful learners. In order to most effectively fulfill these responsibilities, teachers must remain knowledgeable and skilled in educational research, policies, practices, and strategies. To ensure that this occurs, teachers are mandated to regularly participate in continued education through professional development trainings and activities (N.J.A.C. 6A:9C). Unfortunately, research indicates that there is currently a disconnect between teachers' professional development needs and their actual experiences (Cleary, 2011). This is particularly apparent in the area of self-regulated learning (SRL), which has recently been gaining substantial attention in the field of education (Boekaerts, 1997; Boekaerts & Cascallar, 2006). This chapter aims to develop a clear rationale for the immediate need for effective professional development in the area of academic SRL.

Professional Development

Professional development (PD) has been defined as various professional learning opportunities that are guided by student learning needs, teacher development needs, and the goals of the school, school district, and State (N.J.A.C. 6A:9C-3.2). The term *professional development* encompasses a broad range of programs and activities designed to increase teacher knowledge, skills, and effectiveness. Educational research has identified seven distinct models of teacher PD: (1) in-service training, (2) observation and assessment, (3) development and improvement process, (4) study groups, (5) inquiry and action research, (6) individually guided activities, and (7) mentoring (Karimi, 2011). Within these models, teachers may participate in

activities such as local, regional, and national conferences, workshops, panels, and professional committees.

PD training provided through workshops and presentations have been identified as efficient means of increasing knowledge regarding the rationale, background, theory, and research related to an intervention. These PD methods are also useful in introducing an intervention's key components and practices and providing initial opportunities for trainees to practice new skills and receive feedback (Forman, 2015). However, recent changes in educational standards have resulted in an emphasis on the development of PD programs that incorporate other key components, such as opportunities for continued, job-embedded instruction, practice, and feedback following an initial training (N.J.A.C. 6A:9C). Referred to as *technical assistance* or *coaching*, such ongoing support is key to developing competence and ensuring the successful implementation of skills and strategies learned through didactic instruction (Forman, 2015). In the context of PD within schools, coaches may work with individuals or groups to provide teachers with supervision and consultation, teach and model new skills and behaviors, provide assessment and performance feedback, and serve as a source of emotional support.

PD legislature. In 2001, the federal government passed the No Child Left Behind Act (NCLB) as a means of addressing the quality of education and increasing schools' accountability for student achievement. Under this law, the government defines specific qualities that characterize high quality teacher PD, such as being empirically-based, increasing teachers' knowledge and skills in effective instructional and classroom management strategies, and instruction in the effective use of assessment data. NCLB (2001) also recommends that PD activities be sustained and intensive, not consisting of one-day or short-term workshops without follow-up. The New Jersey Department of Education (NJDOE) also outlines a set of mandated

regulations and standards for teacher PD, including the requirement that all teachers to participate in a minimum of 20 hours of PD per year. According to the NJDOE, all PD activities must utilize coherent, continued, and evidence-based strategies to improve teachers' effectiveness in helping their students meet the Common Core State Standards (CCSS) (N.J.A.C. 6A:9C).

The need for PD research. With the installment of federal and state legislature regulating PD and the growing demand for high quality, evidence-based teacher training opportunities, there is an immediate necessity for research that examines the effectiveness of established PD programs. Information from such research can shed light on the mechanisms by which PD impacts teacher knowledge and behavior and, ultimately, improves student learning and achievement. This level of understanding is needed to guide the future development of effective, high quality PD activities that meet legislative standards. It is also important to understand the critical components that make PD programs effective, as research has indicated that it is the features of PD, rather than the structure (e.g., workshop, study group), that explain effects on changes in teachers' knowledge and classroom practices (Desimone, 2009). Unfortunately, though it has been gaining recent attention, the existing research base in the realm of teacher PD is lacking. In 2007, the Institute of Education Sciences released a report examining the evidence on how teacher PD affects student achievement. Of over 1,300 studies identified by the researchers, only nine met the evidence standards set forth by What Works Clearinghouse (Yoon et al., 2007).

The need for research in the area of professional development is not limited to controlled, quantitative designs, but extends to the realm of qualitative data collection and analysis. Leech and Onweugbuzie (2008) note that the field of school psychology is suffering from a lack of

qualitative research studies. They explain that from 2001 to 2005, only six of the 873 articles published in four core school psychology journals represented true qualitative research (Leech & Onweugbuzie, 2008). Further, as of 2006, only one of the 57 graduate-level school psychology programs approved by the National Association of School Psychology (NASP) appeared to require students to enroll in a qualitative research course.

It is undeniable that quantitative research is necessary in uncovering relationships among variables and answering questions concerning *who, where, how many,* and *to what degree* in a reliable, valid, and replicable manner. However, Nastasi and Schensul (2005) remark on the significant challenges practitioners face in transferring evidence-based interventions developed under controlled conditions to real-life settings in schools and communities. Qualitative research is invaluable in answering questions related to process and addressing the *how* and *why*, developing theories and models, uncovering contextual factors that may enhance or hinder the implementation, efficacy, and social validity of interventions, identifying modifications to interventions that may be necessary in real-life application, and isolating key intervention components associated with desired results (Leech & Onweugbuzie, 2008; Nastasi & Schensul, 2005).

The overall lack of high quality quantitative and qualitative research is problematic, as it appears that the current system of PD in the United States may be largely ineffective. Hill (2007) cites that teachers have reported minimal enthusiasm about the quality of their PD experiences, with past research indicating that only 20% of science teachers and 25% of mathematics teachers reporting that PD has changed their teaching practices (Horizon Research, 2002). Further, school districts may allocate between 1% and 6% of their funds to teacher PD (Hill, 2007). With limited resources available to schools, it is critical that these expenditures be invested in programs that

work. High quality studies in the area of PD are critical to guide the development of an improved, more effective system to ensure that the time and funds invested in PD activities result in meaningful changes to teacher knowledge and classroom practices. Further, with the ultimate goal of improving student outcomes, it is important that schools have access to PD programs that focus on topics empirically linked to student learning and achievement, such as student SRL.

To best address this issue, it must be recognized that quantitative and qualitative research need not be mutually exclusive. Over the past two decades, the social sciences have seen an increase in the recognition of the value of mixed methods designs that use qualitative information to strengthen, support, and expand on quantitative data (Nastasi & Schensul, 2005). The interweaving of quantitative and qualitative methodology maximizes a researcher's ability to fully address the research questions at hand, capture the participant's experiences, and collect, analyze, and interpret data in a manner that will be meaningful in real-life contexts.

Self-Regulated Learning

As students transition to the middle and high school years, the responsibility for learning is largely transferred from teachers to the students. Students are expected to track and complete homework assignments outside of class, self-initiate and self-sustain studying and practicing behaviors, navigate the academic expectations and teaching styles of multiple teachers, and motivate themselves to achieve academically (Dembo & Eaton, 2000; Eccles, Lord, & Midgley, 1991; Zimmerman & Cleary, 2009). Broadly speaking, the skills and processes that enable students to successfully meet these expectations fall under the umbrella of SRL.

SRL has been defined as the self-directed processes, personal beliefs, and intentional behaviors that are cyclically initiated and adjusted in order to attain desired outcomes or goals (Zimmerman & Cleary, 2009). Put more simply, SRL can be understood as the process by which

learners strategically organize and control their thoughts, feelings, and behaviors to achieve their

goals (Schunk & Usher, 2013), and it is characterized by several core features. One primary

component of SRL is the use of self-regulated learning strategies, defined as the behaviors and

processes that are purposefully and strategically employed to maximize one's effectiveness in the

learning process (Zimmerman, 1989). Such strategies may include environmental structuring to

enhance productivity, using imagery or mnemonic devices to improve retention, and setting

specific task goals (Zimmerman & Cleary, 2009).

Another core component of SRL is metacognition, or learners' active mental tracking of

the learning process, including thoughts and actions, environmental conditions, and performance

and reactions (Zimmerman & Cleary, 2009). Effective use of metacognition may lead to greater

self-awareness and improvements in subsequent learning activities. Motivation also plays an

essential role in SRL, as one must be self-driven to effectively engage in and sustain learning

efforts. An individual's motivation may be impacted by a variety of factors, including goal

orientation, beliefs about one's ability to learn or perform effectively in a specific context (i.e.,

self-efficacy), and beliefs about the ultimate results of performance (i.e., outcome expectations).

As a conception of teaching and learning, SRL involves providing students with suitable learning

environments, providing teachers with the ability to understand and recognize students' SRL

needs, and equipping teachers with methods that will promote the development of their students'

SRL skills (Tillema & Kremer-Hayon, 2002).

A cyclical model of SRL. An important goal of most SRL theories is to explain how a

learner uses personal feedback to effectively adapt to changing social, environmental and

personal conditions (Bandura, 1991; Zimmerman, 1989). This cycle of feedback, commonly

referred to as a feedback loop, is a key feature in most models of self-regulated learning and

involves the information a learner receives as a result of behavior or understanding that impacts

succeeding adaptations. Working from the social cognitive perspective, Zimmerman (2000a)

developed a three-phase model to illustrate the cyclical nature of the feelings, behaviors, and

cognitive processes associated with self-regulated learning. This model demonstrates the

interdependency of the essential personal, behavioral, and environmental influences of self-

regulation by organizing them within a framework of three phases of learning.

The first phase in Zimmerman's (2000a) model is referred to as forethought, during

which individuals employ self-regulated processes that help them prepare for future learning

behaviors. During this phase, a learner engages in task analysis and strategic planning to

deconstruct a task into its individual components, set learning and performance goals, and select

appropriate self-regulative strategies (Zimmerman & Cleary, 2009). These activities prepare an

individual for the second phase, referred to as performance control, during which one engages in

self-regulated processes while executing academic tasks. The performance phase involves a

number of self-control and metacognitive strategies that learners may utilize to maintain focus on

the task, maximize learning efforts, and monitor their own learning (Zimmerman & Cleary,

2009).

The third phase is referred to as self-reflection, during which an individual engages in

self-regulated processes that affect his or her response to the learning experience (Zimmerman &

Cleary, 2009). Learners make evaluate their performance to make self-judgments, make causal

attributions for their performance, and form self-reactions, including positive or negative affect

regarding performance and adaptive or defensive inferences about changes to make in future

learning efforts. The nature of the conclusions reached in the self-reflection phase impacts a

learner's behaviors in the subsequent forethought phase as the cycle repeats. A primary goal of

instruction and practice in SRL is to teach students to use this cyclical process of planning, monitoring, and reflecting in their learning.

SRL and student achievement. Educational research has indicated that deficits in SRL skills are a major underlying cause of academic underachievement (DiPerna, 2006). Students who struggle in school often lack a repertoire of effective learning strategies and have not learned how to evaluate and adapt their learning behaviors (Cleary & Zimmerman, 2004; Dembo & Eaton, 2000). While these deficits may not be apparent in the earlier grades, the transition to middle school represents a time in which self-regulation skills become critical for academic success. Students are faced with the demands of several teachers, greater academic expectations and emphasis on performance, and increased academic responsibilities outside of the classroom (Eccles, Midgley, & Adler, 1984). Students who are not equipped with the skills to navigate these changes are likely to develop maladaptive self-regulatory beliefs (e.g., external locus of control, low self-efficacy, devaluing of academics), disengage from school (e.g., lack of motivation and effort, poor attention, low or declining performance and work completion), and suffer from school-related stress (Rudolph et al., 2001).

A substantial research base has established training in SRL processes and skills as an effective means of improving students' academic performance. Unfortunately, many of these interventions tend to be delivered on an individual or small-group level to at-risk or struggling students and must be led by a highly trained practitioner or researcher (Cleary & Platten, 2013; Cleary et al., 2008; Dignath & Bütter, 2008). There is a need for a greater availability of classroom-based models of service delivery that can be easily trained and implemented by teachers in daily learning activities. The ability to learn and practice SRL processes and skills in

the context of the classroom can benefit well-performing, at-risk, and struggling students and help minimize the need for intervention referrals.

Research has indicated that students who demonstrate adaptive skills in controlling or managing learning behaviors, such as by setting goals and developing plans, tend to experience greater academic success (Zimmerman, 1989). Unfortunately, most educational reforms are far removed from the students in need, emphasizing changes to curriculum and structure, rather than increasing teachers' knowledge and skills and improving the quality of instruction and intervention services (Dembo & Eaton, 2000). Further, academic interventions tend to be adult-driven, focus on drills and remediation, and increase support from adults rather than empowering students to understand and control their own learning (Trustcott, 2005). For example, struggling students may receive remedial instruction, be given modified tests and assignments, or be placed in support classrooms.

The disconnect between the nature of current intervention strategies and the core underlying needs of struggling students is of particular interest to both educators and school-based practitioners, as research has demonstrated that context-specific instruction and practice in SRL is related to improvements in self-regulatory functioning and performance in both academic (e.g., science, mathematics, writing) and non-academic contexts (e.g., basketball free-throws) (Cleary & Platten, 2013; Cleary, Platten, & Nelson, 2008; Cleary, Zimmerman, & Keating, 2006). Unfortunately, research has indicated that teachers lack the necessary knowledge and training to teach and promote the use of SRL strategies in their classrooms (Dignath-van Ewijk & van der Werf, 2012; Tillema & Kremer-Hayon, 2002; Wehmeyer et al., 2000).

The Need for PD in SRL

In the past decade, a paradigm shift in both the field of school psychology and education as a whole has emphasized the importance of data-based decision-making grounded in context-specific assessments (Reschly, 2004). This shift has prompted some drastic changes in the field of education that have direct implications for students and teachers. As discussed, the development and adoption of the Common Core State Standards (CCSS) has led to changes in both classroom practices and achievement standards. Students are being assessed on a more frequent basis, and teachers must use these assessments to document student growth. Districts are also adopting more standardized systems of teacher evaluation that assess teachers' demonstration of specific classroom behaviors and skills. In particular, educational legislature and evaluative criteria now emphasize a need for teachers to promote students' active role and responsibility in classroom activities and the learning process as a whole.

The move toward more context-specific assessment, data-based decision making, and evidence-based practices also has implications for service delivery. Schools are moving toward alternative models of assessment and intervention for at-risk students, such as through problem-solving and response-to-intervention (RTI) methods (Fuchs & Fuchs, 2006). This has shifted the target of service delivery from trait-like abilities, such as IQ, to context-specific skills, known as academic enablers, that have been demonstrated to facilitate and increase academic achievement and performance (Cleary, 2011; Cleary, et al., 2010; DiPerna, 2006; Reschly, 2004). Unfortunately, research indicates that many schools are lagging in their ability to adopt these new practices. Results from Truscott and colleagues' (2005) national survey indicated that only 4% of responding pre-referral teams reported having a goal of evaluating student progress to inform data-based decisions.

SRL interventions are ideal in this developing era of education and school psychology, as many academic enablers, such as motivation, self-regulation, and classroom engagement, are core targets of SRL programs. Further, the CCSS and teacher evaluation systems are placing great emphasis on the skills encompassed by SRL (Common Core State Standards Initiative, 2014; The Danielson Group, 2013). Research examining the current practices, knowledge, and PD needs of teachers and school psychologists has indicated a great need for the implementation of SRL training, assessments, and interventions in schools (Cleary, 2011; Cleary, Gubi, & Prescott, 2010). Both teachers and school psychologists have indicated that they perceive issues related to SRL to be highly valuable and relevant not only to students, but also to their own professional roles. For example, Cleary and Zimmerman (2006) conducted a study to examine special education teachers' perceptions of the advantages and utility of motivation and self-regulation assessment data relative to the cognitive and academic information presented in traditional psychoeducational reports. Teachers reported the motivation and self-regulation assessment data to be significantly more useful in intervention planning, improving students' academic functioning, and professional-related activities (e.g., parent-teacher conferences). Unfortunately, teachers also reported to be less familiar with this type of information, as it was rarely provided to them, and they lacked the training to conduct such assessments themselves (Cleary & Zimmerman, 2006).

The dearth of SRL-related information and lack of teacher familiarity with SRL has direct implications for students in need. Research has shown that students with SRL-related difficulties are frequently identified as needing intervention services. In a study of school psychologists in urban and suburban settings, between 17% and 27% of school psychologists in both contexts reported motivation to be a top-four referral concern, and the frequency rates of

such referrals were similar to or higher than many other referral concerns (e.g., deficits in academic skills, intellectual problems, and internalizing symptoms) (Cleary et al., 2010). It is unsurprising, then, that these school psychologists also rated PD in motivation and self-regulation as primary areas of interest across domains of both assessment and intervention.

This line of survey research highlights an apparent disconnect between teachers' and school psychologists' beliefs about the need for SRL-related assessments and interventions and their actual availability and use in schools. The services and interventions provided to struggling students (e.g., remedial instruction and tutoring, modified tests and assignments, and placement in support classrooms) do not tend to address the underlying pervasive skill deficits that may be impacting learning and academic engagement. Most current services also do not align with the growing trend toward data-based decision-making and alternative service delivery. Further, the current model of individualized intervention services targets only those students who struggle enough to be identified as in need. All students, however, may benefit from practice in the use of SRL strategies at the classroom level, and this may prevent many students from experiencing failure and requiring more intensive intervention services.

Further supporting the need for teacher PD in SRL is the proposition that teachers who have experienced and applied the learning strategies which they expect their students to use may be better able to understand their students' learning experiences (Tillema & Kremer-Hayon, 2002). Unfortunately, as has been discussed, teachers are often not trained in the area of SRL. An examination of student teacher education found that, while teachers may be exposed to the general theory of SRL, they do not receive meaningful instruction or practice in its application (Tillema & Kremer-Hayon, 2002). Thus, providing teachers with the opportunity to develop their knowledge and skills in SRL may deepen their understanding of the learning process and better

equip them to recognize and address the needs of struggling students without referral for intervention.

