

EFFECTS OF MULTILEVEL SUPPORT ON FIRST-GRADE TEACHERS' USE OF  
RESEARCH-BASED STRATEGIES DURING BEGINNING READING  
INSTRUCTION

by

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## ABSTRACT

CRYSTALYN INNOCENCE SCHNORR. Effects of multilevel support on first-grade teachers' use of research-based strategies during beginning reading instruction. (Under the direction of DR. CHARLES L. WOOD)

The purpose of this study was to examine the effects of multilevel support on first-grade teachers' accurate use of research-based strategies during beginning reading instruction and the extent to which teachers maintained use of these strategies. Teachers were trained to use research-based strategies, including choral responding, response cards, model-lead-test, and systematic error correction during whole-class beginning reading instruction. Multilevel support was provided for all teachers. Following an initial 3-hr group inservice, follow-up support was provided to teachers who did not demonstrate mastery criterion. Using a multiple baseline across participants design, results indicated a functional relation between implementation of supervisory coaching and an increase in teachers' instructional accuracy for three of nine teachers. In addition, all nine teachers maintained high instructional accuracy. Social validity data indicate teachers found the inservice and follow-up support were helpful and provided information on strategies to increase active engagement of all students. The school's literacy facilitator indicated identification of teachers requiring additional support following an initial training would be an effective and efficient use of instructional support time. Limitations of the study, suggestions for future research, and implications for practice are also discussed.

## DEDICATION

I would like to dedicate this dissertation to my family. First, I would like to dedicate this to my parents. It is because of the qualities and values you instilled in me that I was able to accomplish this journey. You allowed me to dream, encouraged me to set and follow my goals, and always believed in my ability to accomplish them. To my mom, whose love for children was an inspiration to me. To my dad, whose unconditional support and encouragement helped me through many difficult days in the last three years. I am grateful we could be there for one another. I love you both more than words can say. I am certain you are celebrating this accomplishment with one another and proudly smiling down from Heaven. I will never forget your love or laughter. You are the two best guardian angels a girl could ask for.

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Finally, this is dedicated to my niece, Kylen. Your laughter, smile, hugs and kisses, and spontaneous personality continue to inspire me. I hope that I will be an inspiration to you and that you will never be afraid to reach for the stars, or the moon! I hope that you dream big, and that you always hold onto those dreams and never give up. Life is big, so dream accordingly.

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## CHAPTER 1: INTRODUCTION

### Statement of the Problem

Students at risk for academic failure. Beginning reading is fundamental to later school success; however, increasing numbers of students are entering school at risk for failure due to poverty, disability, English language learner (ELL) status, and lack of early academic experiences (Coyne, Kame'enui, & Carnine, 2011). It is these students who are often at risk, facing the crucial task of catching up to their peers (Kame'enui, 1993), and requiring intensive instruction to master academic skills (Coyne et al., 2011). Research suggests early literacy acquisition is a predictor of later reading achievement.

Specifically, only 1% of students identified as at risk in kindergarten achieve grade level proficiency by the end of first grade without intensive instructional supports (O'Connor, 2000). In third grade, requirements in reading shift from learning to read to reading to learn (Bursuck & Damer, 2011). Analysis of longitudinal data has shown that students below grade level by third grade are unlikely to meet grade level expectations and more likely to qualify for special education (Manset-Williamson, St. John, Hu, & Gordon, 2002). Students who experience reading failure continue to fall behind their peers and have difficulty catching up (Francis, Shaywitz, Stuebing, Shaywitz, & Fletcher, 1996; Juel, 1988). Roberts, Torgesen, Boardman, and Scammacca (2008) found more than one third of fourth graders do not have the literacy proficiency to comprehend and learn from grade-level texts. Students who do not learn to read in elementary often struggle with

middle and high school curriculum, demonstrating the relationship between poor reading ability and later school failure (Marston, Deno, Dongil, Diment, & Rogers, 1995; Tivnan & Hemphill, 2005). In preventive, early intervention models, general educators are primarily responsible for working with students identified as at risk for reading failure. However, research indicates one of the greatest challenges teachers face with reading instruction includes accommodating diverse, struggling, and at-risk students (Baumann, Hoffman, Duffy-Hester, & Ro, 2000) and these teachers are unprepared to structure instruction in ways that benefit students at risk (Brownell, Ross, Colon, & McCallum, 2005).

Unfortunately, current national data suggest many elementary students are not achieving grade level proficiency in reading. The most recent National Assessment of Educational Progress (NAEP; 2011) report indicated 66% of fourth-grade students in the United States are unable to read at proficient levels, and 33% cannot read at a basic level. The national trend across the last 10 years indicates average fourth-grade reading scores have remained virtually unchanged (NAEP, 2011). Given these data, early identification and intervention to promote success and prevent academic failure is critical (Dickson & Bursuck, 1999; Francis et al., 1996; Juel, 1988; O'Connor, 2000).

The No Child Left Behind Act of 2001 (NCLB) focuses on early identification and intervention for students at risk and those with identified disabilities, and its intent is to raise the achievement of all students, particularly those with the lowest achievement levels. Two of NCLB's basic principles include accountability for results and an emphasis on doing what works based on scientific research. The reauthorized Individuals with Disabilities Education Act (IDEA, 2004) is aligned with NCLB and for the first

time, all teachers are held accountable for the academic achievement of all students, including culturally and linguistically diverse (CLD), ELL, students at risk, and students with disabilities. Together, federal mandates outlined in NCLB and IDEA address high achievement standards by emphasizing use of evidence-based practices in education.

Concern that neither accurate nor early identification or intervention of students was occurring led the U.S. Office of Special Education Programs to consider alternative procedures for early intervention (Danielson, Doolittle, & Bradley, 2007). One early intervention model, Response to Intervention (RtI), is a multi-tiered framework that links assessment to instruction and requires the use of evidence-based practices. The focus is on prevention of academic and social problems, and it aims to identify at-risk students as early as kindergarten (Vaughn, Wanzek, Woodruff, & Linan-Thompson, 2007).

In an effort to ameliorate learning problems, an increasing number of school systems are moving toward preventive models of intervention to identify and provide instruction to students at risk for academic failure. In 2007, only 24% of school districts reported implementing RtI (Scull & Winkler, 2011). Just four years later, the IDEA National Assessment indicated RtI is implemented in 71% of school districts (an increase of 47%), specifically, in 61% of elementary schools (Bradley et al., 2011). According to the National Center on Response to Intervention (NCRTI; 2010), core components of RtI include high-quality instruction, universal screening, continuous progress monitoring, and data-based decision making.

Role of general educators in RtI. Within RtI, general and special educators must be prepared to meet the needs of all students. Traditionally, special education teachers possess knowledge of efficient, low-cost teaching practices that improve academic

engagement and achievement for a range of students (Haager & Mahdavi, 2007). In addition, they are skilled in analyzing assessment data and differentiating curricula to meet the needs of students with disabilities using research-based strategies. The specialized knowledge and skills included in special education teacher programs are not typically included in general education teacher programs (Brownell et al., 2005; Brownell et al., 2009). Conversely, general education teachers are skilled in, and responsible for, implementing core curricula and instruction to all students based on content standards (Haager & Mahdavi, 2007). In early intervention models, general education teachers are responsible for providing Tier 1 instruction. Tiered systems require all students to receive core instruction. In reading this would include students with disabilities, students receiving supplementary support for reading difficulty, as well as those who are typically developing readers. As a result, the role of general education teachers has dramatically changed (Haagar & Mahdavi, 2007), and they have a significant role in RtI implementation. They are required to (a) provide research-based core instruction, (b) possess knowledge of evidence-based practices for remediation, and (c) acquire a strong foundation in assessment and progress monitoring procedures (Brownell, Sindelar, Kiely, & Danielson, 2010). Unfortunately, general education teachers may be ill equipped to perform these duties and may need additional support from someone who can provide training and follow-up support during implementation.

Given the emphasis on high-quality instruction, both in federal mandates and as a core component of RtI, it is essential teachers enhance the learning environment for all students by incorporating effective instructional practices that prevent or ameliorate learning difficulties. This is especially important because students at risk often require

intensive instruction to master academic skills (Coyne et al., 2011). King-Sears (2001) suggests one way general educators can improve learning for students with mild to moderate disabilities, students at risk for school failure, and typical students is to enhance areas of the general education curriculum.

In order to be proficient with any skill, students need frequent opportunities to actively respond to instruction (Heward, 1994). Embedding active student response (ASR) techniques into core instruction provides an opportunity for all students to respond. Three research-based instructional enhancements that can be used to increase ASR include: (a) model-lead-test (MLT); (b) systematic error correction; and (c) unison responding (i.e., choral responding, response cards). These strategies can be easily embedded within core instruction and have demonstrated an increase in academic achievement and engagement, and a decrease in off-task behavior for diverse populations of students (e.g., Lambert, Cartledge, Heward, & Lo, 2006; Park, Weber, & McLaughlin, 2007; Randolph, 2007; Wood, Mabry, Kretlow, Lo, & Galloway, 2009).

Challenges for general educators. Although enhancing the general education curriculum has been recommended, research demonstrates general educators often do not feel equipped to meet the needs of at-risk students (Schumm & Vaughn, 1991). In addition, general educators need additional support in adapting instruction to meet the needs of students with special needs, struggling readers, and students classified as ELL (Helfrich & Bean, 2011). In examining preparedness of general education teachers to meet the needs of students at risk, research indicates they often pay little attention to individual differences, are reluctant to adapt instruction, have difficulty accommodating diverse, struggling, and at-risk students, and are unable to improve academic achievement

of students with disabilities (Baker & Zigmond, 1990; Baumann et al., 2000; McIntosh, Vaughn, Schumm, Haager, & Lee, 1993; Zigmond & Baker, 1990).

Despite attention paid to evidence-based practices, a gap exists between research evidence and classroom practice (Cook & Schirmer, 2006), demonstrating research and evidence-based teaching practices have had minimal, if any, carryover into classrooms (Burns & Ysseldyke, 2009; Cook & Schirmer, 2003; Fuchs & Fuchs, 2001). Kretlow and Blatz (2011) suggest although teachers are familiar with research-based practice and evidence-based practice, there are two significant barriers in using them: (a) limited time to search and identify practices supported by research, and (b) lack of access to these sources. This suggests that on a large scale, teachers may be ill equipped to stay up-to-date with practices and programs deemed effective through scientific research.

Professional development. Professional development is one way to provide general educators with the knowledge and skill to use research-based instructional practices. It is imperative teachers are provided effective professional development and support that will lead to high-quality reading instruction. Based on literature regarding effective professional development, Leko and Brownell (2009) suggest it be coherent, content-focused, active, and collaborative. According to NCLB (2002), high quality professional development (a) is sustained, intensive and content focused; (b) is aligned with academic standards and assessments; (c) improves teacher content knowledge; (d) improves teachers' use of evidence-based instructional methods; and (e) is evaluated for student and teacher effects.

Unfortunately, many teachers have limited access to quality professional development opportunities that offer strategies to meet the needs of all students in the

classroom (Boardman, Argüelles, Vaughn, Hughes, & Klinger, 2005). Provided in an effort to improve instructional practices, professional development is most often a one-day inservice (Desimone, Porter, Garet, Yoon, & Birman, 2002); however, this method often produces little improvement in teacher performance (Yoon, Duncan, Lee, Scarloss, & Shapeley, 2007). Furthermore, teachers are provided little opportunity to practice skills learned and often receive no feedback on performance. Boardman et al. (2005) conducted focus groups with special education teachers to identify perspectives related to use of research-based practices and professional development. Teachers indicated they were “neither obligated to nor impressed by the current push to use research-based practices in their classrooms” (p. 177). Teachers also indicated frustration with professional development, which often did not match their students’ needs and lacked sufficient support in aiding them in selecting and implementing practices.

Coaching and follow-up support. To increase the likelihood that teachers will adopt and maintain use of research- and evidence-based practices, professional development must be in direct relation to both school and teacher needs, should be coupled with follow-up support in implementation, and should provide teachers with the necessary resources for implementation (Boardman et al., 2005). High-quality professional development encompassed with demonstration, practice, and coaching increases teacher knowledge, skill, and application (Joyce & Showers, 2002). Without this, professional development often results in “fragmented, ineffectual attempts to correct surface issues” (Boardman et al., 2005, p. 177).