Characteristics of Effective PD

Though research is limited, it is possible to extract from the literature some of the qualities that characterize effective PD programs. In their reviews of the PD literature, Hill (2007) and Desimone (2009) identified comparable critical features that research suggests impact that effectiveness of PD trainings. The first factor, which Desimone (2009) argues may be the most influential, is the *content* of PD. Research indicates that the content should be focused on subject-specific instruction and specific factors that impact student learning. A second critical element of PD is *active learning*. Teachers should be presented with opportunities to become engaged with the material presented, such as through role-plays, guided practice, interactive feedback, and discussions. Another important feature of PD is its degree of *coherence* with the instructional goals, curriculum materials, and improvement efforts specific to teachers' schools. This increases the relevance and utility of the content of the PD. Hill (2007) and Desimone (2009) also identify *duration* as a key feature. The amount of time spent in a particular PD training, including both the length of each session and the span of the training as a whole, has been shown to be important, with a greater time investment having a stronger effect on learning and teaching. The final feature of effective PD programs is *collective participation*. Research indicates PD trainings that involve participation by an entire school, grade level, or specific department may lead to greater teacher learning, improved teaching, and, ultimately, a greater impact on student outcomes (Desimone, 2009; Hill, 2007).

Peters-Burton, Cleary, and Forman (2015) present a particularly relevant model for professional development that recognizes the importance of SRL processes in teachers' skill

acquisition and mastery. As illustrated by Figure 1, their model employs feedback loops as the

core underlying mechanism by which teachers apply and practice the knowledge and strategies

learned during didactic training. Through the use of didactic training, guided practice, and

structured coaching sessions, teachers systematically and cyclically engage in the three SRL

phases of forethought, performance, and self-reflection. Data gathered during each phase enables

the trainer to identify gaps or weaknesses in teachers' regulatory thoughts and processes as they

apply newly learned skills. The trainer can then use this information to provide appropriate

instructional support and scaffolding, adapt PD activities, and maximize teacher learning and

skill development.
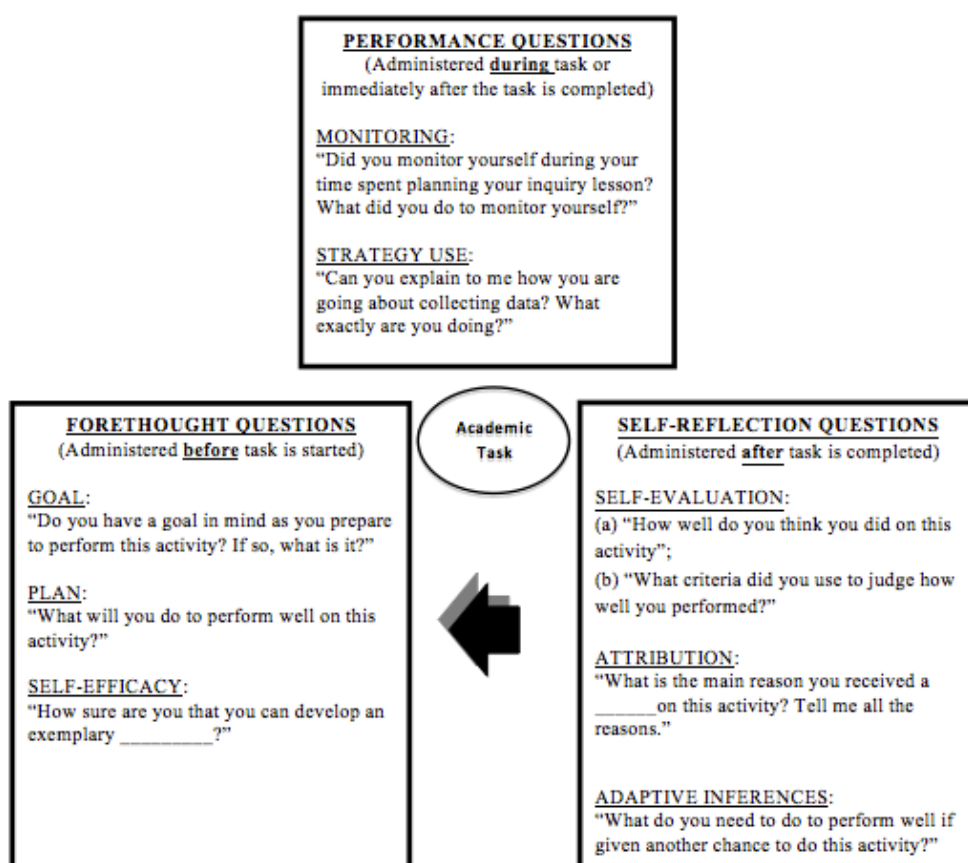
Figure 1. Selected examples of SRL microanalytic questions administered before, during, and after PD participants complete a PD task. Adapted from "Professional Development Contexts that Promote Self-Regulated Learning and Content Learning in Trainees" by E. E. Peters-Burton, T. J. Cleary, and S. G. Forman, 2015.

Goals of PD in SRL

  Increasing teachers' knowledge and skills. With increasing expectations and changing achievement standards and evaluative criteria, it is important that teachers be equipped with the knowledge and skills to successfully adapt classroom practices to meet the state and local educational standards. The Danielson model, a widely adopted framework for evaluating educators, even recognizes that teachers will have to acquire new skills in order to effectively implement the CCSS. However, while teachers may receive PD training on the content of the CCSS and procedures of newly adopted evaluation models, they are not likely to be trained in the implementation of techniques and strategies that will ensure that their classroom practices are aligned with these standards.

  Overall, teachers are expected to design classrooms that promote and support skills and behaviors that fall under the umbrella of SRL. Students can be described as self-regulated learners in the degree to which they personally and proactively initiate, guide, and adapt their own efforts to develop knowledge and skills (Zimmerman, 1989). The ultimate goal of the framework the drives the CCSS and Danielson model is to develop students who can independently engage in the planning, self-monitoring, and self-reflection and adaptation phases of learning. Unfortunately, as discussed, research suggests that teachers lack the necessary education and training to teach and promote the use of such strategies in their classrooms (Dignath-van Ewijk & van der Werf, 2012; Tillema & Kremer-Hayon, 2002; Wehmeyer et al., 2000). Thus, it is critical that PD programs address teachers' knowledge and skill deficits in the area of SRL.

  Increasing teachers' self-efficacy. While increasing teachers' knowledge and abilities are important key goals of any training program, PD activities also need to foster teachers' self-

efficacy beliefs in implementing newly learned skills in the classroom and impacting their

students' success. Perceived self-efficacy can be understood as the personal judgments a person

makes regarding his or her capabilities to perform specific actions at a particular level of

performance (Bandura, 1977). According to self-efficacy theory (Bandura, 1977), the strength of

one's beliefs in one's own efficacy affect whether he or she will attempt to cope with various

situations. That is, perceived self-efficacy impacts a person's choice of behavioral settings. A

person is likely to avoid situations associated with low self-efficacy. In contrast, a person is

likely to behave assuredly, engage actively, and persist through challenges in behavioral settings

associated with high perceptions of self-efficacy. Thus, teachers' perceptions of their own

abilities may affect their motivation to attempt to apply new techniques learned through PD.

　　　Not only can self-efficacy beliefs impact whether teachers attempt and persist to transfer

skills learned in PD to classroom practices, but research has indicated a relationship between

teachers' sense of efficacy and student motivation and achievement (Eccles et al., 1993; Karimi,

2011). For example, a recent study demonstrated a positive relationship between teachers' sense

of efficacy and student achievement in reading (Cantrell et al., 2013). In a study of the transition

from sixth to seventh grade, students who moved from mathematics teachers with high-self-

efficacy to mathematics teachers with low self-efficacy experienced significantly lower

expectations for success in math, lower perceptions of math performance, and higher perceptions

of math difficulty than students who experienced no change in teacher self-efficacy or those in

classrooms with high teacher self-efficacy (Eccles et al., 1993). A key point relevant to the

current study is that research has indicated that participation in and application of PD activities

can be an effective means of increasing teachers' sense of self-efficacy (Karimi, 2011; Ross &

Bruce, 2007; Zambo & Zambo, 2008).

Primary Objectives

The current project was conducted to address two primary objectives. First, a single group pretest-posttest design was used to evaluate the effectiveness of a previously developed (Cleary, 2011) SRL professional development workshop on increasing teacher knowledge, skills, and self-efficacy beliefs. Second, qualitative data was collected through individual interviews with a small subgroup of teachers who participated in the workshop. The purpose of the interviews was to gather information regarding teachers' reactions to and evaluations of the workshop, training and support needs for implementation of SRL strategies in the classroom, perceptions of the characteristics of a feasible and effective coaching model, and barriers to implementation. The study aimed to address the following research questions and hypotheses:

Quantitative research questions.

1. **Do teachers who participate in the workshop demonstrate greater knowledge of SRL at posttest than at pretest?** It was hypothesized that teachers would demonstrate significantly greater knowledge of SRL at posttest than at pretest.

2. **Do teachers who participate in the workshop demonstrate a greater ability to apply SRL intervention strategies at posttest than at pretest?** It was hypothesized that teachers would demonstrate a greater ability to apply SRL to a case example of a struggling student at posttest than at pretest.

3. **Do teachers who participate in the workshop demonstrate greater self-efficacy beliefs for integrating SRL strategies in their classrooms at posttest than at pretest?** It was hypothesized that teachers would demonstrate significantly greater self-efficacy for promoting SRL in the classroom at posttest at pretest.

4. **What are teachers' perceptions of the social validity of the workshop's procedures**

and effects? The social validity survey served as the measure of teachers' perceptions of the acceptability of the workshop's procedures and the importance of its effects.

Qualitative research questions.

1. **What are teachers' reactions to the PD workshop?**

2. **What are teachers' perceptions of the additional training and support they would require to implement the skills taught in the PD workshop?**

3. **What characteristics and methods of a coaching program do teachers perceive as most important and feasible?**

4. **What barriers do teachers anticipate in (a) implementing new skills and (b) implementing a coaching program?**

Methods

Participants

   Target school. The target population for this study consisted of middle school and high

school teachers of all subject areas in the Highland Park school district in Highland Park, New

Jersey during the 2014-2015 school year. Highland Park is a suburban community with

approximately 13,000 residents and a median household income of about $72,000. According to

the 2010 Census, the demographic composition of Highland Park is: 63.6% White, 17.8% Asian,

9% Hispanic, 7.3% African American, and 2.3% Other.

   Demographic information regarding Highland Park middle school and high school was

gathered from publically accessible school performance reports provided by the New Jersey

Department of Education (NJDOE) from the 2012-2013 school year. At that time, a total of 356

students (164 female, 182 male) were enrolled at the middle school, with a student-to-faculty

ratio of 9:1. Highland Park Middle School was identified as a Focus school under No Child Left

Behind (NCLB) regulations due to significant within-school gaps in achievement. In the 2012-

2013 school year, a total of 449 students (219 female, 230 male) were enrolled in the high school,

with a student-to-faculty ratio of 10:1. At the end of the 2012-2013 school year, the four-year

graduation rate was 94%. According to the Highland Park Board of Education Policy 3240, all

teaching staff must participate in a minimum of 100 hours of state-approved professional

development and/or in-service training every five years.

   Participant demographics. A total of nine teachers, eight of whom were female,

participated in the professional development workshop. Eight of the teachers identified as white,

and one identified as Asian/Pacific Islander. Two of the teachers were younger than age 30, five

were between the ages of 30 and 49, and two of the teachers were over the age of 50. At the time

of the workshop, two of the participants were middle school special education teachers, and seven participants were high school teachers. Of the high school teachers, three taught special education. Four of the teachers' highest degree completed was a bachelor's degree, and five teachers had completed their master's degrees. Two of the teachers were actively enrolled in courses toward earning an additional degree. Three of the participants had less than five years of teaching experience, five participants had between 10 and 24 years of teaching experience, and one participant had over 25 years of teaching experience. See Table 1 for a breakdown of participant demographics.

Recruitment of teachers. In September of 2014, the primary researcher presented preliminary plans for the present study to the Superintendent of the Highland Park school district. The Superintendent indicated his approval and support for the study. The primary researcher met with the principals of Highland Park Middle School and Highland Park High School in November of 2014 to explain the proposed study, gain approval and support, and begin the planning process.

In January of 2015 all teachers at Highland Park Middle School and Highland Park High School were informed of the upcoming voluntary PD program, scheduled to occur in April of 2015. Information about the PD workshop, including the title and description, date, time, and location were included in a booklet of in-district PD opportunities distributed to all staff. The primary investigator also wrote a recruitment letter to the middle school and high school teachers, including information about the workshop and the purpose of the study. This letter, along with the participation consent form, was placed in all teachers' mailboxes and was also sent via e-mail. This recruitment e-mail was sent two additional times. Interested teachers were asked to sign up to participate.

Table 1

Participant Demographics

Variable	Frequency *n* (%)
Gender	
Male	1 (11.1%)
Female	8 (88.9%)
Age	
29 or younger	2 (22.2%)
30-39	4 (44.4%)
40-49	1 (11.1%)
50-59	2 (22.2%)
Ethnicity	
White	8 (88.9%)
Asian/Pacific Islander	1 (11.1%)
Education	
Bachelor's Degree (Education)	3 (33.3%)
Bachelor's Degree (Other)	1 (11.1%)
Master's Degree (Education)	4 (44.4%)
Master's Degree (Other)	1 (11.1%)
Continuing Education	
No	7 (77.8%)
Yes	2 (22.2%)
Years of Teaching Experience	
0-4	3 (33.3%)
10-14	2 (22.2%)
15-19	1 (11.1%)
20-24	2 (22.2%)
25 or more	1 (11.1%)
SRL Training	
No	7 (77.8%)
Yes	2 (22.2%)
Grade Level Taught	
Middle School	2 (22.2%)
High School	7 (77.8%)
Special Education Certification	
No	4 (44.5%)
Yes	5 (55.6%)

A total of 76 teachers were invited to participate in the workshop. This included teachers in the areas of: English Language Arts (*n*=14, 18.4%), science (*n*=8, 10.5%), mathematics (*n*=7, 9.2%), social studies (*n*=7, 9.2%), world language (*n*=7, 9.2%), special education (*n*=15, 19.7%),

physical education (*n*=5, 6.6%), family and consumer science (*n*=1, 1.3%), visual and

performing arts (*n*=8, 10.5%), and technology (*n*=4, 5.3%). Participating teachers earned credit

toward their required hours of professional development experience.

Teachers who participated in the workshop were also asked to volunteer to participate in

the second phase of the PD program, which involved individual interviews to provide feedback

about the workshop and input toward the development a coaching framework for continued

training and support. A subgroup of four teachers volunteered to participate. Each of these

teachers engaged in two individual interviews with the primary researcher, with each interview

lasting approximately 45 minutes. Table 2 outlines the demographic information of each of the

four teachers who participated in the interviews.

Table 2

Demographic Information of Interviewed Teachers

Teacher	Gender	Age	Years teaching	Grade level	Special education	Highest degree
A	Female	29 or younger	0-4	High School	Yes	Master's
B	Female	50-59	20-24	Middle School	Yes	Master's
C	Female	40-49	15-19	High School	Yes	Bachelor's
D	Female	30-39	0-4	High School	Yes	Bachelor's

Measures

Demographic information. Teachers' age, gender, ethnicity, subject area, grade level,

education, and years of teaching experience were obtained through self-reports. Refer to

Appendix B for the full demographic survey.

Teacher knowledge of SRL. In order to assess for knowledge of SRL, teachers were

asked to provide a written response to the question, "*How would you define and describe self-*

regulated learning? Provide as many details as you can" (see Appendix C). The use of an open-ended probe was chosen so as not to bias or influence teachers' responses. This measure was administered at pretest and posttest to assess for changes in SRL knowledge (see *Design*).

Coding. Teachers' responses were coded for the inclusion of key features of SRL in accordance with a method employed in previous examinations of SRL knowledge (Dignath-van Ewijik & van der Werf, 2012; Lonka, Joram, & Bryson, 1996). Terms to be included in the coding scheme were identified through an examination of definitions of SRL presented throughout the literature. Convergence among definitions was used to create a list of nine descriptive terms and six regulatory processes to be coded in teachers' responses. The nine descriptive terms were: (1) process, (2) cyclical, (3) strategic, (4) metacognitive, (5) feedback, (6) adaptation, (7) proactive, (8) manage, and (9) achieve goals. The six regulatory processes were*:* (1) goal-setting, (2) planning, (3) self-motivation strategies, (4) self-control strategies, (5) self-observation strategies, and (6) self-reflection. All components of SRL included in the coding were presented and explained in the PD workshop. Teachers' responses to the knowledge of SRL measure were coded for the presence of each identified descriptor or process of SRL, including close synonyms, with a maximum score of 15. Refer to Appendix D for the full coding scheme, including synonyms and related terms that were included within each category.

The primary researcher trained a second coder on the coding scheme. The primary researcher and second coder engaged in a dialogue following their independent coding of each response to ensure consistency of coding and clarify discrepancies. This procedure is consistent with recommendations for the coding of qualitative data developed by the Interdisciplinary Qualitative Research Subcommittee (IQRS) of the Task Force on Evidence-Based Interventions

in School Psychology, as presented in Nastasi and Schensul (2005). See Appendix E for the chart used to record the results of the coding for participants' responses.

Teacher application of SRL. Participants were presented with a short case vignette describing a struggling student, "Dan," with SRL deficits. Teachers were then given the following instruction: *Create a list describing specific things you could do in your classroom to help improve Dan's self-regulated learning* (see Appendix F). This activity served as a measure of teachers' skills in applying SRL. Similar open-ended questions have been used in past research to assess teachers' behavior regarding the use of SRL with students (Dignath-van Ewijik & van der Werf, 2012). As mentioned with the measure of teacher knowledge, the use of an open-ended assessment measure was chosen so as not to direct teachers' responses.

Coding. Teachers' responses were coded for the inclusion of strategies targeting key regulatory processes involved in the forethought, performance, and self-reflection phases of SRL. Through a review of SRL components and strategies included in the literature, a total of seven categories of SRL strategies, all of which were covered in the PD workshop, were identified for use in the coding scheme. The seven SRL strategy categories were: (1) goal-setting, (2) planning, (3) motivation, (4) environmental structuring, (5) learning and studying, (6) self-monitoring, and (7) self-reflection. Refer to Appendix G for the full coding scheme, including examples of specific strategies that were included within each category. Each category could only be counted once within a participant's response, regardless of the number of strategies identified. Thus, teachers' scores on this measure were a reflection not of the total number of strategies, but of the number of different *types* of strategies they could apply. As with the measure of teacher knowledge of SRL, the primary researcher and second coder engaged in a dialogue following

their independent coding of each response to ensure consistency of coding and clarify

discrepancies.