Professional development that includes a combination of inservice and follow-up support (e.g., coaching) has shown promise in promoting changes in teacher behaviors

(Jackson et al., 2006; Jager, Reezigt, & Creemers, 2002; Kretlow & Bartholomew, 2010; Kretlow, Wood, & Cooke, 2011; Yoon et al., 2007). The purpose of coaching is to provide individualized support to teachers following an initial inservice or training in an effort to support teachers' use of new teaching skills (Helf & Cooke, 2011; Kretlow & Bartholomew, 2010). Coaching has been demonstrated to be effective for improving academic instruction (Fisher, Frey, & Lapp, 2011; Menzies, Mahdavi, & Lewis, 2008; Rudd, Lambert, Satterwhite, & Smith, 2009), supporting implementation of newly learned strategies (Kretlow et al., 2011; Tschannen-Moran & McMaster, 2009), increasing teachers' fidelity of implementation of trained strategies (Menzies et al., 2008), and increasing student achievement (Fisher et al., 2011; Powell, Diamond, Burchinal, & Koehler, 2010; Zakiersky & Siegal, 2010). Research also indicates general education teachers can embed research-based instructional enhancements (e.g., unison responding, model-lead-test, systematic error correction) within whole-class core instruction to increase ASR (Bursuck et al., 2004; Jager et al., 2002; Kretlow, Cooke, & Wood, 2012; Kretlow et al., 2011); however, they may need varying levels of follow-up support (Myers, Simonsen, & Sugai, 2011; Schnorr et al., in preparation).

#### Purpose of Study and Research Questions

Despite positive outcomes of coaching support for teachers, a number of suggestions for future research arise from the literature. These include identifying the (a) impact of coaching on achievement of at-risk students (Kretlow et al., 2012); (b) level of support needed by non-Direct Instruction (DI) teachers to apply learned strategies (Kretlow et al., 2011; Kretlow et al., 2012); (c) sustainability of changes in teacher behavior resulting from coaching (Kretlow et al., 2012; Tschannen-Moran & McMaster,



2009); and (d) level of coaching intensity needed to make sufficient gains in instructional accuracy (Kretlow et al., 2012; Tschannen-Moran & McMaster, 2009), teacher behavior (Myers et al., 2011), and student outcomes (Blakely, 2001).

Therefore, the purpose of this study was to examine the effects of multilevel support on first grade teachers' accurate use of research-based strategies during beginning reading instruction and the extent to which teachers maintained use of these strategies. Specifically, the following research questions were addressed in this study:

- (1) What are the effects of multilevel professional development support on teachers' accurate use of research-based strategies during beginning reading instruction?
- (2) How does performance on DIBELS Letter Naming Fluency, Phoneme Segmentation Fluency, and Nonsense Word Fluency measures differ between first grade students who receive enhanced Tier 1 instruction and first grade students who do not?
- (3) What are participating teachers' opinions of multilevel support for instruction and use of research-based strategies during beginning reading instruction?
- (4) What are the literacy facilitator's opinions of providing multilevel support to teachers?

#### Dependent Variable

One dependent variable, percentage of correctly implemented group instructional units (see Kretlow et al., 2011), was measured in this study. Group instructional unit was defined as a single three-term contingency, or series of three-term contingencies, that began with a correct teacher-provided antecedent and ended with a correct independent group unison response from students. It was measured by percentage of instructional

units correctly implemented during 6-min segments of phonemic awareness and phonics instruction. It was calculated by dividing the number of correct group instructional units by the total number of group instructional units and multiplying by 100. Percentage was used because the number of opportunities for teachers to use correct group instructional units varied across sessions and teachers. Data were graphed as percentage of correctly implemented group instructional units.

### Significance of Study

This study has the potential to contribute to the research base in the following ways. First, this study may provide a model for training general educators to use efficient, low-cost research-based strategies that improve academic engagement and achievement in Tier 1 beginning reading instruction. Second, this study may indicate level of support needed by non-DI teachers to apply learned strategies. Third, this study may add to limited research on the impact of enhancements on students' acquisition of beginning reading skills. Finally, the study may provide empirical evidence for a professional development model for use in schools to support teachers' acquisition of new skills through multilevel professional development support. The study may provide initial evidence for varying levels of support necessary when providing professional development and follow-up support to a diverse group of teachers.

### Delimitations

This study evaluated effects of multilevel professional development support on first-grade teachers' accurate use of instructional enhancements (i.e., MLT, unison responding, error correction) during beginning reading instruction. It is important to describe delimitations of the current study to enable readers to accurately interpret the

findings. First, this study used a single-case research design (i.e., multiple baseline across teachers design). Second, this study was also delimited by the school's demographics and geographical restrictions to a suburban school in a southeastern state. In addition, teachers selected for inclusion in this study were teaching first grade and had no prior experience teaching a DI program. Finally, this study did not address the entire block of beginning reading instruction (i.e., 90 min); it only looked at particular reading skills within the reading block (i.e., phonemic awareness, phonics).

### Definitions

The following definitions are provided for terms used throughout the dissertation in describing related literature and the methodology of the study. Familiarity with these terms is critical to understanding the study's purpose and in identification of contributions to the literature base.

Active student response. "Active student response (ASR) can be defined as an observable response made to an instructional antecedent. ASR occurs when a student emits a detectable response to ongoing instruction" (Heward, 1994, p. 286). Examples include words read, problems answered, and sentences written.

Choral responding. "Each student in the class responds orally in unison" to a question, problem, or item presented by the teacher (Heward, 1994, p. 286).

Coaching. Provision of individualized support to teachers following an initial inservice or training in an effort to increase teachers' use of new teaching behaviors (Kretlow & Bartholomew, 2010).

Dynamic Indicators of Beginning Early Literacy Skills (DIBELS). A set of procedures and measures for assessing the acquisition of early literacy skills from

kindergarten through sixth grade. They are designed to be short fluency measures used to regularly monitor the development of early literacy and early reading skills (Good & Kaminski, 2002).

**Instructional enhancements.** Enhancements that can be embedded within existing curriculum or instructional materials to increase student responding, practice, and mastery (Bursuck & Damer, 2011). Examples include unison responding, brisk instructional pace, effective signals, increased practice, model-lead-test format, and systematic error correction.

**Model-lead-test.** A teaching format in which new learning is scaffolded for students. During a model, "...the teacher first demonstrates how to do the new skill so that students have no difficulty understanding exactly what the new skill looks like." During a lead, "the teacher practices the skill with his students until they are able to do it without him." During a test, "the teacher monitors students as they do the skill independently" (Bursuck & Damer, 2011, pp. 23-24).

**Opportunity to respond.** Defined as "the interaction between (a) teacher formulated instruction (the materials presented, prompts, questions asked, signals to respond, etc.) and (b) its success in establishing the academic responding desired or implied by materials, the subject matter goals of instruction" (Greenwood, Delquadri, & Hall, 1986, p. 64).

**Phonemic awareness.** The ability to hear the smallest units of sounds in spoken language and to manipulate them (Bursuck & Damer, 2011). Examples include segmenting and blending.

**Phonics.** Understanding relationships between graphemes (written letter or letter

combination representing a single speech sound) and phonemes (smallest unit of sound; Bursuck & Damer, 2011).

Response cards. "...cards, signs, or items that are held up simultaneously by all students to display their response to a question or problem presented by the teacher" (Heward, 1994, p. 299).

Response to intervention. "Response to intervention integrates assessment and intervention within a multi-level prevention system to maximize student achievement and to reduce behavioral problems. With RtI, schools use data to identify students at risk for poor learning outcomes, monitor student progress, provide evidence-based interventions and adjust the intensity and nature of those interventions depending on a student's responsiveness, and identify students with learning disabilities or other disabilities" (NCRTI, 2010, p. 2). Core components of RtI include high-quality instruction, universal screening, continuous progress monitoring, research-based interventions, and fidelity of instructional interventions. Although varied, RtI is generally implemented as a three-tier approach. Primary prevention (Tier 1) occurs in the general education classroom with all students and includes instruction with a research-based core program. In secondary prevention (Tier 2), evidence-based interventions are provided in small-groups. Tertiary prevention (Tier 3) is most intensive, consists of even smaller group sizes, and is individualized to target each student's needs (NCRTI, 2010).

Side-by-side coaching. Occurs when a coach observes a teacher implementing a new strategy, intercedes during the lesson to model the strategy, and provides the teacher with an opportunity to practice the strategy again with immediate feedback (Kretlow & Bartholomew, 2010).

Students at risk. Students who, based on poverty, ELL status, disability or lack of early academic experiences, enter school with deficits critical to academic success, placing them at risk for academic failure, and often requiring extra support to learn (Bursuck & Damer, 2011). These students “enter school without knowledge of the language of instruction and almost immediately start to fall behind in their academic career because the instruction provided to them assumes knowledge of many concepts and skills the students do not possess” (Carnine, Silbert, Kame’enui, Tarver, & Jungjohann, 2006, pp. 3-4).

Supervisory coaching. Occurs when a coach observes a teacher implementing a new strategy, records data on implementation of desired behaviors, and provides targeted feedback on strengths and opportunities for improvement following the lesson (Kretlow & Bartholomew, 2010).

Systematic error correction. Teacher corrects students immediately after an error is made using the model-lead-test or model-test format (Bursuck & Damer, 2011).

Three-term contingency. A three-term contingency is “the basic unit of analysis in the analysis of operant behavior” (Cooper et al., 2007, p.42). In education, the three-term contingency may be called a learning trial. “A learning trial consists of three major elements: antecedent (i.e., curricular) stimuli, the student’s response to those stimuli, and consequent stimuli (i.e., instructional feedback) following the response” (Heward, 1994, p. 284).

Unison responding. Requiring all students to respond at the same time in an effort to increase academic learning time and participation of all students (Bursuck & Damer, 2011). Examples include choral responding and response cards.

## CHAPTER 2: REVIEW OF LITERATURE

This chapter reviews the relevant literature on the following topics: response to intervention (RtI), effective Tier 1 instruction, teacher preparation, professional development, and coaching. The chapter includes a summary of each topic previously listed, which supports the significance and purpose of this study (see Figure 1 for conceptual map). The chapter begins with a description of RtI, which leads into effective Tier 1 instruction (a component of RtI). The description of effective instruction also includes a description of Direct Instruction, components of effective teacher-student interactions, and instructional strategies that can be used to enhance Tier 1 instruction. Then the chapter describes literature related to teacher preparation for beginning reading instruction. Next, a description of traditional professional development is provided. The chapter concludes with a summary of coaching, the literature to support the significance and purpose of the current study. In the current study, effects of multilevel professional development support on teachers' accurate use of research-based instructional enhancements were analyzed.

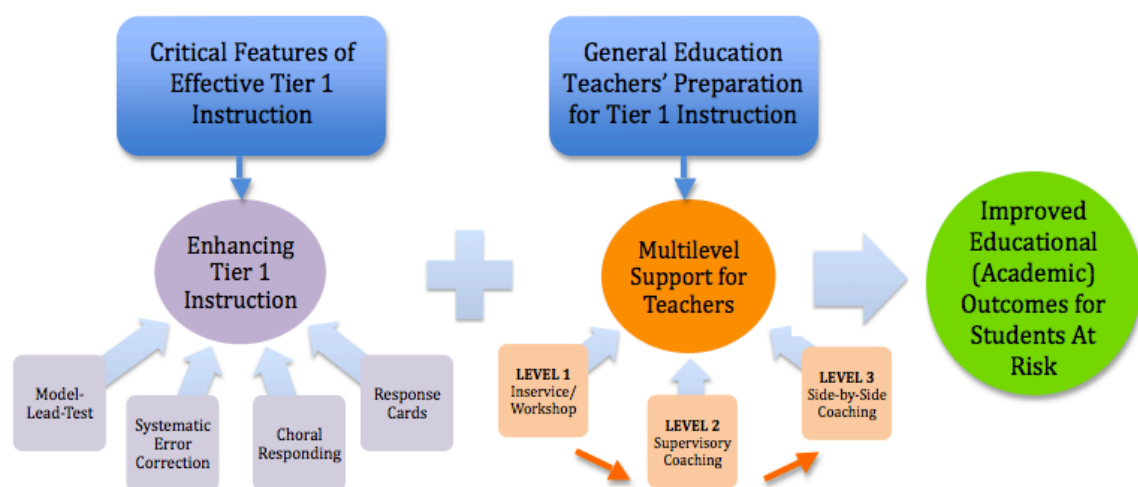


Figure 1. Chapter 2 conceptual map.

### Response to Intervention

In recent years, efforts to improve education and ensure all students are achieving high standards have been set forth. Recent legislation has placed increased accountability on teachers. For example, the reauthorization of the Elementary and Secondary Education Act (2001), known as the No Child Left Behind Act (NCLB), holds teachers accountable for each student's measured growth in reading and mathematics, and requires selection of instructional practices and strategies proven effective through scientific research. NCLB defines scientifically based research as "research that involves the application of rigorous, systematic, and objective procedures to obtain reliable and valid knowledge relevant to education activities and programs" (20 U.S.C. § 7801 [37]). Similar to NCLB, the use of evidence-based teaching practices is mandated in the Individuals with Disabilities Education Act (IDEA, 2004). Specifically, NCLB emphasizes providing students access to scientifically based instructional strategies (20 U.S.C. 70 § 6301 et seq.), while IDEA emphasizes use of scientifically based instruction (20 U.S.C. § 1400 et seq.). IDEA (2004) includes three elements that integrate evidence-based practices, including (a)



requirement for use of scientifically based reading instruction, (b) evaluation of how well a student responds to intervention, and (c) an emphasis on the role of data-based decision making. Together, federal mandates outlined in NCLB and IDEA address high achievement standards by emphasizing use of evidence-based practices in education.