Teacher efficacy for promoting SRL. A scale measuring teachers' self-efficacy beliefs

was created using and adapting items from the Teacher Sense of Efficacy Scale (TSES)

(Tschannen-Moran & Woolfolk Hoy, 2001) and self-efficacy scales provided in Bandura's

Guide for Construction Self Efficacy Scales (2006). Based in the principles of Bandura's social-

cognitive conceptualization of self-efficacy, the TSES is a widely used and accepted measure

with adequate reliability. The TSES includes a long (24-item) and short (12-item) version, both

of which use a 9-point Likert scale to examine teachers' self-efficacy beliefs in the specific

domains of instructional strategies, classroom management, and student engagement. Previous

research has reported Cronbach's alpha for the full scale at .94, with the factor coefficients

ranging from .87 to .91. Cronbach's alpha for the short scale has been reported at .90, with the

factor coefficients ranging from .81 to .86 (Tschannen-Moran & Woolfolk Hoy, 2001).

To create the scale used in the current study, items from the TSES and self-efficacy

scales presented by Bandura (2006) were used as models to create questions specific to teachers'

feelings of self-efficacy for their ability to incorporate and apply SRL skills and strategies in the

classroom (see Appendix H). Teachers were provided with the stem, "*How confident are you*

that you can…," followed by ten items (e.g., "help students use feedback to improve their

performance"). Teachers responded to each item using a five-point Likert scale, ranging from 1

(*cannot do at all*) to 5 (*highly confident I can do*). Cronbach's alpha for the scale used in the

current study was .94 at pretest and .85 at posttest.

Social validity. At posttest, all participants completed a survey regarding the social

validity of the professional development workshop. The social validity questionnaire was

adapted from scales used in previous research (Cleary & Platten, 2013). This measure assessed

two dimensions of social validity as defined by Wolf (1978): (a) social acceptability of

procedures and (b) social importance of effects. Participants responded to nine survey items

using a five-point Likert scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), with

higher scores representing a greater degree of acceptability and consumer satisfaction. A sample

item related to acceptability of procedures includes, "The workshop contained too much

information. A sample item related to importance of effects includes, "The professional

development workshop increased my knowledge of self-regulated learning." Refer to Appendix I

for the full social validity scale. Cronbach's alpha for this scale was .52. An examination of

inter-item correlations revealed that neither item 5 nor item 8 had a significant positive

correlation with any other item within the scale. Further, item 5 was negatively correlated with

six of the items within the scale, and item 8 was negatively correlated with seven items. After

removing these two items from the reliability analysis, Cronbach's alpha increased to .72.

Design and Procedures

       PD workshop. This study was originally intended to utilize a pretest-posttest waitlist

control group design with random assignment. Due to low participant enrollment and difficulty

acquiring other venues for recruitment, a one group pretest-posttest within-subjects design was

employed to examine the effectiveness of the professional development workshop (see Figure 2).

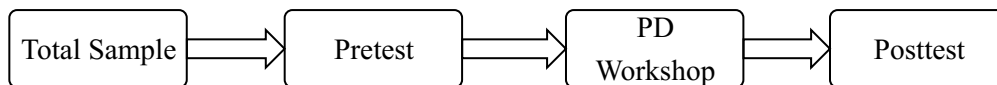The PD workshop represented the independent variable.

Figure 2. Pretest-posttest within-subjects design.

The primary investigator conducted the PD workshop and all assessments. The day of the workshop, all participants were asked to independently complete the survey of demographic information and all pretest measures: teacher knowledge of SRL, teacher application of SRL, and self-efficacy for promoting SRL. Teachers then attended the workshop, which was held in a classroom at Highland Park Middle School and consisted of one three-hour session with a 10-minute break after the first 90 minutes. Instructional content and procedures for the PD were adapted from the materials of an existing teacher training workshop (Cleary, 2011). The information was presented in PowerPoint format projected on a screen at the front of the room, and all teachers were given printed copies of the slideshow. Instructional content focused on increasing teachers' knowledge of SRL, including the theoretical foundation, core processes and features of SRL, the relationship between SRL and academic achievement, and key SRL strategies that teachers may use to help their students think cyclically about learning.

The presentation was divided into five content sections, outlined in Table 3. At the beginning of each section, participants were provided with "target concepts" that would be addressed. Each instructional section included direct instruction, group discussion, and visual illustrations to facilitate the participants' understanding of the content. At the conclusion of each section, participants were presented with "take-home points" to summarize the key information. In addition to didactic instruction, the workshop included active learning activities to give teachers the opportunity to practice applying SRL strategies. For example, teachers engaged in small group discussions to identify SRL deficits and potential SRL strategy interventions based on a vignette of a struggling student. At the conclusion of the presentation, the teachers engaged in a group discussion of ways to infuse SRL into daily learning activities, which strategies would be the most feasible to implement, and the challenges to incorporating SRL into the classroom.

Table 3

Overview of PD Workshop

Target concept	Instructional components	Key points
What is SRL?	- Activity: case example - Define SRL - Zimmerman's 3-phase cyclical model - Underlying assumptions of SRL	- Self-regulation is not one thing or a trait. - SRL is a set of inter-related, changeable thoughts, feelings, and actions that facilitate how students can attain goals. - Learning environments and how students think can influence how well they can manage and direct their own learning.
Why is an emphasis on teaching students to think and act in a cyclical fashion important?	In-depth examination of study conducted by Cleary, Zimmerman, & Keating (2006)	- Teaching students to use a task strategy plus having them engage in cyclical regulatory thinking during practice will often enhance achievement. - It is not simply the quantity of practice that leads to improved performance, but the quality and process of the practice. - An awareness of process can lead to more effective reflection and adaptation.
What is the role of self-reflection in the cyclical feedback model?	- Activity: reflect on personal responses to experiencing failure - Define attributions & adaptive inferences - Discuss relation to Cleary, Zimmerman, & Keating (2006)	Training students to monitor their mistakes, errors, etc. on a particular task and their use of strategies or processes will lead to adaptation.
What prompts students to become more engaged and motivated?	- Define goals and essential characteristics - Define self-efficacy - Tactics to improve self-efficacy	- Break down a task into key component parts and provide evaluative feedback about each of those parts. - Help students understand that success is not an all-or-nothing phenomenon, but that there are different components of success. - Set up instruction, activities, and discussion so that students' skills and progress can be repeatedly demonstrated and observed, and they can experience mastery and success across discrete skills.
What are self-regulation strategies?	- Difference between learning strategies and self-regulation strategies - Examples of environmental structuring, help-seeking, and self-motivation strategies	Self-regulation strategies target processes embedded within the cyclical feedback loop and are designed to optimize the extent to which one can use learning strategies.

At the conclusion of the workshop, all presentation materials and notes were collected to prevent the participants from referencing them when completing the posttest measures. Four days following the workshop, posttest measures (i.e., teacher knowledge of SRL, teacher application of SRL, self-efficacy for promoting SRL, and the social validity survey) were delivered to participants in sealed envelopes labeled with their corresponding participant ID numbers. This delay in posttest was intended to ensure that the teachers' responses did not reflect their immediate short-term memory of the workshop content, but of information learned and internalized. As the workshop occurred on a Thursday, the primary investigator delivered posttest measures to the participants on the following Monday. Teachers were instructed to complete the measures independently without the use of external sources (e.g., the Internet). Participants were able to retrieve their workshop packets and notes from the primary investigator following the collection of all posttest data.

Teacher interviews. The objective of the second phase of the study was to gather feedback that could be used to inform a PD model that would be perceived by teachers as effective, feasible, and as providing them with the necessary training and supports to increase their skills in applying SRL to their students. Following the PD workshop, four participating teachers volunteered to engage in a set of two individual interviews with the primary investigator, each with a duration of approximately 45 minutes. The primary investigator recorded participants' responses in typed format during the interview sessions, notating when responses were recorded verbatim. See Appendix J for the full interview protocol used for each session.

The first interview session focused on gathering feedback about the workshop, including its strengths and weaknesses, what teachers learned, what remained unclear, and what additional information and supports would be needed to help teachers feel confident applying the workshop

content in the classroom. At the conclusion of the first interview, each teacher was given the following instruction: "*Choose one of the components of SRL intervention that you would like to be able to use with your students. In the next two weeks, think about how you this SRL process or strategy as part of a lesson plan. Make note of the questions you have, things that remain unclear, and your additional support and training needs. In our next discussion, we will reflect on your experiences.*"

In the second interview, teachers were asked to discuss their experiences in reflecting on applying SRL to their classrooms. Specifically, this interview was designed to generate data about teachers' remaining questions and additional training and support needs, their perceptions of effective, necessary, and feasible coaching methods, and anticipated challenges to the implementation of both SRL skills and job-based coaching. Teachers provided feedback regarding the frequency, duration, and structure of coaching sessions, including their perceptions of the importance and feasibility of the following strategies, which have been identified and utilized in previous research (Forman, 2015; Peters-Burton et al., 2015; Shernoff et al., 2011): classroom observations with feedback sessions, one-on-one consultation, group consultation, peer consultation, and support through electronic communication.

Qualitative analysis. Individual interviews with a subgroup of four participating teachers were conducted to gather information regarding teachers' impressions of and reactions to the PD workshop and their beliefs and perceptions regarding the essential features and potential barriers to using a supplemental coaching component. For this latter part, teachers were asked about the characteristics of a coaching framework, using methods they perceived as most important and feasible, that could be used to supplement PD workshop. The term *importance* refers to the perceived necessity of the elements of the coaching program for enhancing teachers' knowledge,

abilities, and confidence in applying the skills learned in the workshop. The term *feasibility*

refers to the ease with which the coaching procedures can be implemented and incorporated into

teachers' schedules and routines.

Teachers' responses to the interview questions were analyzed using the qualitative

methodology of Classical Content Analysis. Also known more simply as *content analysis*, this

technique is commonly used when the source of the data is dialogue. The purpose of content

analysis is to determine the most relevant and frequently cited concepts throughout the data by

calculating the frequency with which codes are identified. Using this method, a researcher reads

through the set of data, then chunks the data into meaningful parts with descriptive labels or

codes. These codes are then grouped together by similarity, and a frequency count for the use of

each code is conducted across participants. This process enables the researcher to identify the

most relevant themes generated by the participants' responses (Leech & Onwuegbuzie, 2008).

Research Questions and Analyses

This section presents the primary research questions and hypotheses in this study and the

statistical and analytical procedures used to address these questions. Appendix K provides

detailed tables outlining this information. The present study was conducted to answer three

primary research questions related to the program's impact on teachers' knowledge, skills, and

self-efficacy beliefs, and to develop a socially valid coaching model.

Quantitative data. The following research questions and hypotheses addressed aspects

of the professional development that were analyzed using quantitative statistical procedures.

1. **Do teachers who participate in the workshop demonstrate greater knowledge of**

   SRL at posttest than at pretest? It was hypothesized that teachers would demonstrate

   significantly greater knowledge of SRL at posttest than at pretest. Teachers' responses to

the SRL knowledge measure served as the measure of SRL knowledge. Paired samples t-tests were conducted to determine whether the workshop resulted in statistically greater SRL knowledge.

2. **Do teachers who participate in the workshop demonstrate a greater ability to apply SRL intervention strategies at posttest than at pretest?** It was hypothesized that teachers would demonstrate a greater ability to apply SRL intervention strategies to a case example of a struggling student at posttest than at pretest. Teachers' responses to the SRL application measure served as the measure of skill in SRL application. Paired samples t-tests were conducted to determine whether the workshop resulted in statistically greater skill in SRL application.

3. **Do teachers who participate in the workshop demonstrate greater self-efficacy beliefs for integrating SRL strategies in their classrooms at posttest than at pretest?** It was hypothesized that teachers would demonstrate significantly greater self-efficacy for promoting SRL in the classroom at posttest at pretest. Teachers' scores on the self-efficacy measure served as the measure of self-efficacy. Paired samples t-tests were conducted to determine whether the workshop resulted in statistically greater self-efficacy for promoting SRL in the classroom.

4. **What are teachers' perceptions of the social validity of the workshop's procedures and effects?** The social validity survey served as the measure of teachers' perceptions of the acceptability of the workshop's procedures and the importance of its effects.

Qualitative data. The following research questions addressed aspects of the individual interviews that were analyzed using the qualitative method of classical content analysis.

1. **What are teachers' reactions to the PD workshop in terms of its strengths,**

weaknesses, and additional training needs?

2. **What are teachers' perceptions regarding the additional training and support they would require to implement the skills taught in the PD workshop?**

3. **What characteristics and methods of a coaching program do teachers perceive as most important and feasible?**

4. **What barriers do teachers anticipate in (a) infusing SRL principles with their students, and (b) participating in a supplemental coaching training program?**

Results

This chapter examines the results from the data analytic techniques performed. Before

engaging in statistical and qualitative analyses to address the primary research questions, the

dataset was screened for missing and invalid data. Descriptive statistics, including frequency

counts and minimum and maximum response values, indicated that there were no missing or

invalid responses (e.g., responses outside of an item's Likert scale range). Because paired

samples *t*-tests assume a normal distribution of the difference between paired values, the data

were statistically and visually examined for normality. The Shapiro-Wilk statistic was non-

significant for the paired differences of all three dependent variables, indicating that normality

can be assumed, and this was supported by visual inspection using histograms and boxplots. The

skewness statistic for the difference in the knowledge of SRL measure was -0.75, indicating a

moderately negative skew (Bulmer, 1979). The skewness statistic for the difference in the

application of SRL measure was 0.04, indicating an approximately symmetrical distribution. The

skewness statistic for the difference in the self-efficacy measure was -0.58, indicating a

moderately negative skew. Descriptive analyses were conducted to examine participant

characteristics, as described in the previous section.

Power Analysis

Under the original pretest-posttest waitlist control group design, it was determined that a

sample size of 50 teachers, with 25 teachers in each condition, was necessary to have an 80%

chance of detecting a large effect at $\alpha = .05$, using Cohen's *d* as the measure of effect size. Prior

to conducting the analyses for the primary research questions from the changed design, a

statistical power analysis was conducted to determine the chance of determining a small, medium,

and large effect for each variable based on a dependent-samples design with a sample size of

nine. Using Cohen's *d* as the measure of effect size, it was determined that the study's parameters produced an 8.1% chance of detecting a small effect, a 29.1% chance of detecting a medium effect, and a 61.6% chance of detecting a large effect ($p = .05$). This indicates that the sample size obtained did not produce sufficient power at or above the recommended beta level of 0.80 to detect even a large effect. While statistical significance will still be reported, it must be emphasized that there was a restricted ability to detect even a large effect, leaving high potential for a Type II error, or falsely conveying non-significant results even when a true effect may exist. Due to this lack of adequate power, an emphasis is placed on acknowledging the measured effect sizes for each dependent variable.

Empirical Analysis of Gain Scores

Descriptive analyses and paired samples t-tests were conducted to assess pretest-posttest changes across three teacher variables: knowledge of SRL, application of SRL, and self-efficacy for promoting SRL. Because the social validity survey was only administered at posttest, descriptive analyses were conducted to assess teachers' responses to this measure.

Teacher knowledge of SRL. A paired samples *t*-test was conducted to examine a pretest-posttest shift in the total number of SRL-related terms that the teachers included in their response to the knowledge question (see Table 4). Consistent with a priori expectations, there was a significant increase in teacher knowledge of SRL at posttest ($t = 3.49$, $p = .008$, $d = 1.16$). Specifically, teachers identified an average of about three more key descriptors and regulatory processes in their definitions of SRL at posttest than at pretest. The effect size was large, as measured by Cohen's *d*, suggesting that the shift in the teachers' knowledge was substantial and of clinical importance.

Table 4

Descriptive Statistics and t-Tests Across Measures

Measure	Pretest M (SD)	Posttest M (SD)	Mean difference M (SD)	Paired samples t-test
Teacher knowledge of SRL	2.67 (1.50)	5.89 (2.37)	3.22 (2.77)	3.49**
Teacher application of SRL	2.56 (1.42)	4.00 (1.22)	1.44 (1.88)	2.31*
Teacher self-efficacy	3.52 (0.93)	3.92 (0.49)	0.40 (0.77)	1.56

*$p = .05$

**$p < .01$

To better understand the nature of this shift in SRL knowledge, descriptive statistics were used to examine the frequency with which each codeable term was identified at pretest and posttest (see Table 5). At pretest, the descriptors and components most frequently included in teachers' definitions and descriptions of SRL were: proactive (55.6%), goal-setting (44.4%), and self-observation strategies (44.4%). However, at posttest, the SRL descriptors and components most frequently included in teachers' definitions included: metacognitive (77.8%), adaptation (66.7%), and self-reflection (66.7%). Descriptive analysis indicated that 9 of the 15 coded SRL descriptors and processes were identified by at least one participant at pretest. At posttest, 14 of the 15 categories were present in at least one participant's response. Of particular interest was that references to *metacognitive* features, which was not identified at pretest, was identified by seven participants at posttest, while *self-reflection*, which was identified by only one participant at pretest, was mentioned by six participants at posttest.

Table 5

Frequency of SRL Descriptors and Processes Identified in Knowledge Measure

Term	Pretest frequency *n* (%)	Posttest frequency *n* (%)
Descriptors		
Process	0 (0%)	4 (44.4%)
Cyclical	0 (0%)	4 (44.4%)
Strategic	0 (0%)	0 (0%)
Metacognitive	0 (0%)	7 (77.7%)
Feedback	0 (0%)	1 (11.1%)
Adaptation	2 (22.2%)	6 (66.6%)
Proactive	5 (55.5%)	2 (22.2%)
Manage	3 (33.3%)	2 (22.2%)
Achieve goals	2 (22.2%)	3 (33.3%)
Processes		
Goal-setting	4 (44.4%)	4 (44.4%)
Planning	2 (22.2%)	5 (55.5%)
Self-motivation	1 (11.1%)	2 (22.2%)
Self-control	0 (0%)	2 (22.2%)
Self-observation	4 (44.4%)	5 (55.5%)
Self-reflection	1 (11.1%)	6 (66.6%)

Note. Total percentage in each column is greater than 100%, as participants'

responses may have included multiple codeable terms.

Teacher application of SRL. A paired samples *t*-test was conducted to compare the total number of SRL-related strategies that the teachers included in their response to the application question at both pretest and posttest (see Table 4). Consistent with a priori expectations, there was a significant difference in teacher application of SRL at pretest and posttest ($t = 2.31$, $p = .05$, $d = 0.77$). The effect size was medium, approaching the large range as measured by Cohen's *d*. This suggests that the gains in teachers' application of SRL-related interventions to the case example from pretest to posttest were of clinical significance.

At pretest, the coded categories of strategies most frequently included in teachers' application of SRL were: learning and study strategies (55.5%), motivation strategies (44.4%), self-monitoring strategies (44.4%), and self-reflection strategies (44.4%). At posttest, the coded categories of strategies most frequently included in teachers' application of SRL were: self-reflection strategies (88.9%), goal-setting strategies (66.7%), motivation strategies (66.7%), and self-monitoring strategies (66.7%). Descriptive analysis indicated that seven of the eight coded categories of strategies were identified at pretest, and all eight categories were identified by at least one participant at posttest. All categories were identified by an equal or higher number of participants at posttest compared to pretest. This information is outlined below in Table 6.

Table 6

Frequency of SRL Strategies Reported by Teachers for Application Measure

Category	Pretest frequency *n* (%)	Posttest frequency *n* (%)
Goal-setting strategies	3 (33.3%)	6 (66.7%)
Planning strategies	3 (33.3%)	4 (44.4%)
Motivation strategies	4 (44.4%)	6 (66.7%)
Environmental strategies	0 (0%)	1 (11.1%)
Learning/Study strategies	5 (55.6%)	5 (55.6%)
Self-monitoring strategies	4 (44.4%)	6 (66.7%)
Self-reflection strategies	4 (44.4%)	8 (88.9%)

Note. Total percentage in each column is greater than 100%, as participants'
responses may have included multiple codeable terms.

Teacher self-efficacy. A paired samples *t*-test was conducted to compare the difference
between teachers' pretest and posttest scores on the self-efficacy measure (see Table 4).
Although the results indicated no statistically significant difference between teachers' pretest and
posttest feelings of self-efficacy for promoting SRL ($t = 1.56$, $p = 0.16$, $d = 0.52$), the obtained
effect was considered medium. This suggests that the workshop did not have a statistically
significant effect on changes in teachers' feelings of self-efficacy for promoting SRL in their
classrooms; however, it is noted that power analysis indicated only a 61.6% chance of detecting
a large effect at $\alpha = .05$. Thus, it is possible that an effect was present but due to the
underpowered nature of the study, could not be statistically identified.

Social Validity

The social validity of the PD workshop was assessed using a survey given at posttest. Participants rated each item using a Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*), with higher scores representing a greater degree of acceptability and consumer satisfaction on all items except one (see Table 7). This item was reverse coded when included in the analysis to determine the overall mean social validity rating. The overall mean score for the social validity survey was 4.46. The mean score for acceptability of procedures was 4.56, and the mean score for importance of effects was 4.20.

Table 7

Mean Teacher Ratings of Social Validity of the Professional Development Workshop

Acceptability of procedures	Mean	Importance of effects	Mean
The information taught in the workshop was very important.	4.67	The workshop taught me things about self-regulated learning that I did not already know.	4.33
I would recommend this workshop to other educators.	4.78	The workshop helped me recognize the reasons why students may have difficulty in school.	4.11
I am happy that I participated in the workshop.	4.89	The workshop taught me things I can do to help improve my students' learning in school.	4.11
The workshop contained too much information.	3.89*	The workshop taught me strategies to help students manage the demands of school more effectively.	3.89
		The workshop taught me strategies that I can use in my classroom to increase my students' self-regulated learning.	4.56

* Mean score after reverse coding

Qualitative Analysis of Interview Responses

The primary researcher employed the qualitative analysis technique of classical content analysis to uncover the most relevant and frequently cited themes underlying participants' responses to an interview conducted over the course of two days. The complete interview protocol can be found in Appendix J. The interviews were separated into two broad categories of questions: reactions to the PD workshop and perceptions of continued training using coaching. The first interview session, which focused on participants' reactions to the PD, was comprised of questions pertaining to the following overarching topics: (a) general reactions to the workshop, (b) strengths of the workshop, (c) the most important information learned, (d) weaknesses of the workshop, (e) issues and information to be clarified, and (f) additional training needs. The primary objective of this specific interview was to add qualitative information to the quantitative analysis of the effects of the workshop. Conversely, the second interview session, which was conducted approximately two weeks later, was designed to uncover teachers' perceptions of desirable characteristics and potential barriers of a future follow-up, coaching component to the professional development experience. The overarching topics within this session targeted: (a) important characteristics of coaching, (b) frequency and duration of coaching sessions, and (c) barriers to the implementation of the coaching program and new skills. Themes were identified within each predetermined interview topic based on participants' responses.

Interview session 1: Reactions to PD workshop. The first set of interview questions examined participants' reactions to the PD workshop provided by the primary researcher, including their perceptions of its strengths and weaknesses. Results of the analysis of the first interview are presented in Table 8.

General reactions. Teachers were first asked an open-ended question about their general reactions to the training. Consistent with the ratings obtained through the social validity survey, all of the interviewees responded to this question with positive feedback about the workshop. The content included in the workshop was described as "valuable," "useful," and "relevant," and three of the teachers reported that they wanted to apply the information to their students.

Strengths. Considering teachers' unanimous positive feedback regarding content of the training in the non-directive question above, it is reasonable to include the importance of the workshop content as a primary strength. When asked directly to describe strengths of the workshop, all four teachers identified the structure of the workshop, which included lecture, relevant examples, group discussion, and self-reflection activities. Three teachers identified the use of research and examples of SRL application as another strength of the workshop. Teacher A stated, "showing real examples from research allowed us to see how this has actually worked in the past." Similarly, Teacher C reported, "The studies and research helped me understand how SRL could be applied on an individual or classroom basis." Teacher D identified the small-group format as a strength, stating, "I think having the workshop as a small group made people more comfortable and open in the discussions."

Most important thing learned. Teachers were asked to identify the most important thing they learned or took away from the workshop. Two respondents believed that the most important piece of information they learned was the nature of the process of SRL, with Teacher D specifically citing "the cycle of revision and self-reflection." The other two teachers both reported that the most important content taught was the specific types of SRL strategies that can be used with students, with Teacher B specifically citing "setting goals that are reasonable."

Weaknesses. While the workshop was generally viewed as a positive learning experience, teachers were asked to provide feedback on its weaknesses. The most commonly cited weakness was the single-session format (n=3). For example, Teacher C reported that she would like follow-up experiences to the workshop, while Teacher A stated, "Having multiple sessions would be helpful so that teachers could learn the background information and then, with a particular student or class in mind, could work to develop a plan in sessions that would focus on using SRL and specific strategies." An examination of teachers' responses to other interview questions indicated that the workshop's timing was also a weakness (n=3). One major reason that teachers did not feel able to implement the SRL strategies in the classroom following the workshop was that it occurred late in the school year, and they had already firmly established their classroom routines and lesson structure. Three of the teachers interviewed specifically reported that they were intending to use SRL strategies presented in the workshop beginning in the next school year.

Issues to be clarified. As part of this initial interview, teachers were asked to identify some of the issues that were still unclear to them following the workshop. Two teachers' responses involved engaging unmotivated or reluctant students in the process of SRL. For example, Teacher A responded, "A lot of the students who need SRL strategies are also the ones who are probably least likely to be willing to use them, so how do we get resistant students on board?" Two teachers indicated wanting more information about the application of SRL in specific situations. For example, Teacher C stated that she would like to better understand how to develop SRL skills with students in a life skills program. Thus, while the workshop was effective in teaching general concepts and strategies related to SRL, participants wanted more information regarding the application of SRL in specific settings and with specific student populations.

Additional training needs. To better understand teachers' PD needs in applying learned skills, they were asked to identify and explain what additional training and supports they perceived as necessary and effective. The most prevalent theme that emerged from all four teachers' responses was the need for additional applied, hands-on training, practice, and feedback in order transfer knowledge to skills. For example, Teacher A responded, "It would be helpful to see someone model a class that uses SRL, and to have someone to check in with to make sure I'm doing it right." Teacher D stated, "It would be great to have someone to help me figure out how to incorporate SRL when I'm planning my lessons, or to do a sample lesson. I think I'd want to see it in action, and also have someone observe me and give me feedback."

Another theme apparent in all teachers' responses was the need for ongoing contact with support personnel, including meeting with training staff (n=4) and consulting with other teachers involved (n=2). For example, Teacher B stated that her needs would include "meeting with other teachers using this occasionally, as well as working with the workshop leader." She explained further, "I don't have difficulty identifying what is needed, just knowing how to address those needs." Two teachers also reported that it would be useful to have resources available. For example, Teacher A stated that she would find it useful to have examples of types of SRL worksheets to use a model in developing her own materials based on students' needs. Based on teachers' reactions to the workshop and responses to the questions within the topic of additional training needs, there was an overall consensus that, though the workshop was a valuable learning experience, it did not provide teachers with the necessary training or skills to effectively implement SRL strategies in the classroom.

Table 8

Classical Content Analysis of Themes for Interview 1

Topic	Response themes	Frequency n (%)
1. Reactions to workshop		
A. Strengths	Importance of content	4 (100%)
	Format	4 (100%)
	Meaningful examples	3 (75%)
	Group size	1 (25%)
B. Most important thing learned	Processes in SRL cycle	2 (50%)
	SRL strategies	2 (50%)
C. Weaknesses	Single session	3 (75%)
	Late in school year	2 (50%)
D. What remains unclear	How to engage resistant students in SRL	2 (50%)
	How to apply SRL in specific settings	2 (50%)
2. Additional training needs	Applied training	4 (100%)
	Ongoing contact with support personnel	4 (100%)
	Materials	2 (50%)

Interview session 2: Perceptions of effective coaching methods. The second round of interviews focused on gathering teachers' input regarding their perceptions of the most important and feasible characteristics of a coaching model that could be implemented following the PD workshop. Results of the analysis of the second interview are presented in Table 9.

Important characteristics. First, teachers were asked a general, open-ended question to identify what would characterize an effective coaching program following the PD workshop experience. The most prevalent themes that emerged in all four teachers' responses were: (a) the need for ongoing support, such as modeling and feedback (*n*=4), (b) accessibility of the coach (*n*=4) and (c) time dedicated to coaching and training activities (*n*=3). For example, addressing the need for ongoing support and dedicated training time, Teacher B responded that coaching should include "instruction in skills, ongoing support, common planning time, and feedback." Teacher C identified "ongoing support with resources, practical application, and the ability to see things modeled and get feedback to ensure that I am not doing the SRL strategies for the students, but letting it be student-directed."

Teacher D indicated the need for ongoing support, accessibility of the coach, and dedicated training time by stating that in order for a coaching program to be successful, it would require "time built into the schedule, administrative support, teacher support, and accessibility of the coach." In a similar vein, Teacher A stated, "All teachers would have to be on board and see the value in it. This should be incorporated into the regular schedule of PD training and PLC [professional learning community] meetings. It would also be helpful to train teachers to be coaches, maybe within each subject area, so that there are more people available for support." She explained further that, as an in-class support teacher, she would like to have a coach work jointly with her and the general education teacher during lesson plan writing, and to have the coach the coach available as she modified lesson plans.

Methods. As part of the interview, teachers were also asked to use a forced-response question to convey their perceptions regarding the importance and feasibility of five specific coaching strategies: classroom observations with feedback, one-on-one consultation, group

consultation, peer consultation, and electronic communication. The teachers unanimously responded that electronic communication would be the most feasible, but that it would also probably be the least helpful. Classroom observations with feedback were viewed as the most important, though teachers' responses indicated that they believed all of the methods would be useful. For example, Teacher A responded, "I think they would all be useful, it would obviously be ideal to have able to have all of them." Teacher D stated, "The ones that would help me the most are the peer consultation, one-to-one consultation, and classroom observations with feedback." Teachers were unsure how feasibly each method could be implemented on a regular basis, citing the barriers discussed in the subsequent section.

Time frame. Teachers were also asked to give input regarding time frame, including frequency and duration, of coaching sessions. While teachers did not indicate an ideal total number of sessions, they unanimously reported that coaching sessions would need to be more frequent in the initial period following the workshop as they attempt to apply new knowledge for the first time. Teacher A stated, "I think in the beginning it would be more important to have the coach available as often as weekly, especially to be able to observe." Teacher B stated that, once she felt more comfortable using SRL strategies, it would be useful to have an additional set of two or three meetings with the coach throughout the year. Two teachers noted that the duration of coaching sessions would be limited by natural time constraints in their schedules.

Barriers. The final category of interview questions in the second session addressed barriers to training and skill implementation. Themes were generated based on teachers' responses to these questions, in which they were asked to identify the challenges and barriers they have experienced and would anticipate in the implementation of a coaching program and in the application of new skills.

Coaching implementation. Teachers unanimously identified administrative support as the greatest challenge in implementing a PD program with an ongoing coaching component. Specifically, teachers noted that administration would have to support the program financially (*n*=3) and in terms of scheduling (*n*=3). At the top of the hierarchy, the Superintendent and Board of Education would need to approve the expense required and include the initial PD and any follow-up sessions in the district's scheduled and available workshops. At the building level, principals would need to provide scheduling support. Teachers indicated that this could include creating time in teachers' schedules for consultation with the coach (*n*=3), approving time for follow-up training sessions (*n*=2), and scheduling common planning time or PLC meetings for teachers involved to consult with one another (*n*=2).

Because the coaching could include classroom observations, would require a time commitment, and may ask teachers to add to or change aspects of their teaching, teacher support for the program was also identified (*n*=3) as a potential barrier to its implementation. Teachers who do not see the value in the coaching methods or topic of PD will not be motivated to engage in and learn from the process. Finally, consistent with the challenges reported for skill application, all teachers identified time, including time for planning, time with the coach, time with other teachers, time with students, and time during teaching, as a potential barrier to the implementation of a coaching program.

Skill implementation. The primary barrier to implementing new skills, unanimously identified first by all teachers interviewed, was time. Specifying further, teachers reported needing sufficient time within the class period to implement strategies without sacrificing instructional time (*n*=2), time to plan (*n*=2), time to meet with students (*n*=2), and time to meet with co-teachers (*n*=1), Another challenge identified by all teachers was adequate training.

Following the workshop, no teacher felt able to implement SRL strategies in the classroom. This

is consistent with the fact that the workshop did not result in a statistically significant change in

teachers' self-efficacy for promoting SRL. Thus, in order to use new knowledge in a practical

and applied manner, teachers require practical and applied training. Finally, student motivation

was also identified (*n*=2) as a challenge in the implementation of SRL. Teacher D commented

that she anticipated difficulty in "having the student be motivated to do it, realize the value, and

reflect on it, rather than just doing it because I asked them to."

Table 9

Classical Content Analysis of Themes for Interview 2

Topic	Response themes	Frequency n (%)
1. Perceptions of coaching		
A. Important characteristics	Ongoing support	4 (100%)
	Accessibility of coach	4 (100%)
	Dedicated time for coaching/training	3 (75%)
B. Time frame	More frequent in the beginning	4 (100%)
	Duration limited by schedule	2 (50%)
2. Barriers		
A. Coaching implementation	Administrative support	4 (100%)
	Budget	3 (75%)
	Scheduling	3 (75%)
	Time with coach	3 (75%)
	Additional training	2 (50%)
	Time for peer consultation	2 (50%)
	Teacher support	3 (75%)
B. Skill implementation	Time	4 (100%)
	Instructional time	4 (100%)
	Planning time	2 (50%)
	With students	2 (50%)
	Adequate training	4 (100%)
	Student motivation	2 (50%)

Discussion

Despite the growing need for effective, evidence-based PD programs, high quality research in this area is scarce. There is minimal empirical data to indicate the components, procedures, duration, and intensity that are both necessary and sufficient to create an effective program (Yoon et al., 2007). Though no specific PD formats have been identified as the most effective, the PD literature does support the inclusion of two components: knowledge development and skill development (Forman, 2015; Han & Weiss, 2005; Peters-Burton et al., 2015). Workshops and presentations have been identified as efficient means of increasing knowledge regarding the rationale, background, theory, and research related to an intervention, introducing an intervention's key components and practices, and providing initial opportunities for trainees to practice new skills while receiving feedback. Following initial training, ongoing practice and support through job-embedded coaching is critical to developing competence and ensuring the successful implementation of skills and strategies learned through didactic instruction (Forman, 2015).

Though underpowered, the current study is important because it provides an initial empirical examination of the effectiveness of an established PD workshop in SRL on teachers' knowledge, application, and self-efficacy in applying SRL. In addition, this study provides direct feedback from participating teachers regarding their additional PD needs for skill development and implementation, including their perceptions of the feasibility, utility, and importance of various coaching methods and barriers to their implementation. This section provides a discussion the results of the current study, how these findings contribute to the existing literature, implications of the findings, the limitations of this study, and recommendations for future research activities.

Shifts in SRL Knowledge and Skills

It was first hypothesized that teachers would demonstrate significantly greater knowledge of SRL at posttest than at pretest. Results of a paired samples *t*-test confirmed this hypothesis with a large effect size. Specifically, teachers identified an average of about 3 more key descriptors and regulatory processes in their definitions of SRL at posttest than at pretest. Second, it was hypothesized that teachers would demonstrate a significantly greater ability to apply SRL intervention strategies to a case example of a struggling student at posttest than at pretest. Results of a paired samples *t*-test confirmed this hypothesis with a medium to large effect size. Specifically, teachers identified an average of about one more SRL strategy at posttest than at pretest. Considering the results of the first two hypotheses, it appears that the workshop was more effective in increasing teachers' knowledge related to the definition, features, and processes of SRL than in the application of SRL skills and strategies.

The findings related to the first two research questions are consistent with the existing literature on professional development. The significant increase in teachers' knowledge and ability to apply SRL to a case example following the PD workshop supports prior research, which has shown that trainings in the form of presentations and workshops are an effective way of providing information about the rationale, theory, and research behind an intervention, to introduce its key components, and to provide initial opportunities to practice the application of new skills with feedback (Forman, 2015; Hill, 2007; Peters-Burton et al., 2015). In terms of the implementation of new innovations, as described by Rogers (2003), this demonstrates that workshops can be effective means of increasing teachers' awareness-knowledge and principles-knowledge, both of which are important precursors to applying new skills with success and fidelity (see Appendix A).