Traditionally, students were assumed to be performing satisfactorily unless otherwise identified as having a disability (Fletcher, Coulter, Reschly, & Vaughn, 2004). Historically, a discrepancy between intellectual ability (IQ) and achievement has been utilized as a criterion for identification of a specific learning disability (SLD). Although research suggests there are two significant factors associated with improved outcomes for students at risk, including early identification and early intervention (Vaughn et al., 2007), concern that neither accurate nor early identification or intervention of students was occurring led the U.S. Office of Special Education Programs to consider alternative procedures for early intervention (Danielson et al., 2007) and possible subsequent referral for special education. With reauthorization of IDEA (2004), states must not require use of a severe discrepancy between IQ and achievement, must permit use of a process based on a child's response to scientific, research-based intervention, and may permit use of other alternative research-based procedures in documenting whether or not a child has an SLD. What followed was an acceptable alternative measure of identifying SLD, Response to Intervention (RtI). Given that prevention is the best intervention (Foorman & Moats, 2004), and in an effort to ameliorate learning problems, many school systems are moving toward preventive models of intervention, such as RtI, to identify and provide instruction to students at risk for academic failure. According to the IDEA National Assessment, RtI is implemented in 71% of school districts, and 61% of elementary schools (Bradley et al.,

2011).

RtI is a multi-tiered framework that systematically links high-quality assessment and instructional methods so that students who are not successful when presented with one set of instructional methods may succeed by using alternate practices. As an early intervention model, RtI focuses on prevention of academic and social problems, and aims to identify at-risk students as early as kindergarten (Vaughn et al., 2007). In reading, RtI allows teachers to identify and support struggling readers early on, before they fail (Bursuck & Blanks, 2010). According to the National Center on Response to Intervention (NCRTI, 2010), core components of RtI include (a) high-quality instruction to ensure all students are provided the opportunity to learn, (b) universal screening in target areas (e.g., reading, math), (c) regular progress monitoring to ensure students who do not respond adequately to instruction are provided with more intensive intervention, (d) use of research- and evidence-based interventions, and (e) fidelity of implementation of instructional interventions (see Table 1). The NCRTI (2010) offers the following definition:

Response to intervention integrates assessment and intervention within a multi-level prevention system to maximize student achievement and to reduce behavioral problems. With RtI, schools use data to identify students at risk for poor learning outcomes, monitor student progress, provide evidence-based interventions and adjust the intensity and nature of those interventions depending on a student's responsiveness, and identify students with learning disabilities or other disabilities (p. 2).

Although varied, RtI is generally implemented as a three-tier approach, each tier of

increasing intensity. A goal of the three-tier model is “to provide prevention and intervention simultaneously” (Stewart, Benner, Martella, & Marchand-Martella, 2007, p. 249). In all tiers, student progress is monitored, typically through curriculum-based measures (e.g., DIBELS, AIMSweb), and assessment is used to evaluate student outcomes and movement through the tiers of intervention. Primary prevention (Tier 1) occurs in the general education classroom with all students and includes instruction with a research-based core program (NCRTI, 2010). It is “the least intensive, first level of instruction and consists of the core reading program used in the classroom” (Bursuck & Damer, 2011, p. 14). Tier 1 is designed to provide effective instruction and address the needs of the majority of students (Vaughn et al., 2007). Lembke, McMaster, and Stecker (2010) also suggest use of specific instructional components with empirical validation for improved academic achievement within core programs. In general, 70-80% of students are able to be successful with Tier 1 instruction alone (Vaughn et al., 2007).

In secondary prevention (Tier 2), evidence-based interventions are provided in small groups (NCRTI, 2010). Tier 2 is designed to meet the needs of students who do not progress in Tier 1 and need additional support. These students continue to receive Tier 1 instruction, but are also provided supplementary instruction to strengthen skills taught during Tier 1 instruction (Bursuck & Damer, 2011; Vaughn et al., 2007). Tier 2 instruction may be provided by various school personnel including general education teachers, special education teachers, reading teachers, and paraprofessionals. Instruction in Tier 2 is provided to approximately 20% of students for whom Tier 1 instruction is insufficient (Vaughn et al., 2007).

Tertiary prevention (Tier 3) is most intensive, consists of even smaller group

sizes, and is individualized to target each student's needs (NCRTI, 2010). Tier 3 is designed to meet the needs of students who have not responded to Tier 2 instruction. Typically, these students require instruction that is more explicit, intensive, and individualized (Vaughn et al., 2007). In reading, Tier 3 instruction often includes “a more systematically designed and explicitly taught reading curriculum” (Bursuck & Damer, 2011, p.15). Intensive intervention in Tier 3 is provided to approximately 5-10% of students for whom Tier 2 instruction is insufficient (Vaughn et al., 2007).

Table 1: RtI core components defined

RtI Components	Definition
High-Quality Instruction	Effective instruction for all students using research- and evidence-based interventions that leads to development of academic and behavioral skills (NCRTI, 2010).
Universal Screening	Assessment of every student in the school at the beginning of the school year to identify or predict students who may be at risk for reading failure (NCRTI, 2010). Screening is a critical first step in identifying students at risk for reading difficulties and who might need supplemental instruction (Vaughn et al., 2007).
Progress Monitoring	Regularly monitoring (e.g., repeated measurement) a student's response to instruction to evaluate instructional effectiveness. Instructional adjustments and movement through tiers are made based on data analysis (e.g., data-based decision making; NCRTI, 2010).
Research- and Evidence-Based Interventions	Interventions selected with “attention to their evidence of effectiveness” (NCRTI, 2010, p. 10).
Implementation Fidelity of Instructional Interventions	Educators must make certain that interventions (e.g., practices, programs, strategies) are implemented in a manner in which they have been researched and validated (Kretlow & Blatz, 2011).

Recently, Fuchs, Fuchs, and Compton (2012) address prevention and intervention features of RtI by describing Smart RtI, an approach for designing more effective and efficient multilevel prevention. Smart RtI is described in terms of levels of prevention

(i.e., primary prevention, secondary prevention, tertiary prevention), rather than tiers (i.e., Tier 1, Tier 2, Tier 3). Smart RtI includes three critical components (a) multistage screening, (b) multistage assessment, and (c) role of special and general education teachers. Multistage screening not only involves a universal screening, which is used to identify students not at risk, but also a second stage screening which targets those students who are identified as risk based upon the initial universal screening. Multistage assessment involves using diagnostic assessment to identify students in primary prevention who are likely to be unresponsive to secondary prevention in order to move them straight into tertiary prevention. Smart RtI suggests general and special education teachers have equally important, yet distinctive roles. In Smart RtI, it is special education teachers who deliver tertiary prevention.

Regardless of risk status, all students deserve the opportunity to receive high-quality instruction, and early intervention in general education is critical for preventing academic failure (Vellutino, Scanlon, Small, & Fanuele, 2006). In summary, RtI is a systematic and data-based method for determining which students need more intensive intervention and instruction to make academic gains (Fuchs, Fuchs, & Vaughn, 2008). Within an RtI framework, teachers provide increasingly more instructional support as needed by individual students. These decisions are based upon objective assessment data, and educational decisions should not be made without evidence to support them.

#### Effective Tier 1 Instruction

While there is substantial research to support effectiveness of reading interventions provided to students at risk in Tier 2 and Tier 3, research regarding effective Tier 1 instruction is more limited. Research indicates students at risk for reading

failure “will never develop reading skills naturally” (Bursuck & Damer, 2011, p. 5), facing the crucial task of catching up to their peers (Kame’enui, 1993). In a seminal longitudinal study of reading achievement, Juel (1988) found students who were below grade level in reading at the end of first grade had an .88 probability of demonstrating significantly below grade level reading ability in fourth grade. In a more recent examination, Judge and Bell (2011) found poorly skilled readers continue to fall further behind typically developing peers over time. Given the purpose of NCLB (2001), which is to ensure that all children have a fair, equal, and significant opportunity to obtain a high-quality education, it is essential to close the achievement gap between high- and low-performing children. Research on beginning reading suggests reading failure may be preventable with early identification (Schatschneider, Fletcher, Francis, Carlson, & Foorman, 2004). Data from longitudinal studies demonstrate that early intervention may facilitate subsequent reading success of students identified at risk, thereby increasing later reading achievement (O’Connor, Fulmer, Harty, & Bell, 2005; Simmons et al., 2008; Vadasy, Sanders, & Peyton, 2006; Vellutino et al., 1996).

Of equal importance is the need for effective teaching strategies that will improve academic outcomes for all students. Given the breadth of research on beginning reading, instructional practices that have been demonstrated to improve academic outcomes have emerged. Research demonstrates that instructional strategies and practices used in special education can also increase achievement outcomes for students at risk, especially when compared to traditional teaching methods (Deshler & Schumaker, 1993). Increasing effective instructional practices within the general education classroom in Tier 1 can lead to improved achievement for students who demonstrate early reading difficulties (Al

Otaiba et al., 2008; Pressley et al., 2001). While research-based core reading programs may provide a foundation for effective Tier 1 instruction, teachers often need to supplement the program in order to meet the needs of students at risk (Stein, Johnson, & Gutlohn, 1999).

Significant reading research indicates beginning and at-risk readers benefit from explicit, systematic instruction in phonemic awareness and phonics to improve reading achievement (Adams, 1990; Ehri et al., 2001; Mathes et al., 2005; National Reading Panel, 2000; Torgesen et al., 2001; Wanzek & Vaughn, 2007). With explicit instruction, skills are clearly modeled and key concepts are directly taught so that students are not required to infer meaning from instruction (Denton, 2012; Denton, Vaughn, & Fletcher, 2003). Given that students at risk for reading failure require direct instruction, modeling, and frequent practice opportunities with immediate and specific feedback, utilizing effective teaching strategies to improve the learning of students within the classroom is essential.

Today's classrooms represent a diverse group of students who enter school at risk for failure due to a number of reasons (e.g., poverty, disability, ELL status; Coyne et al., 2011); therefore, teachers need to focus on alterable variables (i.e., those that can be changed; Bloom, 1980). Alterable variables may include frequency of student responding, pace of instruction, error correction, and provision of feedback (Kupzyk, Daly, Ihlo, & Young, 2012). To improve academic performance and close the gap between high and low achievers, general education teachers must use instructional practices and strategies that enhance active student engagement and participation during Tier 1 instruction. Research suggests there are instructional variables that differentiate

effective from less-effective teachers including “instructional pacing and format, active student engagement, delivery of planned activities, motivational strategies and emphasis, and judgments of student learning” (Phillips, Fuchs, Fuchs, & Hamlett, 1996, p. 30). One alterable variable demonstrated to improve student achievement is academic engagement. According to Heward (1994), in order to be proficient with any skill, students need frequent opportunities to actively respond to instruction. Students who are not actively engaged in instruction receive fewer opportunities to respond, are often low achievers (Greenwood et al., 1984), and are more likely to engage in off-task behavior, thereby missing critical teacher input (Randolph, 2007).

One way to focus on alterable variables and increase academic engagement and participation of all students in Tier 1 is by enhancing core reading curricula. It has been suggested to use research-based strategies in addition to scientifically validated Tier 1 core curricula in order to strengthen students’ literacy skills (Jones, Yssel, & Grant, 2012; Lembke et al., 2010). Research on academic engagement describes specific components that contribute to explicit instruction including active student responding (ASR) and systematic error correction (Adams & Engelmann, 1996; Watkins & Slocum, 2004).

In one investigation, Bursuck and colleagues (2004) trained K-2 teachers at high-poverty, minority-diverse schools to modify whole-class Tier 1 instruction by embedding instructional enhancements (e.g., systematic error correction, ASR) into daily reading instruction. Using a one-way ANOVA, results indicated significant achievement differences between students whose teachers were trained in enhancing instruction (i.e., Project PRIDE students) versus students in the control group on DIBELS (Good & Kaminski, 2002) Nonsense Word Fluency ( $p<.000$ ) and Oral Reading Fluency ( $p<.001$ ).



In addition, following core reading instruction plus enhancements, half of Project PRIDE students (53%) who were previously identified as at-risk achieved successfully in Tier 1 whole-class instruction.

In similar investigations, kindergarten and first-grade teachers were trained to modify whole-class Tier 1 mathematics (Kretlow et al., 2011; Kretlow et al., 2012) and reading (Schnorr et al., in preparation) instruction. In these studies, teachers were provided a half-day inservice and follow-up coaching on how to enhance instruction using unison responding, model-lead-test (MLT), and systematic error correction. Results from each study indicated the inservice improved teachers' instructional accuracy; however, a second level of growth was achieved following individual coaching sessions.

In another study, Mathes et al. (2005) compared effects of two first-grade reading interventions. The first intervention was based on the Direct Instruction (DI) model and teachers used scripted lessons based on a carefully designed scope and sequence. The second intervention required students to spend more time reading and writing connected text with teachers providing support and feedback. The second group of students was explicitly taught some skills, but teachers did not follow a script and instead selected identified teaching activities to supplement instruction. While only small differences were evident between the two intervention groups, significant differences were found between intervention and control groups. Authors suggest characteristics shared by the interventions attributed to their success, including explicit, systematic instruction in phonemic awareness and phonics, high levels of active student engagement, and extended opportunities for practice with feedback.

While it has been recommended that teachers provide 90 min of beginning

reading instruction daily (Armbruster, Lehr, Osborn, Adler, & Noonis, 2001), time spent on instruction alone will not close the achievement gap of at-risk students. There needs to be a sufficient amount of time engaged in effective instruction. As demonstrated, this instruction should be explicit and systematic. Such instruction may improve students' reading achievement and reduce placement in special education.

#### Components of Direct Instruction

Direct Instruction (DI), one specific model of explicit instruction, is a highly effective instructional model that improves reading outcomes, and is often implemented with special education or at-risk students (Watkins & Slocum, 2004). Substantial research supports the use of DI curricula to improve achievement of at-risk students (Adams & Engelmann, 1996; Benner, Kinder, Beaudoin, Stein, & Hirschmann, 2005; Hempenstall, 2008; Przychodzin-Havis et al., 2005). The purpose of DI is to efficiently teach academic content in order to maximize student learning (Watkins & Slocum, 2004). Success of DI is relative to its main components including program design, instructional organization, and student-teacher interactions, and each enables DI to accomplish the goal of teaching all students both effectively and efficiently.

Although research demonstrates DI programs are effective with students at risk or with disabilities in reading (Przychodzin-Havis et al., 2005), these programs are rarely used as core curricula in general education classrooms. However, research indicates general education teachers can enhance core curricula using components of DI as strategies to increase student engagement and achievement. Specifically, teacher-student interactions, one of three main DI components, contributes to effects on engagement and achievement of students, particularly those identified as at risk for reading difficulties.

There are seven features that promote effective teacher-student interactions including active student response (ASR), unison responding, signals, pacing, teaching to mastery, correction procedures, and motivation (Watkins & Slocum, 2004).

First, ASR occurs when students make an observable, curriculum-related response to instruction (Heward, 1994). Benefits of ASR include increased learning, immediate teacher feedback, and increased on-task behavior (Heward, 1994). Embedding ASR techniques into core instruction provides an opportunity for all students to simultaneously respond, an advantage over traditional single-student responding. In reading, examples of ASR may include rhyming, segmenting, blending, reading words aloud, and answering comprehension questions. Research demonstrates a correlation between increased student engagement and academic achievement (e.g., Brophy & Good, 1986; Greenwood et al., 1984). Heward et al. (1996) stated, “providing students with frequent opportunities to respond is one of the most powerful means teachers have for increasing academic achievement” (p. 9). One way teachers can increase ASR is through group unison responding. Unison responding provides all students an opportunity to participate and may be in the form of an oral (i.e., choral responding) or visual (i.e., response cards) response. This form of responding provides immediate feedback to the teacher on student learning. Next, teachers must elicit unison responding with an effective signal. Signals may be visual (e.g., hand drop) or auditory (e.g., finger snap) depending on the task. A signal indicates when students should provide an answer to a teacher-posed question and provides all students an opportunity to participate. Fourth, it is important for teachers to maintain a brisk pace during instruction. Brisk pacing keeps students engaged, maintains attention, and ultimately reduces off-task behavior. The fifth feature, teaching to mastery,

ensures students are performing skills at high levels. Instruction should be scaffolded, in which the teacher provides temporary support while students learn new material, and eventually faded once students are able to demonstrate mastery (Coyne et al., 2011). Watkins and Slocum (2004) recommend gauging mastery by the lowest performing student in the group. For example, if the lowest student in the group has mastered the content, a teacher can assume others in the group have mastered it as well. Although DI is designed to minimize student errors, errors are likely to occur when students acquire new information. As a result, error corrections must be immediate and explicit. The basic DI error correction procedure occurs immediately after the error and uses a model-test-retest (e.g., teacher provides correct answer [my turn; model]; teacher elicits student response to original question [your turn; test]; teacher presents other items in teaching sequence, then returns to the item that was previously missed [retest]) or model-lead-test-retest format (Watkins & Slocum, 2004). The final feature, motivation, encompasses specific targeted feedback, praise, and recognition of student success.

While research suggests these components are effective embedded within DI curricula, component analyses demonstrate their effectiveness as individual instructional enhancements as well. In particular, unison responding (i.e., choral responding, response cards), MLT, and systematic error correction can enhance core curricula and be used in whole-class settings to meet the diverse needs of all students. All are easy to implement, low-cost strategies (Heward, 1994). Although these practices are often associated with effective outcomes for students at risk and with disabilities, Vaughn, Gersten, and Chard (2000) conducted a research synthesis and found these interventions have also resulted in high effect sizes for all other students in the classroom, including average and high-

achieving students. More importantly, general education teachers are able to use these instructional enhancements in a whole-class setting during daily instruction (Bursuck et al., 2004; Kretlow et al., 2011; Kretlow et al., 2012; Schnorr et al., in preparation) to increase ASR and maximize student learning. Specifically, by using these enhancements students are more actively engaged in instruction, more attentive, and are less likely to be off task. As a result, students are provided an increase in opportunities to respond, which directly influences engagement with academic content.

Choral responding. Choral responding offers one approach for general education teachers to enhance core instruction within Tier 1, and it provides an efficient way to increase ASR of all students. With choral responding, “each student in the class responds orally in unison” to a question, problem, or item presented by the teacher (Heward, 1994, p. 286). Choral responding is most effective when teachers present instruction at a brisk, lively pace; provide a clear auditory (e.g., finger snap, “What word?”) or visual (e.g., hand drop, point) signal to elicit each response; and provide immediate feedback (Heward, 1994). In addition, choral responding should be used only for academic activities that (a) have only one correct answer; (b) have short answers (e.g., 1-3 words); and (c) are suitable for fast-paced instruction (Heward, 1994). With choral responding, feedback is provided for the “majority” response. In general, if all students answer correctly, the teacher responds with a quick, positive comment (e.g., “Great job!”). If a few errors occur, the teacher should restate the correct answer (e.g., “Yes. That word is nap.”). If one-third or more of the class provides an incorrect answer, the teacher should provide the correct answer and immediately repeat the item (Heward, 1994). Although there is a paucity of research on the effectiveness of choral responding as an individual

component, some experimental research indicates choral responding is an ASR teaching strategy that can be used to increase student participation (Haydon, Mancil, & Van Loan, 2009), correct academic responses (Sterling, Barbetta, Heward, & Heron, 1997), and on-task behavior (Haydon et al., 2009).

Sterling et al. (1997) compared ASR and on-task instruction on acquisition and maintenance of health facts of students with disabilities who participated in a fourth grade general education classroom for health education. During ASR instruction, the teacher stated a health fact, provided an answer, and cued students to provide the answer as a choral response. Conversely, during on-task instruction the teacher simply praised students for attending to instruction. Using an alternating treatments design, results indicated students learned ( $n=114$ ) and maintained ( $n=87$ ) more health facts during the ASR condition when compared to facts learned ( $n=59$ ) and maintained ( $n=37$ ) during the on-task condition. Additionally, 86% of end-of-day test scores were higher during ASR instruction. These findings suggest elementary students with disabilities are able to learn a comparable number of words as same age peers without disabilities by engaging in high levels of ASR through choral responding.

In a more recent study, Haydon et al. (2009) examined effects of an increased rate of opportunity to respond via choral responding within a general education science classroom on disruptive behavior, on-task behavior, and correct responses of a fifth-grade African-American female identified at risk for an emotional behavioral disorder. The classroom teacher was trained in a 30-min session to deliver questions at a rate of at least 3 questions per min. Using an ABA withdrawal design, results indicated a decrease in disruptive behavior and increases in both on-task behavior and correct academic

responses. First, results on disruptive behavior indicated a median rate of 1.9/min during baseline, with a decrease to 0.25/min during intervention, and an increase to 2.0/min with return to baseline. Next, median percentage of on-task behavior increased from baseline (34.15%) to intervention (67%), and decreased upon return to baseline (38%). Finally, results on correct academic responses indicated a median rate increase from baseline (0.025) to intervention (0.90), and a decrease with return to baseline (0.20). These findings suggest general education teachers can be trained to increase rate of questioning in a small amount of time (i.e., 30 min), thereby increasing opportunities for students to respond.

Response cards. Response cards are “cards, signs, or items that are held up simultaneously by all students to display their response to a question or problem presented by the teacher” (Heward, 1994, p. 299). Response cards may be write-on or preprinted, and they provide an additional way for all students to respond in unison during teacher-led instruction. Write-on response cards are cards on which students write their own response. In reading, an example may include writing the sounds for the word map on dry-erase boards. Preprinted response cards are a card, or set of cards on which all possible answers are printed. In reading, a teacher may provide each student with preprinted letter cards for use during instruction. To elicit a unison response from all students, it is important the teacher provide a clear signal for when students are to hold up their cards (e.g., “Cards up!”). As with choral responding, feedback should be based on the majority response (Heward, 1994). Effects of response cards across grades, ability levels, and settings have been investigated over the last 20 years. This research indicates response cards increase student participation (Narayan, Heward, Gardner, Courson, &

Omness, 1990), academic achievement (Gardner, Heward, & Grossi, 1994), and on-task behavior (Christle & Schuster, 2003), and decrease off-task behavior (Armendariz & Umbreit, 1999). Recently, response cards were identified as an evidence-based practice with a moderate level of evidence to increase opportunities to respond for students at the elementary level (Schnorr, Freeman, & Test, submitted).

Lambert et al. (2006) compared effects of response cards and single-student responding on disruptive behavior and academic responding during whole-group math lessons. Nine students identified as the most disruptive and least attentive during math were targeted for data collection across two urban fourth-grade classrooms. The two conditions were alternated in an ABAB reversal design. Results demonstrated a functional relation between response cards and disruptive behavior. During the response card condition, all students had substantial declines in disruptive behavior ( $M=.13$ ) compared to single-student responding ( $M=6.8$ ). Further, data on academic responding indicated students participated in instruction more frequently during response card conditions ( $M=.94$ ) compared to single-student responding ( $M=.12$ ). An increase in correct academic responses was also evident when response cards were used.

In a similar, more recent study, Wood et al. (2009) compared effects of preprinted response cards and handraising on students' participation and off-task behavior in a rural inclusive kindergarten classroom during group calendar instruction. Four students were targeted for data collection as a result of off-task behavior and lack of participation. Using a reversal design, results on student participation indicated an increase from handraising ( $M=1.7$  and  $M=1.93$ , respectively) to response card ( $M=29.36$  and  $M=28.3$ , respectively) conditions. A decrease in off-task behavior was also demonstrated from



handraising (M=70.36% and M=53.6%, respectively) to response card (M=0% and M=6.74%, respectively) conditions. These findings suggest response cards are an effective strategy to increase student participation and decrease off-task behavior in a whole-class setting.

Munro and Stephenson (2009) investigated the effects of response cards and handraising on student participation, academic achievement, and teacher behavior during whole-class English vocabulary instruction. Five students were targeted for data collection. Using a reversal ABAB design, results indicated a functional relation between response cards and student-initiated responses. All students demonstrated increased test scores during response card conditions. Finally, students were provided increased feedback during the response card condition than in the handraising condition.

Horn (2010) conducted a review of literature to determine the effectiveness of response card strategies on students with disabilities. Based on inclusion criteria, six studies were included in the review. Results indicated studies have been conducted across grade levels (preschool through ninth grade) and settings (i.e., inclusion, self-contained) with students of varying disabilities. In each of the studies, rates of accurate responses increased when response cards were used. In three studies, increased on-task behavior and decreased inappropriate behavior were demonstrated. The author suggests response cards be considered an evidence-based practice.

Additionally, Randolph (2007) completed a meta-analysis of research on response cards. The author reviewed 18 studies that met specific criteria for inclusion. Studies compared use of response cards to handraising during group instruction. Use of response cards was the independent variable and two types were used: write-on and preprinted.