Previous research has also demonstrated that this form of training can be perceived by teachers as having an important role in their professional learning. In their examination of a two-year PD project, in which each year began with an informational workshop, Butler and colleagues (2004) found that all teachers reported that they valued these initial workshops for setting a common framework for conceptualizing best practices. Further, when the researchers abbreviated the workshop in the second year, teachers who were new to the project reported that they would have preferred a longer theoretical introduction to the targeted teaching approach. This is consistent with the results of the social validity survey, which indicated that teachers perceived the workshop as having important effects related to teaching them about SRL.

Impact on Self-Efficacy Beliefs

It was hypothesized that teachers would demonstrate significantly greater self-efficacy for promoting SRL in the classroom at posttest than at pretest. It was anticipated that the knowledge gained through participation in the workshop would increase teachers' feelings of self-efficacy in promoting SRL with their students. Results of a paired samples *t*-test did not support this hypothesis, as there was no significant difference between teachers' pretest and posttest feelings of self-efficacy for promoting SRL. This suggests that an increase in knowledge alone is not sufficient to increase one's feelings of self-efficacy to implement new skills. Although this change was not statistically significant, the effect size obtained was considered medium.

Though the workshop significantly increased teachers' ability to identify SRL strategies they would use in a hypothetical scenario, this did not translate to a significant increase in their feelings of self-efficacy in applying SRL in the classroom. This is consistent with teachers' interview responses, which indicated an overall consensus that though the workshop was a

valuable learning experience, it did not provide teachers with the necessary training or skills to effectively implement SRL strategies in the classroom. Thus, workshop-style trainings do not appear to be an effective means of supporting teachers' implementation of new skills in authentic practice. These findings are consistent with previous research on the relationship between instructional methods and skill application and self-efficacy beliefs. In a study examining changes in teachers' perceived self-efficacy across eight months of in-service training, Ross (1994) determined that it was the application of new knowledge, not mere exposure to it, which significantly increased teachers' self-efficacy beliefs.

Tschannen-Moran and McMaster (2009) conducted a study using a quasi-experimental design to examine the effects of four PD formats on teachers' self-efficacy beliefs and strategy implementation. Participating teachers (n=93) responded to surveys regarding their self-efficacy for reading instruction and their degree of implementation of a new teaching strategy, both before and after the PD. Teachers were trained in the same instructional strategy using one of four PD formats: (1) information, (2) information plus modeling, (3) information, modeling, and practice, or (4) information, modeling, practice, and coaching. Results indicated that only the condition that included a coaching component resulted in an increase in all three areas measured: general self-efficacy beliefs, self-efficacy for reading instruction, and implementation of new strategies.

Adding further evidence for the types of PD that can positively impact teachers' feelings of self-efficacy, Karimi (2011) studied the effects of a PD program on EFL teachers' self-efficacy beliefs utilizing a pretest-posttest control group design. Teachers in the treatment group (n=30) attended 16 90-minute sessions that included a variety of PD methods: in-service training, observations with feedback from the instructor and peers, discussions of issues related to

program development and improvement, group consultation with peers, and observations of

exemplar lessons. Results indicated that the PD had a significant effect on teachers' self-efficacy

beliefs, and these results were sustained at a three-month follow-up.

Implications for a Coaching Model

Considering the results of the present study and the established literature, there is

sufficient evidence indicating the time, format, and content-related characteristics of professional

development that do *not* ultimately result in changes in teaching practices or increases in teachers'

feelings of self-efficacy for using new strategies, regardless of gains in theoretical knowledge.

Though the present study demonstrated significant gains in teachers' application of SRL

strategies, this measure was hypothetical in nature and did not involve authentic skill application.

Thus, while teachers' understanding of the application of SRL strategies to struggling students

increased significantly, it cannot be said that the workshop impacted their implementation of

skills in the classroom. During the interviews, teachers also indicated that they had not integrated

any of the SRL strategies in their classrooms. The non-significant impact on self-efficacy, as

well as teachers' responses to the interview questions, add further evidence that the workshop

did not lead to changes in teaching practices. The present study also adds support for and

expands on the existing literature regarding both the content and process of professional

development with a qualitative examination of interviews conducted with teachers following

their participation in a PD workshop. This feedback adds valuable information to quantitative

data by providing direct insight into teachers' perceptions of the features of a training program

that they believe would be most feasible and important in learning, implementing, and mastering

new skills.

When asked for feedback regarding the workshop itself, teachers identified the content as a strength and believed that the SRL strategies they learned were among the most important information taught. This is consistent with the results of the social validity survey, which indicated a high level of agreement among the teachers that the workshop taught important information that was relevant to their students. These findings reinforce previous research on teachers' beliefs about the importance of SRL in the classroom. In a national survey conducted by Wehmeyer and colleagues (2000), over 90% of the participating teachers rated SRL-related strategies, such as goal-setting and self-awareness, as moderately to very important to student functioning. In his review of survey studies, Cleary (2011) reported that teachers generally perceived the domains of student motivation and self-regulation to be relevant both to their instructional roles as teachers and to student achievement. Cleary (2011) concluded that collectively, research has indicated that teachers perceive information related to SRL to be important both to their teaching skills and to their students and are highly interested in further training in this area.

Though the teachers found the information to be both important and relevant, they reported that the single-session format of the workshop was a weakness. It is interesting to note that, in her interview, Teacher A discussed feeling less effective in helping her students after attending the training. She reported that the workshop showed her just how much she was unaware of the processes and strategies that could be used as interventions. Thus, after receiving the training, not only did this teacher not feel prepared to implement the learned material, she also felt less confident that the strategies she was already using were as effective as she had initially believed. This is consistent with findings from the study conducted by Tschannen-Moran and McMaster (2009), in which many teachers reported declines in self-efficacy after

receiving PD without coaching in a new strategy for reading instruction. The authors suggest that

the teachers' new awareness of an effective strategy for struggling students may have prompted

them to reassess their own teaching practices and their beliefs about effective teaching, and to

recalibrate their feelings of self-efficacy against a new standard.

A potential lack of awareness and inaccurate self-assessment prior to training also speaks

to the essential role that feedback can play in professional learning. Research has shown that

feedback, which is a core component of SRL, plays an essential role in prompting behavioral

adjustments, reducing the gap between perceived and actual ability, and improving the use of

new skills (Labuhn et al., 2010; Reinke et al., 2013; Solomon et al., 2012; Zimmerman, 2000a).

Tang and Chow (2007) assert that taking an active role in the feedback process helps teachers

engage in and develop the metacognitive processes necessary to accurately analyze their own

teaching and bridge the gap between theoretical knowledge and applied procedural knowledge.

Anast-May and colleagues (2011) conducted a qualitative action research project to examine the

experiences of teachers who participated in a series of classroom observations with in-person

conferencing feedback. All participants reported that the feedback helped them become more

reflective of their teaching.

Reinke and colleagues (2013) conducted a study to examine the effects of coaching

strategies on teachers' implementation of a classroom management intervention. Participating

teachers (*n*=52) attended six six-hour workshops throughout the school year and received

ongoing coaching supports on a weekly basis. Coaching strategies varied across participants and

sessions, and they included: reviewing workshop content, collaborative goal setting for strategy

use, classroom observations with performance feedback, modeling of effective practice, and role-

playing challenges. Teachers' implementation of the intervention was assessed throughout the

year by independent observers using an observation coding system. Results indicated a significant interaction between performance feedback and implementation, as teachers who received more performance feedback demonstrated significantly higher levels of implementation than teachers who received less performance feedback.

In the present study, teachers also provided feedback regarding what still remained unclear following the workshop. Teachers reported wanting more information about applying the SRL skills in specific contexts and with specific student populations. This is similar to teacher feedback in a study by Shernoff and colleagues (2011), in which teachers reported wanting greater depth of information about specific strategies, rather than less thorough information about a larger breadth of strategies. Teachers also reported wanting more concrete support and specific instructions and feedback regarding how and when to implement new strategies.

The need for further training and support is consistent with previous research on effective PD, as well as the literature on how learning and skill mastery occur. Participants in the current study attended one three-hour PD session consisting of didactic instruction, visual illustrations, and group discussions. Instructional content focused on increasing teachers' knowledge of SRL, including the theoretical foundation, core processes and features of SRL, the relationship between SRL and academic achievement, and key SRL strategies. In their review of the literature on the impact of PD on student achievement, Yoon and colleagues (2007) found that only studies that delivered more than 14 hours of PD demonstrated significant effects on student achievement, and programs that averaged 49 hours of PD resulted in student gains of approximately 21 percentile points. Further, in a three-year study of the impact of various PD features on changes in teacher practices, Desimone and colleagues (2002) demonstrated that PD that included opportunities for active learning substantially increased teachers' use of targeted strategies over

those with no active learning component. Consider the developmental levels of SRL

(Zimmerman, 2000a) discussed in detail in Appendix A. During a single PD workshop using

didactic instruction and discussion, teachers are unlikely to move beyond the first level of

observation. Some workshops, particularly training that is given as a series of events over

multiple sessions, may enable teachers to move into the second phase of *emulation* by providing

opportunities to practice newly learned skills with guidance and feedback. It is at this phase,

however, that traditional PD activities cease, and teachers are unrealistically expected to change

their practices in the classroom without further training, support, or feedback for their

independent efforts.

This speaks to a fundamental misassumption of traditional PD approaches. In the

classroom, students are not expected to learn how to solve math problems, how to write essays,

or how to decipher chemical equations merely from lecture. They are given opportunities for

frequent practice and feedback through teacher modeling, classwork and classroom activities,

homework, and assessments. When teachers attend PD training, they take on the role of *student,*

and they should be expected to learn and master new material in the same manner. It must be

recognized that changing teachers' instructional habits and methods involves both a change in

conceptual knowledge about teaching and the development of procedural skills. Traditional

approaches focus on the dissemination of knowledge and resources but provide little support in

helping teachers translate this information into action.

Butler and colleagues (2004) conducted a two-year project to examine the effects of a PD

model rooted in SRL principles on meaningful shifts in teachers' use of a new approach to

teaching. The researchers employed a qualitative case study design utilizing multiple methods of

data collection, including: notes from school visits, semi-structured classroom observations,

teacher reflection forms, notes from school meetings, and semi-structured interviews. A total of ten teachers participated in the project in the first year. The next year, seven teachers continued and three new teachers joined, for a total of ten participants in the second year. In the first year of the project, training began with a workshop that introduced teachers to the theory and principles related to the targeted approach. Following this initial workshop, various methods of continued training were used to help teachers employ new strategies in the classroom. This included collaborative meetings between researchers and groups of teachers to review goals and discuss the implementation of strategies, weekly one-to-one coaching in the classroom using modeling, co-planning, co-teaching, observation, and feedback, weekly review, evaluation, and self-reflection of data collected, and collaborative meetings among groups of participating teachers. The frequency of one-to-one sessions was slowly faded throughout the year as teachers became more comfortable using the new instructional methods. The second year of the study focused on evaluating the sustainability of the effects on teacher behavior, and individual coaching sessions were further reduced.

The project was met with success in teaching and sustaining the use of a new instructional approach, and at the end of the second year, teachers reported that the new strategies had become automatic and integrated into the way they conceptualized their teaching. The researchers noted that in interviews conducted throughout the project, teachers reported that they would likely have abandoned their attempts at using new methods without the ongoing classroom support from the trainer. Teachers reported that the initial workshop would not have been enough to impact a change in their teaching and emphasized the value and importance of the ongoing modeling, observation, and feedback that the trainer provided. Teachers also valued the time they were given to collaborate and discuss challenges and successes with colleagues

using the same strategies. One of the core conclusions drawn from this study was that expertise must be built over time, and meaningful shifts in practice require continuous opportunities construct new knowledge and reflect on authentic practice experiences.

Teachers in the current study were also asked to give input regarding the characteristics of a potential coaching program that they would perceive as most feasible and important for effective training. Consistent with the structure of the project conducted by Butler and colleagues (2004), all teachers in the present study indicated that coaching activities would need to be more frequent at the start of the training program. This is also supported by participation records in a study conducted by Shernoff and colleagues (2011), in which teachers' attendance rates for group seminars were highest early in the school year. Further, teachers in the current project did not report any single coaching method as being most important, but perceived all options presented as being potentially useful and effective. It is noted that this feedback was hypothetical, as the teachers did not actually experience these coaching methods in vivo. While all of the forms of training presented could be useful, each may be differentially feasible and effective depending on the context (e.g., subject matter, class time, school culture). In their study, Shernoff and colleagues (2011) piloted their program over the course of three years, using feedback from participants and related stakeholders to make adaptations to the structure and content of the model. Participants in the project conducted by Butler and colleagues (2004) also appreciated that classroom supports were tailored to each of their preferences, learning styles, and training needs. Teachers' feedback in the current study supports this need to create a training model that allows opportunities for frequent and open feedback and can adapt to the specific needs of a school in context.

Teachers also provided feedback regarding the barriers they anticipate facing both when introducing new skills and in the implementation PD with an ongoing coaching component. Far from being unique to this group of teachers, the barriers identified in the current study are consistent with those commonly cited throughout the PD literature (Butler et al., 2004; Peters-Burton et al., 2015; Shernoff et al., 2011). Teachers most frequently identified issues related to time, administrative support, and teacher support as the greatest anticipated barriers to program implementation. Teachers unanimously identified issues related to time and adequate training as the greatest barriers to skill implementation. This need for administrative and teacher support further enforces the need for a program to gather regular feedback from teachers and school staff to inform necessary adjustments. Teachers in the study by Butler and colleagues (2004) reported that resistance from others sometimes hindered their efforts, and they discussed that involving more district personnel in all phases of a PD project may help assuage this challenge. Shernoff and colleagues (2011) discuss the crucial role that collegial relations plays in the maintenance of a program. They found that teachers' perceptions of the effectiveness and feasibility of the program's components were related to their coworkers' experiences and opinions. Further, Desimone and colleagues (2002) found that PD activities with collective participation of teachers within the same school, department, or grade are more effective in changing teachers' classroom practices than those attended individually.

Limitations of the Current Study

There are several limitations to the current study that must be addressed: (a) small sample size, (b) limited generalizability, and (c) lack of a control group. Due to low participant enrollment and an inability to acquire additional recruiting sites, this study had a very limited sample size of nine participants, which greatly undermined the power of the study. Power

analysis showed that the study had only a 61.6% chance of detecting a large effect at α = .05. While significant results were detected for teacher knowledge and teacher application of SRL, it must be acknowledged that the small sample size may have hindered the detection of a potential significant impact on teachers' feelings of self-efficacy. It was noted that the measured effect size on teachers' self-efficacy beliefs was medium, suggesting that gains were made from pretest to posttest. Unfortunately, it could not be determined with confidence that these changes did not emerge from chance.

In addition to the sample size being small, characteristics of the sample also impact the generalizability of the results. Though they ranged in age years of experience, and subject areas, all taught within the same middle-class suburban school district. Only one teacher was male, and all who participated in the individual interviews were female special education teachers. Thus, the ability to generalize these results is limited.

The study was initially intended to utilize a pretest-posttest waitlist control group design. Due to low participant enrollment and teachers' availability for only one day of the two scheduled trainings, a single group within-subjects design was implemented. The lack of a control group has significant implications on the internal validity, which pertains to the extent that one can make causal inferences about relationship between the PD workshop and the dependent variables (i.e., teacher knowledge, teacher application, and teacher self-efficacy). It is important to consider the extraneous factors that may have impacted the results. Though the sample size was small, the teachers were fairly diverse regarding their years of experience, making it unlikely that this variable impacted the results. There was also a fairly even distribution between teachers with Bachelor's degrees and those with Master's degrees, as well as those with and without certification in Special Education, making it unlikely the either of

these variables affected the findings. Because the participants voluntarily participated in the three-hour workshop after school hours, the sample may have been particularly interested in learning about SRL and were motivated to actively engage in the training. This represents a potential threat to the external validity of the study, as it is unknown whether the same gains in knowledge and application would occur if teachers attended the training as part of a non-voluntary school-wide or district-wide initiative. Further, considering that these teachers were likely particularly interested in the topic, it is possible that the participants engaged in additional research and exploration following the workshop. Because posttest measures were given several days after the workshop, any extraneous information learned independently would have impacted participants' responses.

Future Research

Though small in scale, the current study, in conjunction with the existing PD research base, highlights key areas in need of further, more rigorous exploration. First, there exists a clear need for larger-scale studies that include a control group to examine the effectiveness of PD programs on changes in both teachers' knowledge and skills. Future research must include the use of high quality quantitative and qualitative data in order to obtain rich and empirically sound data. Further, there is sufficient evidence to indicate that, though single-session and didactic-based training programs are effective in teaching new information and the theoretical application of skills, they are unlikely to be effective in changing teachers' behavior in the classroom. Thus, while these formats certainly have value as a component of PD programs, it is critical that future research examine the effectiveness and social acceptability of various coaching methods to support skill development and mastery.

Rather than attempting to create canned programs, future research projects should aim to develop PD frameworks and examine the effectiveness and social acceptability of each component used. As demonstrated by the current study and previous research, flexibility and context specificity are necessary in order for a program to successfully meet the needs of a range of schools, teachers, and students. That is, while a training program should have a developed framework and progression of training activities, established content, and outcome goals, the specific characteristics of its implementation (e.g., frequency and duration of sessions, coaching methods used) should be flexible. Considering the commonly identified barriers of time and scheduling difficulties, administrative support, and teacher support, a PD program that is able to adapt to the needs and wants of each school context will likely be far more successful in overcoming these barriers, being accepted by staff, being implemented with fidelity, and having meaningful outcomes.

Future research is also needed in developing PD programs grounded in SRL. Not only is it important to utilize SRL processes and strategies when training teachers in new skills, it is critical that they understand the learning process as it relates to their content area. Both past research (Cleary, 2011) and the current study demonstrate that teachers perceive SRL-related information as important and highly valuable in their teaching roles. As discussed by Hill (2007), PD that includes training in *how* students learn has been demonstrated to result in an increase in student achievement. This is also consistent with Kennedy's (1998) review of the PD literature, which concluded that training programs focused on teachers' behaviors resulted in smaller effects on student learning than programs focused on teachers' knowledge of the subject, on the curriculum, or on how students learn that subject. In the study conducted by Butler and colleagues (2004), teachers were trained in an SRL-related instructional approach through a PD

program that was rooted in SRL principles. The researchers discussed that the teachers and

students were learning in parallel, both engaging and in an active and reflective learning process

and building confidence and independence in the use of strategies. By using SRL as the

foundation for both the format and content of PD activities, teachers directly experience the

learning process that they will be trained to apply in their own classrooms.