The control condition was handraising. Four dependent variables including participation, quiz scores, test scores, and intervals of off-task behavior were measured. First, participation was identified as the proportion of opportunities to respond to the number of times students actually responded. An analysis of studies showed a 47.7% increase in participation in the response card condition. Second, off-task behavior was defined as an inappropriate behavior (e.g., hitting or touching others, making noises) or attending to stimuli other than instruction (e.g., leaving assigned seat, playing with objects at desk). Results indicated off-task behavior was approximately 34% lower during the response card condition. In general, write-on response cards had a larger effect size for off-task behavior than preprinted response cards. The average effect size for quizzes administered following each session was 1.08 in the response card direction. Finally, on tests administered at least one week after instruction, the pooled effect size of test achievement was 0.38 in the response card direction. Analysis results indicated a higher effect size for test scores, quiz scores, and participation when preprinted response cards were used. The results of the meta-analysis suggest increasing opportunities for students to respond during instruction will increase learning and decrease off-task behavior.

Model-lead-test. Explicit instruction is clear, direct teaching of a skill using modeling, guided and independent practice, and systematic feedback (Bursuck & Damer, 2011). Teachers can provide explicit instruction using a MLT instructional sequence (Engelmann & Carnine, 1991). MLT is a teaching format in which new learning is scaffolded for students. During a model, "...the teacher first demonstrates how to do the new skill so that students have no difficulty understanding exactly what the new skill looks like." During a lead, "the teacher practices the skill with his students until they are

able to do it without him.” During a test, “the teacher monitors students as they do the skill independently” (Bursuck & Damer, 2011, pp. 23-24). An example of MLT in reading follows: (a) first the teacher models the skill (e.g., “This word is man.”); (b) then the teacher and students perform the skill together (e.g., “Let’s read this word together, man.”); and (c) finally the teacher provides the opportunity for students to perform the skill independently (e.g., “Your turn to read this word.”). Using this format, learning is scaffolded and students are successful from the start of instruction. Research demonstrates use of MLT to introduce academic content to students at risk promotes mastery of newly learned skills (Hollingsworth & Woodard, 1993; Idol, 1987; Park et al., 2007).

In the first investigation, Idol (1987) examined effects of MLT using a story mapping strategy to teach story comprehension to five 4<sup>th</sup> and 5<sup>th</sup> grade students with learning disabilities or low reading comprehension achievement. Using a multiple baseline across participants design, results indicated an increase in the percentage of correct comprehension questions answered. Additionally, by the end of the study, all but one student wrote stories that included all story map components.

Hollingsworth and Woodard (1993) investigated effects of explicit strategy instruction on problem solving with 37 secondary students with learning disabilities. All students were taught health facts and concepts that were then applied to problem-solving exercises presented through computer-simulation games. One group of students was taught using an explicit strategy for solving the problems, while a second group was encouraged to produce their own strategies while being provided supportive feedback. Students taught using explicit, scaffolded instruction outperformed students encouraged

to use their own strategies on two posttest measures (i.e., Health Diagnosis Test, Video Diagnostic Test). These authors suggest explicit strategy instruction benefits students at risk and with disabilities.

Park et al. (2007) examined effects of using a MLT procedure to teach two preschoolers with a developmental disability how to write their names in preparation for the transition to kindergarten. Students were instructed using a MLT format, along with fading and prompting. Using a multiple baseline across participants, results indicated an increase in median number of legibly written letters from baseline to intervention. As prompts and dotted lines were faded throughout instruction, students were able to independently and legibly write all letters in their name.

Systematic error correction. Teaching to mastery requires correction procedures that ensure students master content as they move through tasks. Errors are likely to occur when students are acquiring new information; therefore, error corrections must be immediate and explicit. Error correction procedures should occur immediately after an error is made using the MLT or model-test format (Bursuck & Damer, 2011; Watkins & Slocum, 2004). In an error correction, the teacher first models the correct answer (i.e., model), guides students to correct the error (i.e., lead), and provides the opportunity for students to independently answer the question (i.e., test). When teachers provide systematic error correction they give important feedback to students during instruction. Provision of immediate, corrective feedback is important because it prevents students from learning incorrect information, which in turn maximizes students' learning. Research demonstrates systematic error correction results in increased accuracy of academic responses (Alber-Morgan, Ramp, Anderson, & Martin, 2007; Barbetta, Heron,

& Heward, 1993; Barbetta, Heward, & Bradley, 1993; Barbetta, Heward, Bradley, & Miller, 1994; Carnine, 1980; Drevno et al., 1994; Meyer, 1982; Nelson, Alber, & Gordy, 2004).

Carnine (1980) compared effects of phonic versus whole-word correction procedures on word acquisition with nine preschool children. Using a multiple baseline across groups design, results indicated phonic corrections produced increased correct responses in training and transfer tests for two of three groups. The third group did not improve in training tests upon phonic intervention, but slight improvements were evident during transfer tests.

In the context of a DI program, Meyer (1982) compared effects of word-analysis and word-supply correction procedures on norm-referenced and criterion-referenced measures with fifty-eight students with disabilities in fourth through seventh grade. Inferential statistics (i.e., t-test, ANOVA) were used to evaluate differences among groups in correction procedures. Results indicated no significant differences in posttest scores, percentage of word-attack words missed, criterion-referenced test scores, or instructional periods required to complete 70 lessons. However, mean gains in grade equivalents and reading accuracy on norm-referenced tests (i.e., Wide Range Achievement Test, Gray Oral Reading Test) from pre- to posttest exceeded growth of norm samples of the tests.

Barbetta, Heward, et al. (1993) compared effects of whole-word and phonetic-prompt error correction during sight word instruction with five elementary students with developmental disabilities in a self-contained class. Using an alternating treatments design, results indicated whole-word error correction produced higher scores on 86% of

same-day and 75% of next-day tests when compared to phonetic-prompt error correction on administered word sets. Further, when errors occurred during instruction with whole-word error correction, 100% of trials ended with a correct response, whereas only 40% of trials with phonetic-prompt error correction ended with a correct response.

In an extension of the previous study, Barbetta et al. (1994) compared effects of immediate and delayed error correction on acquisition and maintenance of sight words with four students with developmental disabilities in a self-contained classroom. Using an alternating treatments design, results indicated immediate error correction produced 44% more correct responses during sight word instruction. In addition, 89% of same-day and 87% of next-day test scores were higher with immediate versus delayed error correction. Results also indicated an increase in percentage of learned words read correctly on 1- and 2-week maintenance tests.

Barbetta, Heron, et al. (1993) compared effects of ASR error correction and no-response error correction on acquisition, maintenance, and generalization of sight words with six students with developmental disabilities in a self-contained classroom. Using an alternating treatments design, results indicated ASR error correction resulted in a greater number of student responses during instruction ( $M=30$ ) over non-response error correction ( $M=12.6$ ). Students' performance was also higher on 80% of same-day and 77% of next-day tests, producing higher mean scores as a result of ASR error correction. Maintenance tests administered 2 weeks after instruction indicated ASR error correction produced more words correct for five students. Students produced the same or higher percentage of correct target words read in a sentence with ASR error correction on generalization tests.

In a replication study, Drevno et al. (1994) compared ASR error correction and no-response error correction on science vocabulary with five elementary students in a general education classroom. Two students identified as gifted and talented and three students considered at risk for academic failure participated in the study. Using an alternating treatments design, results indicated ASR error correction produced approximately 50% more correct responses during instruction. In addition, ASR error correction was more effective for all five students on variables measured during (i.e., correct definitions stated, just-corrected definitions correct on next presentation) and after instruction (i.e., same-day tests, next-day tests, 1-week maintenance, 1-week paper-and-pencil tests, maintenance tests).

In a recent investigation, Wood, Schnorr, Ross, and Cooke (in preparation) compared the effectiveness and efficiency of two error correction procedures: DI error correction and DI plus air-writing error correction on number correct on a next-day test. Eight third-grade students participated in the study, and four were targeted for data collection. Using an alternating treatments design, results indicated both methods were comparable when comparing mean number of words correct on delayed reading tests for each student; however, DI plus air-writing error corrections took twice as long to deliver when compared to DI error corrections. Authors suggest these findings are important when considering instructional efficiency, given that students at risk need to learn more in less time.

Summary of instructional enhancements. In Tier 1, instructional enhancements (e.g., unison responding, effective signals, model-lead-test, systematic error correction) make whole-class instruction more effective. Each of these enhancements is low tech and

low cost (Heward, 1994). Research suggests general education teachers can use instructional enhancements in the core reading program to facilitate learning for students at risk (Bursuck et al., 2004; Schnorr et al., in preparation). Additional research suggests teachers can embed these enhancements during math instruction (Kretlow et al., 2011; Kretlow et al., 2012) and further, can generalize their use to an untrained area (Kretlow et al., 2011). Most importantly, effective Tier 1 instruction may decrease the number of students identified at risk and may prevent subsequent referral to special education. Denton and Mathes (2003) stated, “if high-quality primary and secondary instruction were regularly provided in our public schools, less than 2% of our children would require tertiary intervention” (p. 239).

#### General Education Teacher Preparation

Within RtI, general educators must be prepared to meet the needs of all students, and they have a significant role in RtI implementation. They are required to provide research-based core instruction, possess knowledge of evidence-based practices for remediation, and acquire a strong foundation in assessment and progress monitoring procedures (Brownell et al., 2010). Unfortunately, research indicates general educators may be ill equipped to perform these duties.

Effective teachers possess expertise in the areas they teach and are able to demonstrate that knowledge through instruction (Brownell et al., 2010). However, research on teacher preparation across the last 20 years indicates teachers often feel helpless and unable to meet the needs of all students, and they often lack important pedagogical and content knowledge in reading (e.g., Baker & Zigmond, 1990; Cunningham, Perry, Stanovich, & Stanovich, 2004; Mather, Bos, & Babur, 2001; Moats,



1994; Scanlon & Vellutino, 1996; Spear-Swerling, Brucker, & Alfano, 2005; Troyer & Yopp, 1990; Vaughn, Moody & Schumm, 1998), and are unprepared to teach reading (e.g., Helfrich & Bean, 2011; McCombes-Tolis & Feinn, 2008) and assess reading (e.g., McCombes-Tolis & Feinn, 2008). For example, Troyer and Yopp (1990) surveyed 163 kindergarten teachers and results indicated only one-third of those were familiar with the term phonological awareness. Scanlon and Vellutino (1996) observed kindergarten reading instruction and reported observing little explicit and systematic reading instruction. In another example, Moats (1994) surveyed 89 educators (e.g., reading teachers, general educators, special educators) with 0 to 20 years teaching experience to identify knowledge of spoken and written language structure. Results identified gaps in teachers' knowledge and awareness in reading; thereby suggesting they are inadequately prepared to explicitly teach students, specifically beginning readers and students at risk, how to read. Baumann and colleagues (2000) surveyed teachers and administrators, and results indicated one of the greatest challenges with reading instruction included accommodating diverse, struggling, and at-risk students. Although research from the past decade is alarming, more recent research indicates some of the same trends, suggesting teachers still may be unprepared to teach reading.

Recently, McCombes-Tolis and Feinn (2008) surveyed 65 general and special education teachers certified to teach K-3 students to investigate knowledge of (a) when K-3 students develop key reading competencies, (b) who has responsibility for teaching key reading competencies to K-3 students, and (c) teachers' perceptions of knowledge of key competencies. Competencies were outlined in the states blueprint for reading achievement. Results indicated 75% of all teachers failed to correctly identify which

grade level students are supposed to learn specific beginning reading skills (e.g., blend phonemes, demonstrate letter-sound correspondence, identify words with similar initial and final sounds). Authors suggest these gaps may be a result of inadequate preservice preparation. Specifically, teachers indicated they were required to complete (a) none (16.7%) to greater than three courses (12.5%) in K-3 reading instruction, with the majority completing two courses (36%) and (b) none (46%) to greater than three courses (1.5%) in reading assessment for K-3 students. Results of general education teachers follow. Sixty-three percent of general education teachers indicated they were not required to complete a supervised clinical experience. Results also indicated general education teachers were confident in their knowledge of and skill in teaching K-3 students how to read (74.3%); however, 40% indicated they did not agree or were uncertain if they agreed with a statement on knowledge of characteristics of students who experience difficulties in reading. In addition, 42.8% agreed that it was difficult for them to meet instructional needs of lower level students in the regular classroom, and 62.8% agreed they needed to learn more about how best to teach children to read. Teachers also indicated they have the responsibility of deciding how to teach students in their classroom to read (74.3%).

Brady et al. (2009) investigated effects of professional development on 65 first-grade teachers' knowledge of phonological awareness and phonics. All teachers were administered a teacher knowledge survey, assessing phonemic awareness and code concepts, fluency-related items, and knowledge of vocabulary and oral language items, prior to participating in the professional development. The majority of teachers (n=43) had obtained a Master's degree and mean duration of teaching experience was 10.42 years. Results of the teacher knowledge survey indicated teacher performance prior to

professional development was moderately low with a mean score of 25.26 (out of 60) points (42%). Percentages correct on phonemic awareness concepts, code concepts, fluency, and oral language items were 38%, 48%, 41%, and 40% respectively. While percentage correct increased following professional development, initial scores on the teacher knowledge survey are alarming.