Conclusion

In the current system, teachers are monitored for the number of hours of PD they attend,

but research has shown that it is the quality of the practice, not the quantity, that matters most

(Cleary et al., 2006). Over the course of a school year, teachers may attend numerous one-day

workshops on varying, potentially unrelated topics. There is ample evidence of the

ineffectiveness of and teacher dissatisfaction with this training model. Current programs focus

largely on the dissemination of information and resources, but there is little to no follow-up

support to help teachers translate knowledge into practice. Rather than simply increasing

teachers' superficial knowledge on a breadth of topics, PD should aim to increase teachers' depth

of knowledge and skill in a specific area across several sessions and using multiple instructional

and training methods.

The ultimate goal of professional development is to increase students' learning and

academic performance by ensuring that teachers' continuously develop and hone their

knowledge and skills. This goal is based on the assumptions that PD increases teachers'

knowledge and skills, that new knowledge and skills are applied and improve classroom teaching,

and that these improvements raise student achievement (Yoon et a., 2007). This can only occur if

teachers are able to practice applying their learning, feel confident to implement new skills in the

classroom, and are given feedback to do so with fidelity. Though not entirely ineffective as PD

tools, it is clear that workshops, presentations, and didactic training cannot be the sole method of providing training on a given topic if this goal is to be achieved. As asserted by Bandura (1997), mastery experience is the most influential factor in promoting one's sense of self-efficacy for a given task, and such experience cannot be achieved without opportunities to practice and refine new skills.

Appendix A

Literature Review

Professional Development

Definition and purpose. The term *professional development* (PD) refers to a variety of

programs and activities that are designed to increase teacher knowledge, skills, and effectiveness

and are guided by student learning needs, teacher development needs, and the goals of the school,

school district, and State (N.J.A.C. 6A:9C-3.2). PD is viewed as a primary mechanism through

which to improve classroom instruction and, ultimately, student outcomes (Yoon et al., 2007). In

their review of PD research, Yoon and colleagues delineate the theoretical process through which

PD is expected to impact student achievement, mediated by teacher knowledge and skills and

classroom practices, and occurring within the context of systemic variables such as standards,

curricula, accountability, and assessments (see Figure 3).
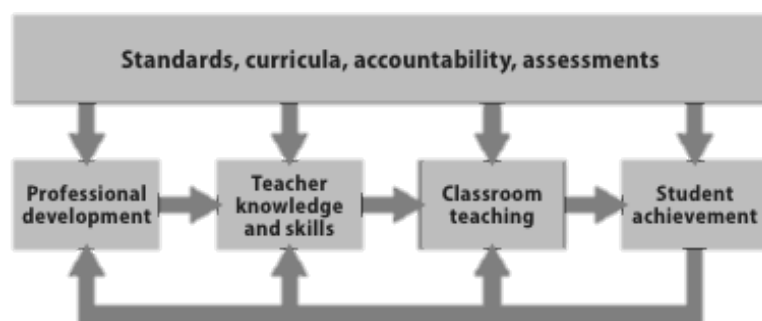
Figure 3. How professional development affects student achievement. Adapted from "Reviewing the Evidence on How Teacher Professional Development Affects Student Achievement" by K.S. Yoon, T. Duncan, S. W. Lee, B. Scarloss, & K. L. Shapley, 2007, *National Center for Educational Evaluation and Regional Assistance*.

Legislature and regulations. In 2001 the federal government passed the No Child Left

Behind (NCLB) Act as a reiteration of the Elementary and Secondary Education Act (ESEA) of

1965. The purpose of the original law was to raise student achievement, close achievement gaps,

and provide aid for schools serving disadvantaged youth. As a reauthorization of this bill, NCLB set updated standards and regulations for federal funding and data-based education reform.

NCLB outlines extensive criteria for activities that fall within the umbrella of professional development. Though not an exhaustive list, the law states that PD includes activities that: (a) enhance teacher knowledge in effective, research-based instructional strategies that improve student achievement or increase teachers' skills, (b) are high-quality, continued, intensive, and classroom-focused in order to have long-term positive effects on teachers' classroom performance, (c) are aligned with state standards for academic content, achievement, and assessment, (d) include instruction in the use of data to inform classroom practices, (e) are developed with the participation of relevant stakeholders, such as teachers and administrators, and (f) are regularly evaluated, and appropriately improved, for their impact on student achievement and teacher effectiveness. Under the federal definition, PD may also include activities designed to provide additional training, following a program that meets PD criteria, to ensure that newly learned knowledge and skills are applied in the classroom.

In 2010, the New Jersey State Board of Education adopted the Common Core State Standards (CCSS), developed in an initiative led by the National Governor's Association (NGA) and the Council of Chief State School Officers (CCSSO) with participation by teachers and administrators, curriculum experts, and higher education faculty. The goal of the new standards was to ensure that students graduate school with adequate preparation for college, careers, and adulthood (Common Core State Standards Initiative, 2014). The standards outline specific grade-level learning and performance expectations in the areas of English Language Arts and mathematics from kindergarten through twelfth grade. According to the New Jersey Department of Education (NJDOE), the CCSS: (a) set clear and consistent standards for all students, (b)

foster the development of critical thinking and independent problem-solving skills, (c) are

aligned with academic standards from the highest-performing nations, and (d) are aligned with

standards of college entrance exams, such as the SAT and ACT (NJDOE, 2010).

In 2012, New Jersey applied for and received a waiver from some of the NCLB

provisions, including the requirement that 100 percent of students demonstrate proficiency in all

subject areas assessed by the year 2014. In exchange for this waiver, however, New Jersey was

required to create and implement comprehensive systems for educator development, support, and

evaluation.

Teacher evaluation. In 1987, a group of state and national educational agencies and

organizations formed the Interstate Teacher Assessment and Support Consortium (InTASC) with

the mission of reforming the system of preparation, licensing, and continuing professional

development for teachers (CCSSO, 2014). One of the most widely used state-approved educator

assessment programs is the Danielson model (Danielson Group, 2013). Aligned with the

InTASC standards and grounded in a constructivist theory of learning and teaching, the

Danielson model assesses teachers in four domains: (a) planning and preparation, (b) classroom

environment, (c) instruction, and (d) professional responsibilities.

Challenges in PD development and implementation. When choosing and

implementing PD services for teachers, it is important to be cognizant of a number of challenges

that are likely to arise. Peters-Burton and colleagues (2015) identify several such issues. First,

there often exist differing, or even opposing, interests between the organization of the school and

the needs and desires of the teachers. Thus, it is possible that programs chosen by administrators

do not align with teachers' PD needs and interests. Second, following PD activities, teachers are

expected by administrators to implement newly learned programs with expertise and fidelity.

Unfortunately, teacher PD trainings do not often provide information in a form that can be readily translated to practice in the classroom. Further, teachers are generally not provided with sufficient opportunities for guided practice become fluent in such new skills and teaching strategies. Thus, administrators' expectations may be unrealistic and place undue pressure on teachers (Peters-Burton et al., 2015).

Another issue is that fact that PD activities tend to be delivered in a large group context, meaning that there likely exists a wide range of experience and proficiency among participating teachers. Thus, it is difficult to tailor training to teachers' level of expertise. Finally, it is important to recognize logistical challenges that may arise when working in the context of school. Teacher schedules, time constraints, contractual limitations, and available space must be taken into consideration. Ideal PD programs provide trainings in multiple sessions over an extended course of time, provide ample opportunities for active learning and guided practice, and support teachers with individualized coaching and feedback, not all schools will have the resources to carry out such an involved program (Peters-Burton et al., 2015).

PD to support teachers. The adoption of CCSS has placed a new set of demands on teachers, who must adapt classroom practices and develop new skills to lead lessons that are aligned with the standards. Further, as discussed above, legislature has recently mandated that school districts adopt state-approved methods for ongoing teacher evaluation to ensure that students have access to effective teachers and engaging, supportive learning environments that meet the CCSS (NJDOE, 2014). Under the widely-used Danielson model of educator evaluation (Danielson, 2013), which has been revised to be reflect an alignment with the CCSS, teachers are regularly observed and evaluated based on their performance across four domains: planning and preparation, classroom environment, instruction, and professional responsibilities.

With increasing expectations, changing achievement standards and evaluative criteria, and implications for job security, it is important that teachers be equipped with the knowledge and skills to successfully adapt classroom practices and meet the state and local educational standards. The Danielson model even recognizes that teachers will have to acquire new skills in order to effectively implement the CCSS. However, while teachers may receive professional development training on the content of the CCSS and procedures of newly adopted evaluation models, such as Danielson, they are not likely to be trained in the implementation of techniques and strategies that will ensure that their classroom practices are aligned with these standards. Further, while it is mandated that teachers receive training on new evaluation procedures and observation instruments (NJDOE, 2014), they are not necessarily provided with sufficient training in classroom practices aligned with the evaluative criteria.

Following the CCSS and Danielson standards for distinguished teaching, teachers are expected to set clear, measureable goals and create lessons in which students are highly engaged, take an active role in the learning process, critically examine the thinking of their classmates, and recognize interdisciplinary relationships. To achieve the highest evaluative rating, teachers must create learning communities in which the students are encouraged to set their own goals, are provided with activity choices, largely take the responsibility for directing and monitoring their own learning, and serve as resources to their peers. Further, teachers must demonstrate a thorough understanding of the learning process and of the unique needs, abilities, and interests of their students. Teachers must provide modeling, scaffolding, and guided practice for student skill development, provide constructive, meaningful, and frequent feedback, and encourage students to reflect on their own learning. They are expected to use ongoing assessment methods to frequently measure their students' comprehension and skill levels and use the information to

adjust and differentiate instruction (Danielson, 2013). Thus, as will be discussed in further details, the Danielson model appears to promote classrooms characterized by self-regulated learning.

      PD to support students. Adolescence is a critical stage of developmental, social, and cognitive growth and change. During this time, adolescents spend more time in school than in any other setting (Eccles & Roeser, 2011), making the school environment perhaps the single most powerful context in shaping adolescents' development. School experiences in this transitional period can set a student on the trajectory to success or failure, making effective instruction and early intervention absolutely essential. As discussed, research has shown that negative school experiences in the adolescent years can strongly impact a student's immediate and future academic career, potentially resulting in disengagement and loss of motivation, academic failure, and eventual school drop-out.

      The ideal option would be to intervene at the system-level, restructuring the school environment to appropriately meet the developmental needs of adolescent students and facilitate positive growth. Unfortunately, such changes are difficult and time-consuming to initiate, require full administrative and teacher support to be effectively implemented and sustained, and may not produce immediate effects. Further, system-level changes may be restrained by bureaucratic variables, such as state and federal educational policies and curricular demands, and school characteristics, such as size and student-teacher ratio, organizational factors, and school climate (Eccles et al., 1993).

      If the school system cannot be changed to meet the needs of the students, a different avenue must be pursued to provide more immediate and effective efforts toward preventing negative outcomes in middle and high school. Working at the primary level of intervention, PD activities can be used to equip teachers with the knowledge and skills to help their students

develop the behaviors needed to successfully navigate the challenges presented in middle school and high school. The remainder of this chapter will focus on exploring the literature on the characteristics of successful, autonomous leaners and effective intervention strategies and programs.

Components of PD. Despite the clear need and legislative demand for effective, evidence-based PD programs, research in this area is surprisingly lacking (Yoon et al., 2007). Without well- established methods for strategic implementation and evaluation, there is little empirical data to indicate the components, procedures, duration, and intensity that are both necessary and sufficient to create an effective program. Though no specific methodology can be identified as most effective, the PD literature does support the inclusion of two components: knowledge development and skill development (Forman, 2015; Han & Weiss, 2005; Peters- Burton et al., 2015).

Didactic training. Before teachers can be expected to adopt new classroom practices, it is important to develop their knowledge and understanding in the target skills. The purpose of didactic instruction is to increase teachers' knowledge about an intervention, including theoretical background and rationale, procedures and components, the target clients, identifying barriers to implementation, and addressing myths and misconceptions of the intervention. Didactic training is generally delivered through either live or web-based presentations and workshops accompanied by the provision of written materials (Forman, 2015).

Three types of knowledge should be addressed through didactic training: awareness knowledge, how-to knowledge, and principles knowledge (Rogers, 2003). *Awareness knowledge* simply refers to one's knowledge of the existence of an intervention. Such knowledge may spark curiosity and motivate an individual to seek out additional information. *How-to knowledge*

pertains to knowledge about how to correctly implement new skills. Such information is critical

for intervention adoption and fidelity. Third, *principles knowledge* is defined as knowledge about

how and why an intervention is effective. According to theories of adult learning, this type of

knowledge is important in increasing adults' motivation to learn and apply a new skill, as it

provides a rationale for why the content of the training is necessary and important.

Didactic training sessions should utilize multiple methods of instruction to maximize

participant engagement and interest (Forman, 2015). For example, Brown (2008) suggests that

ice breakers can be used at the start of a workshop to encourage active participation and create a

comfortable atmosphere for learning. Further, while a lecture format may be necessary to convey

theoretical and procedural information about an intervention, audiovisual supports, such as

PowerPoint presentations, visual aids, and video clips, can be useful in stimulating interest,

emphasizing or demonstrating important content, and maximizing the effectiveness of training

materials. Didactic training should also include active learning opportunities to increase trainees'

engagement with the content, demonstrate and model the target behavior, and providing initial

opportunities for practice and feedback. Such activities will enable trainees to begin to bridge the

gap between knowledge of a new skill and its actual application. Methods for active learning

may include behavioral and cognitive modeling, group discussions or brainstorming, case

analysis, and role-plays with feedback (Brown, 2008).

Competency training. A critical, and yet often absent, component of any effective

teacher PD program is the provision of continued opportunities for skill development, practice,

and refinement prior to independent in vivo application in the classroom (Han & Weiss, 2005;

Peters-Burton et al, 2015). Research has demonstrated that didactic training is necessary but not

sufficient in creating effective and lasting behavior change (Forman, 2015). Following a didactic

workshop, teachers enter their classrooms as novices in the new skills. Their initial

implementation efforts may be awkward or inaccurate, and they are inexperienced in adapting

new behaviors to meet contextual demands. They may also lack confidence in the new skill, and

negative feedback, experiences, or affective reactions may stifle future application efforts. Thus,

following the didactic component, effective PD activities should include methods of competency

training to provide participants with ongoing, supportive opportunities for skill development,

refinement, and mastery. Competency training can be provided in either a group or individual

format through methods such as supervision, technical assistance, and expert consultation

(Forman, 2015).

Technical assistance, also referred to as *coaching*, is a prime example of competency

training that provides teachers with ongoing and intensive job-embedded support. An expert

facilitator works closely with trainees as they apply their new skills in context (Forman, 2015).

Methods such as modeling and guided practice, observation of implementation, and performance

feedback are used to support teachers' skill development and refinement, increase their self-

efficacy for using the new skill, and foster their ability to apply the skill independent of explicit

prompting and guidance (Peters-Burton et al., 2015). According to Spouse (2001) a coach serves

four major roles in the relationship with the trainee: supervision, teaching new behaviors through

modeling, assessment and feedback, and provision of emotional support.

A critical feature of any coaching model is the use of performance feedback throughout

teachers' implementation efforts. Delivered through oral comments, written notes, or visual aids,

such as graphs, performance feedback is important to sustain application efforts, ensure fidelity

in implementation, and increase trainees' self-efficacy in the new skills. Feedback can also help

teachers accurately and adaptively reflect on their performance, identify and troubleshoot

challenges that arise, and make changes necessary for success in future efforts (Forman, 2015;

Han & Weiss, 2005; Peters-Burton et al., 2015).

The Academic Environment

Adolescence and the period of transition from elementary school to middle school and,

eventually, high school have long been areas of concern for developmental and educational

researchers (Anderman & Maehr, 1994; Eccles, Midgley, & Adler, 1984; Wigfield et al., 1991).

While middle schools and junior high schools were initially designed to addressed the particular

academic, social, physical, and emotional needs of adolescent students, it appears that this

purpose is not being adequately served (Eccles & Roeser, 2009). Rather, for many students, the

transition out of elementary school marks the beginning of a decline in motivation, academic

achievement, and self-perceptions that may eventually lead to disengagement, truancy, school

failure, and school drop-out (Eccles, Lord, & Midgley, 1991; Eccles et al., 1989; Wigfield et al.,

1991). However, as explained by Eccles and colleagues (1991), it is not merely the presence of a

transition that causes this academic decline; these effects are a function of the nature of the

changes that students experience, both developmentally and in the school environment. Thus, the

various developmental and school-related changes that occur during adolescence must be

explored to understand the needs of these students.

Instruction and evaluation. Both teachers and students have reported that middle school

begins the trend of an increase in practices such as whole-class instruction, ability grouping, and

social comparison of performance (Eccles et al., 1991), each of which may have negative

implications for students. The dominant form of instruction in middle and high school, teacher-

directed whole-class instruction is associated with several potential disadvantages. A whole-class

format, in contrast to small-group, paired, or individualized instructional strategies, may decrease

student-student and student-teacher interactions, limit the potential opportunities for

differentiated instruction, reduce student autonomy and choice in the classroom, and diminish

student interest and participation (Radencich, McKay, & Paratore, 1995).

Ability grouping is another a common practice that begins in middle school and

continues through high school (Eccles et al., 1984; Eccles & Roeser, 2009). Using this approach,

students are separated into classes on the basis of ability. The theoretical rationale for ability

grouping is that students learn most efficiently when the material is matched to their level of

understanding. Using this strategy to create classes, teachers can adjust a curriculum to a group

of students at the same level, rather than trying to satisfy the academic needs of high, average,

and low achieving students in a heterogeneous group. Unfortunately, the practice of ability

grouping also leads to increased competition and social comparison among students (Eccles et al.,

1991; Eccles et al., 1984). Summarizing the research on the effects of ability grouping, Eccles

and colleagues (1984) explain that this practice, when compared to heterogeneous grouping,

results in lower levels of ambition, greater feelings of worthlessness and rejection, lower self-

esteem, lower academic self-efficacy beliefs, less class participation, and greater test anxiety for

students placed in the lower ability tracks. This is particularly concerning considering evidence

that lower-achieving students are at greater risk for negative outcomes (Eccles et al., 1991;

Eccles et al., 1993).

Grading practices also change in middle school. In the elementary years, letter grade

systems are often not used; rather, evaluation emphasizes effort over performance and recognizes

ipsative growth. This changes drastically in middle school and continues through high school, as

grading is based on normative evaluation and demonstration of ability, public evaluation of

performance may occur, and social comparison and competition become highly salient (Eccles et

al., 1984; Eccles et al., 1993; Eccles & Roeser, 2009). The standard for evaluating students'

competence and academic performance also increases, which may result in a natural initial

decline in grades for many students (Eccles et al., 1991). The change in grading practices,

emphasis on social comparison, and potential initial decline in grades may contribute to

increased test anxiety, decreased feelings of self-efficacy, and further declines in academic

performance and motivation. Examining the impact of this focus on ability and competition,

Ryan and Patrick (2001) found that students engaged in more disruptive behavior when they

believed that their performance would be directly compared to that of their peers. It is suggested

that this indicates that students are less willing to engage in tasks when they believe their

performance will be evaluated by means of relative ability.

 Academic expectations. Despite being given less control within the classroom, middle

and high school students are expected to exhibit a significant degree of independence outside of

school. The amount of assigned homework increases, and students must manage assignments

from several teachers, and the completion of homework becomes a critical component of

students' grades. Students must develop the ability to manage both short-term and long-term

assignments, independently monitoring their progress and maintaining an awareness of due dates.

In order to be successful, students must also have the skills to plan and manage their own

studying, as class tests and quizzes become the primary method for evaluation and grading

(Dembo & Eaton, 2000; Zimmerman & Cleary, 2009). That is, in order to achieve success in

middle and high school, students must develop self-regulated learning skills.

Self-Regulated Learning

 Self-regulated learning (SRL) is comprised of the self-directed processes, personal beliefs,

and intentional behaviors that are purposefully and cyclically initiated and adjusted in order to

attain desired outcomes or goals (Zimmerman & Cleary, 2009). In other words, SRL can be

understood as the process by which learners strategically organize and control their thoughts,

feelings, and behaviors, gather and react to environmental feedback, and make adaptations to

achieve their goals (Schunk & Usher, 2013).

Theoretical overview. Though feedback is central to all models of self-regulation,

theorists have provided differing accounts for the ways in which individuals utilize the

information to become self-regulated learners. For example, classic models of self-regulation,

which are commonly employed by information-processing theorists, suggest that the feedback

loop is used to inform control decisions that are based on a desired goal or reference standard.

From this perspective, a learner's baseline level of performance is first compared to a fixed

standard. Information from the feedback loop is used to determine whether this performance

meets the standard; if performance is deemed insufficient, control shifts to initiate self-corrective

behaviors. This cycle continues until the level of performance satisfies the standard, triggering a

shift in control that terminates the corrective operation. Zimmerman and Cleary (2009) compared

this system to a thermostat that turns a furnace on and off based on a preset desired temperature.

From this perspective, self-regulated processes are motivated by negative feedback. That is,

information from the feedback loop highlights the discrepancy between a learner's performance

and the reference standard. The discrepancy is experienced as aversive, and a learner engages in

purposeful behaviors to reduce or eliminate it.
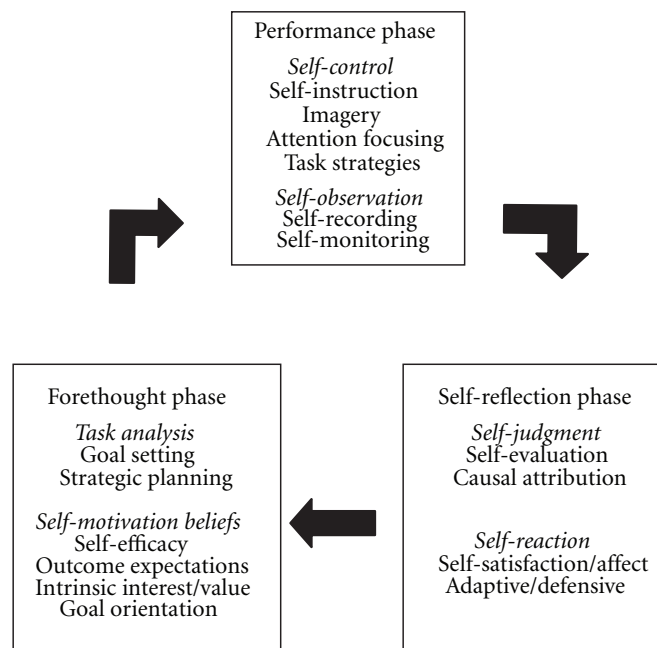
Though this model has been widely used to explain self-regulated learning, social-

cognitive theorists argue that it presents a limited conceptualization of learners' reactions to

feedback. Understood from this framework, the sole function of a learner's self-reactions is to

reduce the discrepancy between performance and a fixed standard. The feedback loop terminates

once the desired outcome has been achieved. To address this limitation, Bandura (1991) utilized social-cognitive learning theory to formulate a more adaptive account of the function of the feedback loop. From this standpoint, the feedback loop is involves three cyclical processes that are affected by both social factors and self-reactions. As previously discussed, Bandura's (1991) feedback loop consists of self-observation, self-judgment, and self-reaction. When engaging in these processes, learners monitor their own performance, compare their performance to a goal or standard, and react to these judgments both affectively and behaviorally. Self-regulated learners use information from these processes to adjust their own behaviors or modify their goal or reference standard. Because the performance target is malleable under this framework, the feedback loop and its associated self-regulated processes need not discontinue when a goal is achieved.

Adaptation of Bandura's social-cognitive model of SRL. Using Bandura's model as a foundation, Zimmerman (1989, 2008) presents an expansion of the social-cognitive perspective of self-regulated learning. He explains that self-regulated learning is a proactive process that involves self-initiated behaviors and self-beliefs that facilitate improvement in academic performance. Students are self-regulated to the degree to which they purposefully engage in metacognitive, motivational, and behavioral strategies as active participants in the learning processes (Zimmerman, 2008). From the social-cognitive perspective, learning is impacted by the reciprocal interaction of individual and social influences. Thus, it is necessary to discuss the specific interdependent personal, behavioral, and environmental factors involved in self-regulation to fully understand of how an individual becomes motivated to be the master of his or her own learning.

A three-phase cyclical model of SRL. Further expanding on the social-cognitive perspective, Zimmerman (2000a) developed a three-phase model to illustrate the cyclical nature of the feelings, behaviors, and cognitive processes associated with SRL. This model, illustrated in Figure 4, demonstrates the interdependency of the essential personal, behavioral, and environmental influences of self-regulation by organizing them within a framework of three phases of learning.

Performance phase

Self-control
Self-instruction
Imagery
Attention focusing
Task strategies

Self-observation
Self-recording
Self-monitoring

Forethought phase

Task analysis
Goal setting
Strategic planning

Self-motivation beliefs
Self-efficacy
Outcome expectations
Intrinsic interest/value
Goal orientation

Self-reflection phase

Self-judgment
Self-evaluation
Causal attribution

Self-reaction
Self-satisfaction/affect
Adaptive/defensive

Figure 4. Phases and subprocesses of self-regulation. Adapted from "Motivating self-regulated problem solvers" by B.J. Zimmerman & M. Campillo, 2003, in J. E. Davidson & R. J. Sternberg (Eds.), *The nature of problem solving* (p. 239). New York, NY: Cambridge University Press. Copyright by Cambridge University Press.

Forethought. The first phase is referred to as forethought, during which individuals engage in self-regulated processes that help them prepare for future learning behaviors. There are several specific processes and beliefs that occur within this first phase of regulation. One critical component of forethought is task analysis, the process by which an activity is deconstructed into its individual components. Understanding the nature of a task allows an individual to set realistic, task-specific proximal and distal learning and performance goals and to effectively engage in

strategic planning, which involves the purposeful selection appropriate, task-specific self-regulative strategies needed to acquire or demonstrate the target skill (Zimmerman & Cleary, 2009).

Goal setting. As mentioned, goal setting is a crucial forethought phase element of SRL, as an individual's goal orientation plays a large role in influencing his or her approach to and engagement in learning activities. The focus of a student's goal will determine whether learning itself is valued as an end or perceived as a means to an external goal, such as gaining social approval or avoiding negative evaluations from family or peers (Meece, Blumenfeld, & Hoyle, 1988). The two major contrasting goal orientations are *task* or *mastery focused* and *performance focused*. When students are striving to meet task goals, they engage in academic activities to improve competency and tend to experience intrinsic satisfaction from the learning process. In contrast, when students work to achieve performance goals, they engage in academic activities to prove their abilities and avoid appearing inferior to others (Anderman & Midgely, 1997).

Motivational beliefs. The extent to which an individual is able to engage in adaptive forethought processes is influenced by several self-motivational beliefs. Perhaps the most important of these is self-efficacy, which refers to beliefs about one's ability to learn or perform effectively in a specific context. As will be discussed in more detail, self-efficacy beliefs can impact the likelihood of task engagement, motivation, and effort (Bandura, 1977; Zimmerman, 2000b). Outcome expectations, or one's beliefs about the ultimate results of performance, also play a role in forethought processes. An example of an outcome expectation is the belief that good grades will result in a desirable career. Further, it is important to consider learners' task interest and task value beliefs. Task interest typically refers to the emotional state aroused by a specific activity, whereas task values pertain to the activity's perceived significance or relevance

to a student's personal goals (Eccles & Wigfield, 2002). The greater one's feelings of self-efficacy, the more positive one's outcome expectations, and the greater one's intrinsic interest and task value, the more likely the learner is to be motivated to perform and learn from an activity, successfully engage in forethought processes, and effectively prepare for learning.

Performance control. The second phase in Zimmerman's (2000a) cyclical SRL model is performance control, during which a learner actively employs self-regulated processes while executing learning tasks. During the performance phase, effective learners engage in *self-observation*, which includes various metacognitive processes by which learners actively monitor their own learning. This enables learners to more fully understand their personal learning patterns, make necessary adjustments in behavior, and may lead to greater academic performance (Zimmerman & Cleary, 2009). One form of self-observation is *self-monitoring*, during which a learner continuously assesses his or her progress in the learning process, such as through the use of a rubric or checklist. Another form of self-observation is *self-recording*, in which an individual keeps a record of specific actions or strategies used within the context of a learning task. Such information can be used to enhance effective reflection. For example, a student may record the amount of time he or she spends writing each section of a lab report. This data, combined with teacher-provided performance feedback on the lab report, can be used to more accurately predict and plan for the amount of time required for future lab reports.

The performance phase also involves a variety of self-control strategies, chosen to be appropriate for the specific activity and context, which a learner may utilize to maintain focus on the task and maximize learning efforts. For example, one may engage in *self-instruction* by overtly or covertly self-explaining how to proceed while a task is being performed. A learner may engage in *environmental structuring* to create an optimal learning atmosphere, may employ

imagery to mentally organize information and to aid with learning and memorization, and may utilize various time management techniques to help focus attention and ensure efficiency. Self-control strategies may also include the use of self-determined and self-administered incentives and consequences, such as positive self-talk or access to a desired item (Bandura, 1991; Wolters, 2003; Zimmerman, 1989).

Self-reflection. Finally, the third phase is self-reflection, during which an individual evaluates and make judgments about his or her learning experiences (Zimmerman & Cleary, 2009). In this phase students reflect on learning outcomes to make two types of self-judgments, *self-evaluations* and *causal attributions*. *Self-evaluatio*n is defined as assessing one's performance relative to a certain standard, criteria, or personal goal. After judging how successfully one performed on a task, a student will then make *causal attributions* to explain his or her degree of success or failure. These attributions may be internal (e.g. "I studied hard"), external (e.g., "The teacher made the test easy"), controllable (e.g., "I stayed up late watching TV") or uncontrollable (e.g., "I had a headache"). The self-reflection phase also contains an emotional component. That is, learners form *self-reactions*, involving positive or negative affect associated with their degree of self-satisfaction, in response to learning outcomes. Self-reactions also include adaptive or defensive inferences to draw conclusions regarding modifications to make in their self-regulatory approach for future learning efforts. Based on the three-phase model, the adaptive or maladaptive nature of these judgments and reactions impacts a learner's subsequent forethought phase processes prior to engaging in a subsequent learning cycle.

Developmental levels of SRL. The social-cognitive model of SRL delineates four distinct levels through which strategic and regulatory skills are developed: (a) observation, (b) emulation, (c) self-control, and (d) self-regulation (Zimmerman, 2000a). This progression

delineates the roles and task expectations of both the model and the learner at each developmental level and illustrates the gradual transfer of responsibilities throughout the process.

At the *observation* level, the model is responsible for actively demonstrating and verbally describing and explaining concepts, processes, and behaviors. The learner is expected to perceive, actively attend to, and retain behaviors demonstrated and explained by the model. Following sufficient demonstration and explanation, the *emulation* phase begins. At this level, a leaner makes efforts to imitate and reproduce the behaviors, skills, strategies and processes previously observed and explained. The model is responsible for supervising and guiding the learner's attempts and providing direct, frequent feedback. When ready for greater independence, a learner enters the *self-control* stage. At this level, the learner reproduces the observed and practiced behaviors and skills, building competency with minimal guidance and supervision from the model. The model is expected to be available to provide feedback when necessary. At the final stage, *self-regulation*, the learner independently reproduces the learned skill and is responsible for self-regulating behaviors, strategies, motivation, and adaptation. The model is expected to remain available for feedback when requested or necessitated and should challenge the learner to transfer the new behavior to different settings and conditions (Zimmerman, 2000a).

Linking SRL and PD

The goal of PD activities is to increase teachers' knowledge and skills in effective instructional and classroom management strategies that will ultimately lead to improved student outcomes. However, in order for this to occur, teachers must be able to consistently and accurately apply newly learned skills into their classrooms. Thus, in order to be effective, PD programs must be grounded in a logic model with empirically supported mechanisms of behavior change.

While it is critical that students learn SRL skills in order to monitor, regulate, and maximize their own learning, SRL also represents a highly effective model through which teacher training can be implemented. Just as SRL interventions support students in repeated cycles of preparation, learning, practice, feedback, reflection, and adaptation, this model can be used to support teachers as they learn, practice, and enhance their skills in the classroom. Not only is this beneficial in increasing teachers' self-efficacy, independence, and competence in utilizing new strategies, it exposes them to modeling and personal experience in the stages and cycles of SRL. As noted by Dembo (2001), it is not sufficient for teachers to learn how to teach; they must learn how to learn. Engaging teachers in the processes of SRL during their own training better equips them to model and foster SRL skills in their students (Bembenutty, White, & Vélez, 2015).

An SRL model of PD. With the goal of increasing teachers' foundational knowledge, improving and refining their skills, and building teachers' self-efficacy beliefs, Peters-Burton, Cleary, and Forman (2015) present the model of PD based in the principles of SRL. Incorporating didactic instruction, guided practice, and ongoing, intensive feedback and support, this program increases teachers' knowledge and skills through the developmental levels of observation, emulation, self-control, and self-regulation (Zimmerman, 2000a). The model consists of two primary components: the *SRL workshops* and *structured coaching sessions*. Table 10 outlines the relationship between the developmental levels of SRL and the various components of the PD program.

The SRL Training Institute is comprised of module-based workshops that provide direct instruction in SRL theory and principles and the target skills of the training. The purpose of these workshops is to build teachers' knowledge base and develop their skills prior to application in

the classroom. Beginning with the development level of *observation*, teachers are exposed to didactic instruction and the modeling of behaviors and thought processes involved in the successful application of target skills. While modeling the target behaviors, trainers use instructional strategies such as think alouds, demonstrations, and explanations to highlight the reasoning and self-regulatory thought processes behind the actions.

Taking teachers into the second developmental level of SRL, or *emulation*, the SRL Training Institute also incorporates structured opportunities for teachers to practice the target skills. These activities, known as *guided practice* or *scaffolding,* allow teachers to refine their skills by receiving prompts, suggestions, and immediate feedback from the trainers as they are observed in practice. Research has identified such activities that provide performance feedback as a critical component of effective PD (Han & Weiss, 2005; Yoon et al., 2007).

Following these sessions of instruction, modeling, and supported practice, participants move into the *self-control* level of SRL. Teachers begin direct their own SRL thoughts and behaviors as they apply their new skills to the classroom, continuing to access support and feedback as needed. At the final level of *self-regulation*, teachers will have developed the skills necessary to independently engage in SRL thoughts and behaviors, reflect on and respond to feedback and contextual changes, and make effective adaptations.

Table 10

Relation Between Developmental Model of SRL Instruction and Components of PD Activities.

Level of development	Component of PD training	Instructional tactics
Observation	SRL Training Institute	PD facilitators provide behavioral and cognitive modeling to trainees to illustrate effective forms of feedback behaviors and thought processes governing that feedback. For this level of instruction, the following activities can occur: • Think alouds • Explanation of reasoning behind actions • Demonstrations of behaviors
Emulation	SRL Training Institute Ongoing Coaching	PD facilitators organize highly structured practice opportunities for trainees. Core characteristics of these practice sessions include: • Student emulation of modeled actions • Immediate and continuous feedback, as needed • Additional feedback generated with SRL microanalytic protocols
Self-control	Ongoing Coaching Feedback Hotline	Emphasis on shift to trainee-directed activities with available feedback from PD facilitators/ The PD facilitators may observe trainee actions, provide additional feedback during coaching sessions, and respond to questions initiated proactively by the trainees.
Self-regulated	Feedback Hotline	The trainees are capable of engaging in sophisticated forms of SRL thought and action characterized by independently adapting their behaviors and strategies to varying conditions. The PD facilitator continues to provide assistance and redirects behaviors as required, but greater emphasis is placed on nurturing and enabling trainees to adapt their RL behaviors for varying conditions

Note. Adapted from "Professional Development Contexts that Promote Self-Regulated Learning and Content Learning in Trainees" by E. E. Peters-Burton, T. J. Cleary, & S. G. Forman, 2015.