Student achievement is impacted by the quality of teacher preparation programs. In examining preparedness of general education teachers to meet the needs of students, research indicates they often pay little attention to individual differences, are reluctant to adapt instruction, and are unable to improve students' academic achievement (Baker & Zigmond, 1990; McIntosh et al., 1993; Zigmond & Baker, 1990). Research suggests this may be a result of their preservice preparation (e.g., McCombes-Tolis & Spear-Swerling, 2011; Joshi et al., 2009; Walsh, Glaser, & Wilcox, 2006).

In a study titled, What education schools aren't teaching about reading and what elementary teachers aren't learning, conducted by the National Council on Teacher Quality, Walsh et al. (2006) examined syllabi (n=227) and textbooks (n=227) from 223 reading courses to determine how they aligned with findings of the National Reading Panel (NRP; 2000). Seventy-two institutions that housed elementary education programs were randomly selected, representing 35 states. Results indicated only 11 institutions (15%) provided future elementary teachers reading coursework that was aligned with the NRP and included all five big ideas (i.e., phonemic awareness, phonics, fluency, vocabulary, comprehension), and one-third of the institutions made no reference to the big ideas in reading in any of their reading courses. When determining how frequently individual components of reading instruction were taught, results indicated phonics and

comprehension were taught in one in seven courses (16% and 15%, respectively), phonemic awareness and fluency were taught in one in 20 courses (9% and 7%, respectively), and vocabulary was taught in 13% of courses. Results also suggest that elementary educators are frequently trained in constructivist approaches (e.g., guide on the side). For example, in reviewing course syllabi, “the teacher is commonly described as supporter, helper, encourager, facilitator, and collaborator without clear direction about how to actually teach children how to read” (p. 30), and instructional methods are presented as equally valid with the decision on how to teach reading left up to individual teachers. After reviewing textbooks, only four were considered acceptable for teaching a reading course, and these four texts were used in only 11 of 223 courses (5%). These findings suggest many schools and colleges of education may not be adequately preparing preservice elementary general education teachers to teach reading aligned with findings of the NRP. Given the failure to focus on instructional methods for students at risk, findings also suggest preservice teachers are not receiving basic knowledge required to teach literacy skills, and they may be unprepared to meet the needs of students, specifically those at risk in reading.

In a recent study, Helfrich and Bean (2011) conducted a survey to examine teacher education program effectiveness in literacy. Authors surveyed 20 general education teachers who had recently graduated from a teacher preparation program at one large urban mid-Atlantic university. Participants were teaching at grade levels from kindergarten through eighth grade across eight states. Results indicated upon entering the classroom, teachers needed additional support in (a) adapting instruction to meet the needs of students with special needs, struggling readers, and ELLs and (b) using reading

assessment data to drive instruction. Teachers also indicated that as a result of their coursework, they felt only moderately prepared to deliver reading instruction.

Recently, McCombes-Tolis and Spear-Swerling (2011) investigated preparedness of elementary teachers to meet literacy needs of students within RtI. Authors reviewed syllabi from undergraduate certification and graduate programs. Results indicated the following: (a) 53.2% of required textbooks were considered unacceptable (“intended to be a comprehensive source on good reading instruction, but were inaccurate and/or incomplete,” p. 368); (b) three-fourths of required reading courses did not include phonemic awareness on the course calendar; (c) 45% of syllabi did not mention any of the five big ideas in reading; (d) 82.8% of syllabi did not include instruction on formative assessment; (e) none of the syllabi referenced RtI; and (f) teachers received minimal preparation in lesson planning and assessment. These findings suggest some teacher preparation programs may not prepare teachers in the essential components of reading, even following introduction of RtI.

#### Traditional Professional Development

Despite attention paid to evidence-based practices, a gap between research evidence and classroom practice in both general and special education classrooms exists (Cook & Schirmer, 2006; Denton et al., 2003), demonstrating research- and evidence-based teaching practices have had minimal, if any, carryover into classrooms (Burns & Ysseldyke, 2009; Cook & Schirmer, 2003; Fuchs & Fuchs, 2001). Denton et al. (2003) suggest two reasons for this documented gap between research and practice including (a) lack of information and knowledge of implementation and (b) disbelief that practices are associated with improved outcomes for students. While schools and colleges of education

should, at a minimum, provide foundational knowledge on the five big ideas in reading and effective instructional methods, professional development can be used as a method for teachers to foster skill development and stay abreast of current research (Walsh et al., 2006).

Using a time-sampling observation system to record 34 general education teacher behaviors across urban, suburban, and rural classes, Schumaker et al. (2002) found no research-based programs and instructional methods were used. Of these 34 teachers, all were certified to teach in their respective state and had received a Bachelor's degree, and 17 teachers had obtained a Master's degree. In a more recent survey of 390 primary and secondary general educators, Williams and Coles (2007) found teachers had positive perceptions towards use of research-based practices; however, given a lack of time and lack of access to sources, teachers were unlikely to use these practices in the classroom. On the contrary, there is also research to suggest teachers don't feel obligated to use practices deemed effective through research (Boardman et al., 2005).

Professional development is one way to provide general educators with the knowledge and skill to use research-based practices. Research indicates professional development is provided in an effort to improve instructional practices and is most often provided as a 1-day inservice or workshop; however, this method produces poor results in terms of changing teacher behavior in the classroom (Yoon et al., 2007). In addition, there is little opportunity for teachers to practice skills learned and often no feedback on performance. Research indicates the opportunity to practice learned strategies and methods with immediate feedback during professional development experiences provides teachers the confidence to apply learned strategies in the classroom (Nichols et al., 2006).

Based on literature regarding effective professional development, Leko and Brownell (2009) suggest professional development be coherent, content-focused, active, and collaborative. According to NCLB (2002), high-quality professional development is (a) sustained, intensive, and content focused; (b) aligned with academic standards and assessments; (c) improves teacher content knowledge; (d) improves teachers' use of evidence-based instructional methods; and (e) is evaluated for student and teacher effects.

Boardman et al. (2005) conducted focus groups with teachers to identify perspectives related to use of evidence-based practices and professional development. Teachers reported they were provided few opportunities for professional development targeting students at risk. Teachers stated they were "neither obligated to nor impressed by the current push to use research-based practices in their classrooms" (p. 177). Teachers also indicated frustration with professional development, which often did not match their students' needs and lacked sufficient support in aiding them in selecting and implementing practices.

Research suggests teachers can use knowledge learned in professional development to change classroom practices, and these changes can in turn improve student learning (McCutchen et al., 2002). Specifically, Showers, Joyce, and Bennett (1987) identified three particular professional development components that lead to teacher change in instructional practices, including presentation of the theory behind the practice, demonstrations and opportunities for practice, and prompt feedback as teachers practice skills learned. To further increase the likelihood that teachers will adopt and sustain use of evidence-based practices, professional development offered to teachers must be in direct relation to both school and teacher needs, should be coupled with

follow-up support in implementation, and should provide teachers with the necessary resources for implementation (Boardman et al., 2005). Without this, professional development often results in “fragmented, ineffectual attempts to correct surface issues” (Boardman et al., 2005, p. 177).

Given the increase in implementation of RtI in elementary schools (Bradley et al., 2011), it is imperative teachers are provided effective professional development and support that will lead to high-quality reading instruction. As demonstrated, traditional professional development is often not efficiently designed, provides little opportunity for teachers to practice skills learned, and often lacks feedback on performance. Conversely, professional development that includes a combination of inservice and follow-up support (e.g., modeling, coaching) has shown promise in promoting changes in teaching behaviors (Jackson et al., 2006; Jager et al., 2002; Kretlow & Bartholomew, 2010; Kretlow, Wood, et al., 2011; Schnorr et al., in preparation; Yoon et al., 2007). Joyce and Showers (2002), suggest high-quality professional development with coaching increases teacher knowledge, skill, and application (see Table 2).

Table 2: Impact of training components on training outcomes

Training Components	Outcome Attainment		
	Content Knowledge	Skill Implementation	Classroom Application
Presentation/Lecture (P/L)	10%	5%	0%
P/L Plus Demonstration	30%	20%	0%
P/L Plus Practice	60%	60%	5%
P/L Plus Coaching	95%	95%	95%

### Coaching

Although research has revealed that intensive, explicit instruction that meets the



needs of at-risk students is rarely provided in general education classrooms (Fuchs & Fuchs, 1998; McLeskey & Waldron, 2002; Zigmond & Baker, 1996), professional development literature indicates coaching increases general education teachers' use of research-based strategies within whole-class core instruction (Bursuck et al., 2004; Kretlow et al., 2011; Kretlow et al., 2012; Schnorr et al., in preparation). Specifically, professional development that includes a combination of inservice and follow-up support in the form of coaching has shown promise in promoting changes in teaching behaviors (Jackson et al., 2006; Jager et al., 2002; Kretlow & Bartholomew, 2010; Kretlow et al., 2011; Schnorr et al., in preparation; Yoon et al., 2007). Raney and Robbins (1989) stated, "coaching provides teachers a means of examining and reflecting on what they do in a psychologically safe environment where it is all right to experiment, fail, revise, and try again" (p. 37). The purpose of coaching is to provide individualized support to teachers following an initial inservice or training in an effort to increase teachers' use of new teaching skills (Kretlow & Bartholomew, 2010). The coach is considered an expert, one who has a deep understanding of the instructional practices she supports teachers to implement.

Kretlow and Bartholomew (2010) conducted a comprehensive literature review to determine the impact of coaching on preservice and inservice teachers' fidelity of implementation of evidence-based practices in the classroom setting. Authors identified 13 studies for inclusion and all demonstrated coaching led to improvements in instructional fidelity. Studies included in the review used two types of coaching: supervisory and side-by-side. Additionally, six of the studies reported student outcome variables (i.e., academic engagement, on-task behavior), and two of the studies examined

academic outcomes (i.e., spelling test performance, teacher- and district-created literacy measures). Given the paucity of research on student outcomes, authors recommend future researchers continue to examine the impact of coaching on changes in students' academic performance using valid and reliable measures (e.g., Dynamic Indicator of Basic Early Literacy Skills; DIBELS; Good & Kaminski, 2002).

There are many approaches and perspectives on coaching (e.g., supervisory, side-by-side; Kretlow & Bartholomew, 2010). To support teachers in implementing practices deemed effective through research, coaches frequently engage in observation, modeling, and feedback. Supervisory coaching occurs when a coach observes a teacher implementing a new strategy, records data on implementation of desired behaviors, and provides targeted feedback on strengths and opportunities for improvement following the lesson (Kretlow & Bartholomew, 2010). This method does not provide in vivo feedback, a cornerstone of side-by-side coaching. Kretlow and Bartholomew (2010) describe side-by-side coaching as the coach providing in vivo feedback specific to accuracy of implementation of identified teaching behaviors during a lesson with students. The coach intervenes during a lesson to model specific teaching behaviors and then turns instruction back over to the teacher to provide her an opportunity to practice the same teaching behaviors with immediate feedback. A feedback meeting is then held to discuss strengths and opportunities for improvement.

### Supervisory Coaching

Supervisory coaching has been found to increase teachers' accuracy of academic instruction. Kohler, Crilley, Shearer, and Good (1997) examined effects of inservice and peer supervisory coaching on kindergarten teachers' acquisition of an integrated

instructional approach following Rosenshine's (1983) direct instruction model (i.e., review, present academic content, guided practice, corrective feedback, independent practice, weekly and monthly assessment) within a teacher-selected curriculum area (e.g., spelling, mathematics, language arts). Teachers participated in a full-day inservice plus seven 30-45 min individual coaching sessions with a peer coach. The peer coach had taught elementary school for 32 years but had no relationship with participating teachers prior to the study. Using a multiple baseline design across teachers, results indicated improvements in teaching behaviors during peer coaching as compared to the initial independent phase. Additionally, all four teachers expanded teaching procedures and made a greater number of procedural changes as a result of supervisory coaching.

Rudd et al. (2009) investigated effects of supervisory coaching following a 2-hr inservice on 12 teachers' implementation of math-mediated language (MML) in an early childhood center. Teachers were observed weekly to determine level of implementation following inservice. All teachers received supervisory coaching following the inservice. Coaching consisted of an observation of the teacher during instruction with a follow-up session to discuss strengths, opportunities for improvement, and to address teacher questions. All teachers received four supervisory coaching sessions. Researchers used a multiple baseline design; however, due to variability in the data only descriptive statistics were reported. Results indicated a 56% increase in teachers' use of MML following the inservice, with a second increase of 39.5% following supervisory coaching. Authors suggest inservice plus supervisory coaching may be an effective intervention to increase teachers' implementation of trained strategies.