The second phase of the PD model presented by Peters-Burton and colleagues (2015) is

the provision of ongoing, intensive feedback and support through coaching as teachers

independently practice and apply the newly learned skills in the classroom. Following the

workshop sessions of the SRL Training Institute, teachers may still have misconceptions of how the new skills are to be applied and adapted in context and lack the confidence to independently practice new behaviors. Thus, the purpose of the coaching sessions is to foster teachers' competence, self-efficacy, and long-term learning. Teachers are able to continue to develop and refine their skills in vivo without explicit prompting and guidelines, as coaches provide performance feedback following a specific instance of skill application. This feedback is then used to help teachers engage in effective self-reflection and identify adaptations to be made in planning for the next instance of the target skill. The feedback typically occurs during live coaching sessions but can also occur via technology such as telephone, Skype, e-mail, and discussion forums. It is expected that this intense level of feedback and guidance will lead teachers to become more self-directed, independent, and confident in their application of the target skills.

An additional component to the feedback sessions within this particular model is the use of SRL microanalytic assessment protocols as a source of information to provide feedback to teachers about their regulatory approach to applying the target skills in their classrooms. Through the use of the context-specific microanalytic interview protocols, information is gathered about an individual's SRL processes before, during, and after task performance. For example, an individual would respond to questions related to forethought (e.g., self-efficacy, goal setting) before engaging in an activity. Questions related to the performance phase (e.g., metacognitive monitoring) would be answered during the activity, and self-reflection questions (e.g., causal attributions) would be answered after the task completion. Peters-Burton, Cleary, and Forman (2015) suggest that the use of SRL microanalysis in PD may help trainers identify gaps or weaknesses in teachers' self-regulatory thoughts and processes as they apply newly learned skills.

This information can then be used to modify the PD instruction and activities and to inform appropriate instructional supports and scaffolding to maximize teachers' learning and skill development.

Increasing teachers' self-efficacy. As discussed, an individual's perception of his or her ability to successfully perform a task impacts the likelihood that the task will be attempted (Bandura, 1977). Specifically, teacher efficacy has been defined as a teacher's beliefs about his or her ability to positively impact student engagement and learning, even among those who may be challenging or unmotivated (Tschannen-Moran & Woolfolk Hoy, 2001). After delivering direct instruction in new strategies, it is important that PD programs include activities aimed at building teachers' self-efficacy in skill application. Without providing opportunities for teachers to practice new skills in a supported context, they are unlikely to feel confident in their abilities to successfully apply them in a classroom setting. Thus, while teachers may gain new knowledge in didactic instruction, this knowledge is unlikely to be transferred into the classroom and benefit students unless steps are taken to target teachers' self-efficacy.

Karimi (2011) conducted a control-group study using convenience sampling to examine whether participation in effective PD has a significant effect on teachers' sense of self-efficacy to engage students, to implement appropriate teaching strategies, and to manage students. Teachers in the treatment group received three 16-session courses that utilized five models of PD: in-service training, observation and assessment, development and improvement process, study groups, and mentoring. No statistically significant differences were identified between the treatment and control groups. Following the PD, results indicated that teachers in the treatment group reported significantly greater feelings of self-efficacy in all three domains (engaging students, implementing strategies, and managing students) than teachers in the control group.

These effects were maintained after a three-month follow-up. These findings provide evidence

that PD can have a significant and lasting positive impact on teachers' perceptions of self-

efficacy.

Developing Effective PD Programs

   Characteristics of successful programs. According to Rogers (2003), there are several

key characteristics that impact a program's success: (a) relative advantage, (b) compatibility, (c)

complexity, (d) trialability, and (e) observability. *Relative advantage* refers to the perceived

benefits of a program relative to current practices. *Compatibility* refers to the perceived goodness

of fit between a program and the values and needs of the consumers. *Complexity* refers to the

level of ease or difficulty with which consumers can learn and implement an innovation.

Trialability refers to the program's ability to be tested and adapted or modified. The final trait,

observability, refers to visibility of a program's effects. Past research has demonstrated that the

perceived presence of these characteristics impacts teachers' likelihood of adopting new

technologies into their teaching (Anderson et al., 1998; Bennett & Bennett, 2003).

   Steps in PD development. Brown (2008) outlined a sequential framework that can be

applied to the development of an effective PD program. The first step is to conduct a needs

assessment. It is crucial to gather information about the specific needs of the target audience to

ensure that the training delivered is both relevant and meaningful. Trainers may explore existing

client data and conduct interviews, surveys, and observations to collect data pertaining to

participants' knowledge and skills, attitudes toward various training methods and interventions,

and professional goals.

   Once a needs assessment has been conducted, trainers can determine the overarching

goals for the program. The statement developed in this step is designed to reflect the general

benefits expected to be gained from the training and tend to reflect the goals and needs of the

implementing organization, the participants, and the target intervention. Following this step, the

trainers establish more narrow objectives for the training program. These objectives should align

directly with the needs of the participants and specify the changes in knowledge, skills, and

attitude to be attained through completion of the training. The fourth step in Brown's (2008)

framework is the selection of learning methods and activities. Program objectives should be used

to guide the selection of appropriate, relevant, and empirically supported training methods.

Once goals, objectives, and training methods have been established, the training must be

conducted and evaluated. In the fifth step, trainers collect data to document evidence of learning.

A program may be assessed on several dimensions, such as participant satisfaction, gains in

knowledge, and changes in behavior. Data collection methods may include social validity

surveys, self-report questionnaires, tests of knowledge, observations, and interviews. Information

gathered is then analyzed and judgments are made regarding the success of the training program.

The final step is redesign, during which trainers use the results of data analysis to inform any

revisions that must be made to make the program more successful.

Social validity. When designing, implementing, and evaluating a program, it is essential

to consider and assess its degree of perceived social importance, or *social validity*. While

methods of quantitative analysis provide objective data about the effects of an intervention,

measures of social validity provide subjective information regarding consumers' perceptions

regarding an intervention's importance and acceptability. As defined by Wolf (1978), consumers

make social validity judgments on three dimensions of an intervention: (1) social significance of

goals, (2) social appropriateness of procedures, and (3) social importance effects. Through the

collection of subjective feedback from consumers, social validity measures enable researchers to

determine whether a program's goals align with those of the target population, whether the

procedures are viewed as justified and acceptable, and whether participants are satisfied with

both the expected and unexpected results. It is essential to gather such information from the

direct consumers, as buy-in from stakeholders is critical for the successful adoption of any

intervention. Information gathered in social validity assessments may provide insight that can be

used to inform modifications that, without altering the integrity of the program, make it more

acceptable and useful to the population.

Appendix B

Demographic Survey

Please circle your responses to the following demographic items.

1. Age:

    a. 29 or younger   d. 40-49   3. 60 or older

    b. 30-39   e. 50-59

2. Gender:

    a. Male   b. Female

3. Race / Ethnicity:

    a. White   e. Native American

    b. Hispanic / Latino   f. Asian / Pacific Islander

    c. Black or African American   g. Mixed, two or more

    d. Other: _____

4. Highest level of education completed:

    a. High school diploma or GED   f. Master's degree, Education

    b. Associate degree   g. Master's degree, Other*

    c. Bachelor's degree, Education   h. Doctorate degree, Education

    d. Bachelor's degree, Other*   i. Doctorate degree, Other*

    e. Professional or Specialist degree*

        Specify: _____

5. Are you currently enrolled in classes toward earning an additional degree? If yes, what degree?

    a. No

    b. Yes: _____

6. Total years of teaching experience:

    a. 0-4   d. 15-19

    b. 5-9   e. 20-24

    c. 10-14   f. 25 or more

7. Grade level(s) currently taught (*circle all that apply*):

    a. 6th d. 7th c. 8th

    d. 9th e. 10th f. 11th g. 12th

8. Subject area(s) currently taught *(circle all that apply)*:

    a. Science   g. World Language

    b. Mathematics   h. Technology

    c. Language Arts / English   i. Family & Consumer Science

    d. Social Studies / History   j. Visual & Performing Arts

    e. Physical Education   f. Other: _____

9. Content area(s) in which you are highly qualified (*circle all that apply)*:

    a. Science   e. Social Studies / History

    b. Mathematics   f. Visual & Performing Arts

    c. Language Arts / English   g. World Language

    d. Reading   h. Not applicable

10. Are you a certified special education teacher?

    a. No   b. Yes

9. Have you ever received education or training in self-regulated learning? If yes, explain.

    a. No

    b. Yes: _____

    _____

Appendix C

Teacher Knowledge of SRL

Please respond to the following question:

How would you define and describe self-regulated learning? Provide as many details as you can.

_____

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Appendix D

Coding Scheme for Teacher Knowledge of SRL

Question posed: *How would you define and describe self-regulated learning? Provide as many details as you can.*

Sample definitions:

1. the self-directed processes, personal beliefs, and intentional behaviors that are cyclically initiated and adjusted in order to attain desired outcomes or goals

2. process by which learners strategically organize and control their thoughts, feelings, and behaviors to achieve their goals

Coding Scheme:

A. General descriptors of SRL

1. Process

2. Cyclical (repeated, recurring)

3. Strategic (planned)

4. Metacognitive

5. Feedback

6. Adaptation (adjustment, change)

7. Proactive (self-initiated, self-directed, purposeful)

8. Manage (control, direct)

9. Achieve goals (outcomes, targets, performance, improvement)

B. Specific regulatory process

1. Goal-setting

2. Planning

3. Self-motivation strategies (i.e., strategies that target self-efficacy, interest, attitudes, outcome beliefs)

4. Self-control strategies (e.g. environmental structuring, use of imagery/mnemonic devices)

5. Self-observation strategies (e.g., monitoring/recording performance, strategy use)

6. Self-reflection (e.g., making attributions, making inferences, evaluating performance)

Appendix E

Coding Sheet

PARTICIPANT ID: _____   CODER INITIALS: _____

TEACHER KNOWLEDGE OF SRL			
		PRETEST	POSTTEST
A. General Descriptors	1. Process		
	2. Cyclical		
	3. Strategic		
	4. Metacognitive		
	5. Feedback		
	6. Adaptation		
	7. Proactive		
	8. Manage		
	9. Achieve goals		
B. Specific processes	1. Goal-setting		
	2. Planning		
	3. Self-motivation strategies		
	4. Self-control strategies		
	5. Self-observation strategies		
	6. Self-reflection		
TOTAL			

TEACHER APPLICATION OF SRL		
	PRETEST	POSTTEST
1. Engage in goal-setting		
2. Panning strategies		
3. Strategies to enhance motivation		
4. Strategies that target the environment		
5. Learning and study strategies		
6. Self-monitoring strategies		
7. Self-reflection strategies		
TOTAL		

Appendix F

Teacher Application of SRL

Please read vignette below and use it to answer the question that follows.

Dan, a student in your class, has been reported by both yourself and other teachers to exhibit academic and motivational difficulties. More specifically, there is a lot of concern about his poor test performance and inconsistent homework completion, his tendency to give up easily, and his overall negative attitude about school. Dan fails most tests and quizzes, and he often seems surprised by his poor performance. When assignments and assessments with poor grades are returned, you've noted that Dan immediately stuffs the paper in his backpack and appears disengaged for the remainder of class. Dan reports that he has attempted to use index cards and other strategies to help him learn and study, but "nothing works," and he continues to struggle. In addition, over the past couple of years, Dan has developed a sense of helplessness and poor confidence in school because he does not really understand why things are so difficult. Although Dan acts out and becomes oppositional about completing his work, he does have an underlying desire to do well.

Create a list describing specific things you could do in your classroom to help improve Dan's self-regulated learning.

Appendix G

Coding Scheme for Teaching Application of SRL

After reading a vignette of a struggling student, teachers were instructed: *Create a list describing specific things you could do in your classroom to help improve Dan's self-regulated learning.*

Coding Categories:

1. Engage the student in goal-setting

2. Planning strategies (e.g. task analysis)

3. Strategies to enhance motivation (e.g. self-talk, self-reinforcement, targeting self-efficacy)

4. Strategies that target the environment (e.g., finding a quiet place)

5. Learning and study strategies (e.g. mnemonic devices, imagery)

6. Self-monitoring strategies (e.g., self-recording)

7. Self-reflection strategies (e.g., self-evaluation, making attributions, making inferences)

Appendix H

Self-Efficacy for Promoting Self-Regulated Learning

The following statements refer to various things teachers may do in their classrooms. Rate your degree of confidence to perform each of the following behaviors using the five-point scale below.

1	2	3	4	5
Cannot		Moderately confident		Highly confident
do at all		I can do		I can do

HOW CONFIDENT ARE YOU THAT YOU CAN:

_____   Help your students to believe they can do well on schoolwork

_____   Help struggling students understand why they are doing poorly

_____   Motivate students to try harder in school

_____   Figure out the reasons why a student is not motivated

_____   Find ways to help struggling students experience success.

_____   Give feedback that helps students improve future learning behaviors

_____   Help students identify the learning strategies that work best for them

_____   Help students understand their control over their performance

_____   Help students use feedback to improve their performance

_____   Get students to consistently track how well they learn

Appendix I

Social Validity Survey

Rate your level of agreement with the following statements by recording a number from 1 to 5 using the scale below:

1	2	3	4	5
Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree

Rating (1-5)

_____   The information taught in the workshop was very important.

_____   I would recommend this workshop to other educators.

_____   I am happy that I participated in the workshop.

_____   The workshop contained too much information.

_____   The workshop taught me things about self-regulated learning that I did not already know.

_____   The workshop helped me recognize the reasons why students may have difficulty in school.

_____   The workshop taught me things I can do to help improve my students' learning in school.

_____   The workshop taught me strategies to help students manage the demands of school more effectively.

_____   The workshop taught me strategies that I can use in my classroom to increase my students' self-regulated learning.

Appendix J

Interview Protocol

Session 1

1. Do you have any general reactions to the professional development workshop on self-regulated learning?

2. Comment on the workshop's strengths. What did you like best?

3. What was most effective?

4. Comment on the workshop's weaknesses. What did you like least or find least effective?

5. What is the most important thing you learned from the workshop?

6. What remains unclear about SRL? What questions do you still have?

7. The following are components of an SRL intervention that were covered in the training.

_____ Instruction in specific strategies

_____ Causal attributions

_____ Goal-setting

_____ Adaptive inferences for change

_____ Self-monitoring

_____ Strategies to increase self-efficacy

 a. Use the following 5-point scale to rate how useful or important each intervention component is to incorporate into teaching?

1	2	3	4	5
Not	Somewhat	Moderately	Very	Extremely

    b. Since the workshop, have you attempted to use any of these components of SRL? Why or why not?.

8. What are the greatest challenges and barriers to implementing these types of SRL components?

9. Think about applying the concepts and strategies presented in the workshop in your daily lessons and classroom activities.

    a. What additional knowledge would you need?

    b. What training or supports would be most useful and important in helping you implement SRL components?

10. What are your greatest needs in transferring the skills you learned in the SRL workshop to your classrooms?

Instructions: Choose one of the SRL intervention components that you would like to be able to use with your students. In the next two weeks, think about how you this SRL process or component as part of a lesson plan. Make note of the questions you have, things that remain unclear, and your additional support and training needs. In our next discussion, we will reflect on your experiences.

Session 2

1. Talk about your experiences in applying self-regulated learning strategies to your lessons during the past two weeks (what did you do, how successful were you, did you feel effective?).

    a. What were the challenges?

    b. What additional training and support would you find most useful?

Coaching is one strategy that can be used to support teachers in applying the skills they learn in professional development trainings. Coaching can include a variety of methods, such as: classroom observations with feedback sessions, one-on-one consultation, group consultation, peer consultation, and support through electronic communication. What is most important is that the coaching strategies are viewed as important, feasible, and useful by teachers. Your input will help inform components of a potential coaching program.

2. Have you ever participated in a professional development program that involved job-embedded coaching?

3. Think about how a coaching program may be designed to help you design lessons plans for your content area that incorporates SRL processes or strategies.

    a. How might you envision such a program working effectively?

    b. What coaching methods do you believe would be most necessary and helpful?

    c. What are some potential barriers to the implementation of a coaching program to help teachers use SRL strategies and processes during classroom instruction?

4. Based on your initial experiences in applying self-regulated learning strategies to your lessons, comment on your perceptions of the feasibility and importance of these coaching strategies:

      a. Classroom observations with feedback sessions

      b. One-on-one consultation

      c. Group consultation

      d. Peer consultation (e.g., PLC meetings)

      e. Support through electronic communication

6. What do you believe are the most important characteristics of a coaching program in maximizing its effectiveness and feasibility for teachers?

7. What do you think is an appropriate time frame for a coaching program (e.g., frequency and number of sessions)?

Appendix K

Table 11

Quantitative Research Questions, Hypotheses, Measures, & Statistical Analyses

	Research questions	Hypotheses	Dependent measures	Statistical analyses
1.	Do teachers who participate in the workshop demonstrate greater knowledge of SRL at posttest than at pretest?	Teachers in the treatment group will demonstrate significantly greater knowledge of SRL at posttest than at pretest.	Coded SRL definitions	Paired samples *t*-tests
2.	Do teachers who participate in the workshop demonstrate a greater ability to apply SRL to their at posttest than at pretest?	Teachers in the treatment group will demonstrate a greater ability to apply SRL to their students at posttest than at pretest.	Coded responses to SRL application measure	Paired samples *t*-tests
3.	Do teachers who participate in the workshop demonstrate greater self-efficacy for integrating SRL strategies in the classroom at posttest than at pretest?	Teachers in the treatment group will demonstrate greater self-efficacy for promoting SRL strategies in the classroom at posttest than at pretest.	Teacher Efficacy for Promoting SRL	Paired samples *t*-tests
4.	What are teachers' perceptions of the social validity of the workshop's procedures and effects?		Social validity survey	Descriptive analysis

Table 12

Qualitative Research Questions, Methods, and Analyses

Research questions	Methods	Analyses
1. What are teachers' reactions to the PD workshop?	Individual interviews	Classical Content Analysis
2. What are teachers' perceptions of the additional training and support they would require to implement the skills taught in the PD workshop?	Individual interviews	Classical Content Analysis
3. What characteristics and methods of a coaching program do teachers perceive as most important and feasible?	Individual interviews	Classical Content Analysis
4. What barriers do teachers anticipate in (a) implementing new skills and (b) implementing a coaching program?	Individual interviews	Classical Content Analysis

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