Supervisory coaching for reading. The majority of studies examining supervisory

coaching have been conducted in reading (e.g., Menzies et al., 2008; Powell et al., 2010; Zakierski & Siegel, 2010). Morgan, Menlove, Salzberg, and Hudson (1994) investigated effects of supervisory peer coaching on improvements of Direct Instruction teaching behaviors (e.g., signal, wait time, error correction) of five low-performing teachers during Reading Mastery (Engelmann & Bruner, 1995) sessions. Coaching occurred twice per week for 30-45 min using video recordings of teachers' instruction. Coaches evaluated videotapes of low-performing teachers, provided detailed feedback on observed teaching behaviors, modeled as needed, and collaborated with the teacher to establish objectives for improved performance. Coaching occurred with individual teachers and did not take place during classroom instruction. Using a multiple baseline across teachers, results indicated teachers' percentage of correct instructional trials increased as a result of supervisory peer coaching. Additionally, rates of teacher praise and student responses increased. These findings suggest supervisory coaching with video feedback may be an effective way to improve teaching behaviors. Given the functional relation between supervisory coaching and improved instructional trials, authors suggest future research investigate student outcome data. Authors also note feedback utilizing observation videos could be an effective method during coaching sessions.

Peterson, Taylor, Burnham, and Schock (2009) documented communication between successful literacy coaches and elementary school teachers who demonstrated gains in students' reading achievement. Four high-performing schools and their coaching teams involved in the Minnesota Reading First Professional Development Program were selected based on overall school effectiveness rating, school reform effort rating, and students' reading growth. Using a mixed methods design, results indicated the types of

supervisory coaching conversations observed included (a) using data from observed lessons to focus on critical elements of instruction, (b) using questions based on observation data to elicit conversations, and (c) making connections between professional development and instruction. Authors concluded teachers benefit from targeted feedback from coaches based on observational data, in addition to the opportunity to engage in collaborative reflection.

Impact of supervisory coaching on student achievement in reading. In the last few years, effects of supervisory coaching have also been extended to examine student achievement in reading. Menzies et al. (2008) examined effects of coaching on reading progress of 42 first-grade students identified as at risk. Students were provided explicit, small group instruction. Using students' Developmental Reading Assessment (DRA) scores as the dependent variable, ANOVA results indicated at-risk students showed significant DRA growth ( $F=49.88$ ,  $p<.001$ ) over time. Further, 90% of all first-grade students were proficient grade-level readers at the end of the year. Three of four students identified as "treatment resisters" qualified for special education. The fourth student had moved away and was out of school for 1 month before returning. Authors suggest supervisory coaching enabled teachers to implement research-based instruction, supported fidelity of implementation, and increased student achievement.

Zakierski and Siegel (2010) conducted a case study to examine effects of a schoolwide reading intervention including supervisory coaching to strengthen skills of literacy teams on fourth-grade student achievement data. All teachers received professional development on analyzing data, embedding daily read-alouds into instruction, and assessment. The school's reading specialist served as the coach, by

modeling lessons and providing direct service to small groups of students. Results indicated state exam scores rose 28% (from 68% to 93%) following one year of implementation. Following a second year of implementation, 99% of students achieved mastery on state exams. Authors suggest providing teachers with supervisory coaching support may be one factor positively impacting student achievement.

Powell and colleagues (2010) conducted a randomized controlled trial to examine effects of a 2-day workshop followed by literacy-focused supervisory coaching on Head Start teachers' instructional practices and student outcome data. Authors also examined comparative effects of technologically mediated versus in-person delivery of supervisory coaching. The study included 759 students from 88 classrooms in 24 Head Start centers. Following the workshop, teachers participated in seven coaching sessions across 15 weeks. Supervisory coaching consisted of classroom observation (i.e., face-to-face, videotape) followed by written feedback on strengths and opportunities for improvement. Changes in teaching behaviors were measured using the Early Language and Literacy Classroom Observation (ELLCO). Using a hierarchical linear model, results indicated statistically significant gains on ELLCO subscales in coaching classrooms. Further, students in coaching classrooms showed significantly larger gains and higher mean scores than control classrooms on letter knowledge ( $d=0.29$ ), print awareness ( $d=0.22$ ), writing ( $d=0.17$ ), and blending ( $d=0.18$ ). No significant results were found among teachers who received on-site coaching versus teachers who received remote coaching.

Fisher et al. (2011) examined effects of ongoing professional development and follow-up supervisory coaching for middle school teachers on student achievement in reading comprehension. Participating teachers were engaged in ongoing professional

development on literacy strategies (e.g., think alouds, shared readings, vocabulary instruction) based on the school-wide literacy plan. Of 16 teachers, eight were selected to receive weekly supervisory coaching and feedback to support implementation of think-alouds during comprehension instruction. The coach first observed these teachers, and then both engaged in a discussion following the observed lesson. The remaining eight teachers and their students served as the control group. ANOVA results indicated statistically significant posttest results between students in intervention and control groups ( $p=0.001$ ;  $ES=.435$ ) on the Gates-MacGinities reading assessment comprehension subscale. Authors suggest supervisory coaching is an effective teacher development tool that facilitates implementation and may increase student learning.

Summary of supervisory coaching. Research has shown supervisory coaching is effective for improving academic instruction (Fisher et al., 2011; Menzies et al., 2008; Morgan et al., 1994; Rudd et al., 2009), increasing teachers' fidelity of implementation of trained strategies (Kohler et al., 1997; Menzies et al., 2008), and increasing student achievement (Fisher et al., 2011; Menzies et al., 2008; Powell et al., 2010; Zakiersky & Siegal, 2010); however, recent research indicates teachers may need varying levels of follow-up support in order to implement strategies learned during an inservice (Myers et al., 2011; Schnorr et al., in preparation). As demonstrated, teachers benefit from targeted feedback following observations (Peterson et al., 2009), and supervisory coaching with video feedback may be one way to improve teaching behaviors (Morgan et al., 1994). A number of recommendations for future research arise from the literature regarding supervisory coaching including (a) whether a particular type of coaching is more effective than another (Powell et al., 2010); (b) implementation of supervisory coaching

using school personnel rather than researchers (Myers et al., 2011); (c) effects of coaching on student achievement data (Morgan et al., 1994; Myers et al., 2011); and (d) level of teacher support necessary to make sufficient gains in teacher behavior (Myers et al., 2011).

### Side-by-Side Coaching

Side-by-side coaching differs from supervisory coaching in that the coach not only observes a teacher presenting instruction to students in the classroom, but also intercedes to model specific strategies, and turns instruction back over to the teacher to provide an additional opportunity to practice with immediate feedback (Kretlow & Bartholomew, 2010). Research indicates teachers place added value on coaching compared to traditional professional development (Blakely, 2001).

Side-by-side coaching for math. A number of studies have examined effects of side-by-side coaching to increase teachers' fidelity of implementation of academic instruction in both math and reading. In a recent study, Kretlow et al. (2011) examined effects of inservice support plus side-by-side coaching on three kindergarten teachers' accurate delivery of group instructional units during 10-min calendar math segments. Teachers had experience teaching Direct Instruction (DI) programs (i.e., Reading Mastery), which employ strategies similar to those used during inservice training (i.e., choral responding, model-lead-test, response cards, systematic error correction). Teachers received a 3-hr group inservice followed by one individual preconference, side-by-side coaching session, and feedback session. Using a multiple baseline across teachers, results indicated teachers' percentage of correctly implemented group instructional units increased from baseline to post inservice, then increased again following individual side-



by-side coaching sessions. Authors indicate side-by-side coaching is likely a critical component of professional development in order to support implementation of newly learned strategies. Authors also suggest future research investigate effects of inservice and coaching with general education teachers who do not have training in DI programs or strategies to examine effectiveness in a more typical general education classroom situation.

In a systematic replication, Kretlow et al. (2012) investigated effects of inservice and side-by-side coaching on three first-grade teachers' implementation of research-based strategies (i.e., model-lead-test, systematic error correction, unison responding) during calendar math instruction. A generalization measure was obtained during an untrained area of math (i.e., numeracy and problem solving). All teachers included in the study had taught a DI reading program for at least 1 year. Teachers participated in a 3-hr inservice, and each received individual side-by-side coaching during calendar instruction. Using a multiple baseline across teachers design, results indicated side-by-side coaching was effective in increasing teachers' instructional performance across both types of math lessons. Authors recommend future research investigate the relationship between teachers' implementation of strategies and student achievement.

Side-by-side coaching for reading. Tschannen-Moran and McMaster (2009) conducted a survey to evaluate the self-efficacy beliefs of 93 elementary school teachers (K-2) in addition to implementation of a reading strategy (i.e., Tucker Signing Strategies for Reading) targeted for beginning readers. All teachers participated in a 3-hr workshop across four levels of professional development. The four levels included: (a) information only; (b) information plus modeling; (c) information, modeling, and practice; and (d)

information, modeling, practice, and coaching. Coaching included a 30-min small group review of the reading strategy, a 15 min one-on-one coaching session, and a 30-min side-by-side coaching session in the classroom. All participating teachers responded to the survey and results indicated teachers believed professional development followed by coaching was the most effective training format. A Tukey post-hoc test revealed teachers who received all four components (i.e., information, modeling, practice, coaching) varied significantly from the other three levels of professional development regarding implementation of the instructional reading strategy. Authors suggest follow-up coaching may be a necessary component when teachers are implementing new reading strategies.

Quick, Holtzman, and Chaney (2009) conducted a mixed methods study to identify school personnel's conception of effective professional development methods and extent to which teachers' use of instructional practices increased student achievement in English/language arts. Interview data revealed five characteristics fundamental to school personnel's conceptions of effective professional development, including (a) time for collaboration; (b) opportunities for modeling, practice, and feedback; (c) based on teacher needs; (d) provided in safe, trusting environment; and (e) connected to broader school goals. Regression analysis results indicated participation in side-by-side coaching was positively associated with higher-level comprehension instruction ( $B=.312$ ;  $p<.05$ ).

In a recent study, Schnorr et al. (in preparation) examined effects of inservice and side-by-side coaching on nine kindergarten teachers' group instructional unit accuracy during beginning reading instruction. Teachers' experience in general education ranged from 1 to 26 years, with no teachers trained in DI reading programs. All nine teachers participated in a small group, half-day inservice (i.e., 3-hr). During the inservice, teachers

were trained to use choral responding, response cards, model-lead-test, and systematic error correction within the district selected core reading program, *Imagine It!* (Bereiter et al., 2008). Teachers who did not achieve a preselected mastery criterion (i.e., mean of  $\geq 80\%$  correct group instructional units) received side-by-side coaching that included a preconference, side-by-side coaching/demonstration session, and feedback meeting. Using a multiple baseline across teachers, results indicated the majority of teachers ( $n=6$ ) did not require additional support in the form of coaching following the inservice. In baseline, mean percent correct group instructional units across all nine teachers was 43.9% (range 7% - 76.3%). Following the inservice, mean percent correct group instructional units across all teachers increased to 78.6% (range 52.1% - 96.9%). Of the six teachers who did not require follow-up support, mean percent correct ranged from 80.8% to 96.9%. Of the teachers requiring side-by-side coaching ( $n=3$ ), mean percent correct accuracy for each teacher following side-by-side coaching was 66.8%, 96.8%, and 92% respectively. One teacher required a second side-by-side coaching session. Authors suggest that although side-by-side coaching is likely a critical component of professional development to support implementation of newly learned strategies, teachers may require varying levels of follow-up support.

Impact of side-by-side coaching on student achievement. Studies have also examined the effects of coaching on improvements in student achievement. Maheady, Harper, Mallette, and Karnes (2004) evaluated effects of coaching on 10 general educators' accurate implementation of Classwide Peer Tutoring (CWPT). Teachers attended a 2-hr workshop conducted by researchers and were provided a procedural implementation manual. The workshop included 15-min video clips on CWPT in

spelling, and role-play opportunities with positive and corrective feedback regarding implementation. Following the workshop, side-by-side coaching occurred in respective teachers' classrooms and included feedback on performance and modeling of tutoring procedures. Coaching sessions continued until teachers completed 85% of CWPT procedures correctly during spelling lessons. Using a pretest-posttest measure, results of teacher and student data indicated teachers who received coaching learned to use CWPT with high degrees of accuracy (mean 88%). Authors also examined student achievement in spelling. Results indicated mean pretest and posttest spelling grades and normalized gain scores increased from pretest (mean 69%) to posttest (mean 94%), representing a 25% increase in students' spelling averages and two to three letter grade improvements (i.e., D+ to A).

Conducted within an RtI model, Bursuck et al. (2004) examined effects of teacher delivered Tier 1 instruction on students' reading achievement scores in three high-poverty, minority-diverse elementary schools. Kindergarten, first, and second grade teachers in Project PRIDE were trained to use instructional enhancements (e.g., model-lead-test, systematic error correction, unison responding) to enhance whole-class core reading instruction through a series of workshops (i.e., afterschool, summer institute) and on-site coaching. Coaching included demonstration teaching via supervisory and/or side-by-side coaching sessions. Using a one-way ANOVA, results indicated significant differences between the PRIDE group and control group on DIBELS Nonsense Word Fluency (NWF;  $p < .000$ ) and Oral Reading Fluency (ORF;  $p < .001$ ). In addition, following core reading instruction plus enhancements, half of Project PRIDE students (53%), who were previously identified as at risk, achieved benchmark scores on DIBELS NWF and

ORF following Tier 1 whole-class instruction. Authors suggest these data indicate professional development models including hands-on workshops and on-site coaching be directly tied to classroom practice.

In a recent study, Sailors and Price (2010) compared effects of a traditional professional development model (i.e., inservice) and inservice plus side-by-side coaching on students' reading comprehension achievement. A total of 44 first through eighth-grade general education teachers and 527 students participated in the study. All teachers attended a 2-day workshop and were randomly assigned to receive side-by-side coaching or no coaching. Coaching included side-by-side demonstration lessons in classrooms and reflective feedback on observations. Authors compared effectiveness of inservice alone versus inservice plus coaching on reading instruction and student achievement. Using hierarchical linear modeling, results indicated statistically significant differences between inservice and inservice plus side-by-side coaching on increasing the following teacher behaviors: (a) constructed explanations ( $d=0.64$ ,  $p<.05$ ) and (b) opportunity to engage in cognitive reading strategies ( $d=0.78$ ,  $p<.05$ ). Additionally, 71% of students whose teachers participated in side-by-side coaching demonstrated a positive increase on group reading assessment and diagnostic evaluation (GRADE) scores (Cramer's  $V=.86$ ).

Levels of support. Similar to the suggestion by Fuchs et al. (2012) to design more effective and efficient multilevel prevention in RtI, the following studies describe multilevel professional development. As with RtI, research indicates professional development and follow-up support may occur in levels, with each level distinguished by the amount of support provided. Provision of multilevel support for general educators may be integral, given the importance of providing at-risk students with strong Tier 1

instruction (Fuchs et al., 2012). Additionally, research indicates teachers place added value on coaching when compared to traditional professional development. Blakely (2001) surveyed 150 school personnel (e.g., teachers, instructional assistants, counselors) to identify the level of coaching support they felt was most effective in acquisition of new teaching behaviors and had the greatest impact on maintenance of those behaviors. Type of coaching support included (a) demonstration lesson conducted by coach; (b) teacher observation with follow-up meeting on changes/adaptations (e.g., supervisory coaching); (c) verbal prompts from coach during teacher-led instruction; (d) side-by-side coaching; and (e) after school workshops on teaching strategies. Specifically, side-by-side coaching was defined as the coach intervening during a lesson, providing a model and rationale for change, and providing an opportunity for the teacher to teach the same format again. Surveys were distributed to five elementary, middle, and high school DI implementation sites. All respondents participated in an in-class coaching model. Survey results indicated the majority of respondents (61.1%) indicated side-by-side coaching was most effective when acquiring new teaching behaviors, and this level of support impacted retention of teaching behaviors (62%). Twenty-two percent of teachers identified demonstration lesson by the coach as the component of coaching that was most helpful in acquiring new teaching techniques. As a result, authors suggest teacher training include follow-up support in the form of side-by-side coaching. Given the nature of the study (i.e., survey), authors suggest future research include direct observation of teacher performance, and an examination of effects of various levels of professional development on students' academic outcomes.

Research indicates multi-tiered coaching is effective in increasing teacher praise.

Myers et al. (2011) examined effects of supervisory coaching on increasing middle school teachers' use of specific praise. Authors used a multi-tier, RtI approach to professional development. All teachers received schoolwide positive behavior support (SWPBS) training (Tier 1). Nonresponsive teachers were provided a brief consultation, data on teacher-student interactions, and weekly praise from the coach (Tier 2). Teachers requiring a third level of support received feedback (i.e., email, in person) following all observations (Tier 3). Movement through tiers was dependent upon data indicating the teacher had met praise statement criteria and ratio of positive to negative teacher-student interactions. Using a multiple baseline across teachers design, results did not indicate a functional relation between teacher behavior and level of professional development follow-up. However, authors suggest these data indicate teachers may need varying levels of support following professional development and recommend future research examine the relationship between level of support and change in teacher behavior.

Summary of side-by-side coaching. Research has shown that teacher training including follow-up support in the form of side-by-side coaching is effective for improving fidelity of implementation of academic instruction. As demonstrated, side-by-side coaching may be a critical professional development component necessary to support implementation of newly learned strategies (Kretlow et al., 2011; Schnorr et al., in preparation; Tschannen-Moran & McMaster, 2009), and provision of hands-on workshops and side-by-side coaching should be directly tied to classroom practice (Bursuck et al., 2004). A number of recommendations for future research arise from the literature on side-by-side coaching including (a) investigate effects of various levels of professional development on students' academic outcomes (Blakely, 2001); (b) evaluate

impact of coaching on achievement of at-risk students (Kretlow et al., 2012); (c) evaluate impact of coaching on more than one instructional outcome (Quick et al., 2009); (d) identify level of support needed by non-DI teachers to apply learned strategies (Kretlow et al., 2011; Kretlow et al., 2012); (e) measure teacher performance via direct observation (Blakely, 2001); (f) examine fidelity of teachers' implementation of core curriculum (Kretlow et al., 2011); (g) investigate sustainability of changes in teacher behavior resulting from coaching (Kretlow et al., 2012; Tschannen-Moran & McMaster, 2009); and (h) examine level of intensity of coaching needed to make sufficient gains in instructional accuracy (Kretlow et al., 2012; Tschannen-Moran & McMaster, 2009) and student outcomes (Blakely, 2001). Recent research indicates teachers may need varying levels of follow-up support (Myers et al., 2011; Schnorr et al., in preparation).



## CHAPTER 3: METHOD

The purpose of this study was to examine the effects of multilevel support on first-grade teachers' accurate use of research-based strategies during beginning reading instruction and the extent to which teachers maintained use of these strategies. This chapter will present methods that were used to investigate the research questions. Specifically, the chapter will present information about participants and recruitment, setting, data collection, experimental design, procedures, and data analysis.

### Participants

Teachers. The target population of this study was certified general education first-grade teachers. Convenience sampling was used to select nine teachers and their general education literacy classes. Teachers were selected based on the following inclusion criteria: (a) holds a North Carolina teaching license in elementary education, (b) teaches first grade, (c) has not previously taught a Direct Instruction (DI) program, (d) was the primary classroom teacher during the study, (e) teaches whole-class literacy using an established research-based curriculum, and (f) provides written consent to participate. Exclusion criteria include: (a) uses DI as core reading program (e.g., Reading Mastery); (b) previously taught a DI program; (c) teaches small group reading; or (d) was not the primary classroom teacher. Consent to conduct research was obtained from the principal at the school (see Appendix A). Once principal permission was obtained, the experimenter scheduled a meeting with all eligible first-grade teachers. At this meeting,

teachers received information on the purpose of the research study and were given an opportunity to ask questions. Once verbal consent was provided, teachers were given written consent forms to sign (see Appendix B). Subsequently, participating teachers provided written demographic information describing years of teaching experience, number of years teaching first grade, level of education, teaching license(s) held, highest degree earned, and previous experience teaching a DI program (see Appendix C).

Ms. Ace held a master's degree in Elementary Education (K-6). At the time of the study, she had 9 years teaching experience, all in first grade. Ms. Pandora held a bachelor's degree (B.S.) in Elementary Education (K-5). She had 20 years teaching experience, with 19 years in first grade. Ms. Fiji also held a bachelor's degree in Elementary Education. She had 6 years teaching experience, all in first grade. Ms. Capri held a bachelor's degree (B.A.) in Education (PK-K, K-8) with a specialization in pre-kindergarten. She had 9 years teaching experience, with 7 years in first grade. Mr. Brooks also held a bachelor's degree (B.A.) in Elementary Education (K-5) with an additional certification in ESL (K-12). He was also a National Board Certified Teacher (NBCT). He had 6 years teaching experience, all in first grade. Ms. Market held a bachelor's degree (B.S.) in Elementary Education and was also a NBCT. She had 16 years teaching experience, with 15 years in first grade. Ms. Anson held a bachelor's degree in Elementary Education (K-6) and a master's degree in Literacy (B-6). She was also licensed in Special Education: General Curriculum (K-6). She had 6 years teaching experience, with 5 years in first grade. Ms. Hughes held a bachelor's degree in Elementary Education (K-6). She had 4 years teaching experience, all in first grade. Ms. Gwinn held a master's degree in Elementary Education. She had 9 years teaching

experience, with 3 years in first grade. None of the teachers had ever been trained in, or taught, a DI program (e.g., Reading Mastery, Corrective Reading). However, Ms. Anson had been trained in, and taught, Orton-Gillingham reading programs. See Table 3 for teacher participants' demographic information.

Table 3: Teacher participants' demographic information

Teacher	Highest Degree Earned	Additional Certifications Earned	Years Teaching Experience	Years Teaching First Grade	Trained in a DI Program	Taught a DI Program
Ms. Ace	Master's in Elementary Education (K-6)	None	9	9	No	No
Ms. Pandora	B.S. in Elementary Education (K-5)	None	20	19	No	No
Ms. Fiji	Bachelor's in Elementary Education	None	6	6	No	No
Ms. Capri	B.A. in Education (PK-K, K-8)	Specialization in PK	9	7	No	No
Mr. Brooks	B.A. in Elementary Education (K-5)	ESL (K-12) NBCT	6	6	No	No
Ms. Market	B.S. in Elementary Education	NBCT	16	15	No	No
Ms. Anson	Master's Degree in Literacy (B-6)	Elementary Education (K-6); Special Education: General Curriculum (K-6)	6	5	No*	No*

Table 3 (continued)

Ms. Hughes	Bachelor's in Elementary Education (K-6)	None	4	4	No	No
Ms. Gwinn	Master's degree in Elementary Education	None	9	3	No	No

Note. PK = pre-kindergarten, ESL = English as a second language, NBCT = National Board Certified Teacher. \*Trained in and taught Orton-Gillingham reading programs.

Students. All students in the classrooms of the teachers selected for participation received daily beginning reading instruction (i.e., approximately 18 to 21 students per class). This study intended to determine whether or not students at risk for reading failure taught by teachers who received professional development on instructional enhancements differed from the scores of students at risk taught by the same teachers using traditional instructional methods. However, the school district changed assessment measures for the current school year and meaningful comparisons of students risk status could not be made. If comparisons could have been made, the following inclusion and exclusion student criteria would have been used. Students in teacher participants' classrooms who were identified at risk, defined as falling between the 10<sup>th</sup> and 25<sup>th</sup> percentile on Dynamic Indicators of Basic Early Literacy Skills (DIBELS; Good & Kaminski, 2007) first grade fall benchmark would have been selected for inclusion in the study. Specifically, letter naming fluency (LNF) scores ranging from 25-36, phoneme segmentation fluency (PSF) scores ranging from 10-34, and nonsense word fluency (NWF) scores ranging from 13-23 are considered some risk. Only native English speakers and students without documented disabilities falling within the at-risk criteria would have been included. Exclusion criteria

would have been as follows: (a) identified as a student with a disability, (b) received services for English as a second language (ESL), and (c) fell below the 10<sup>th</sup> or above the 25<sup>th</sup> percentile on DIBELS first grade fall benchmark.

### Setting

All training and implementation procedures occurred in a southeastern urban district. The district was the second largest in North Carolina and the 18<sup>th</sup> largest in the U.S. The district consisted of 178 schools, including 100 elementary schools, 36 middle schools, 33 high schools, four alternative schools, and five prekindergarten centers. Total student enrollment for the 2010-2011 school year was 135,638, including African American (41.2%), Caucasian (32.8%), Hispanic (16.4%), Asian (5%), and American Indian/Multiracial (4.6%) students. Fifty-three percent of students were eligible for free or reduced-price lunch. Ten percent of the student population was identified as English language learners (ELLs).

The study took place in a southeastern suburban elementary school, prekindergarten through fifth grade, within the district. The school was pursuing authorization as an International Baccalaureate World School and was currently a candidate for the Primary Years Programme (International Baccalaureate, 2009). The school housed 1,104 students, including Caucasian (42%), African American (30%), Hispanic (21%), Asian (3.3%), Multiracial (3.1%), and Native American (0.3%). Approximately 44% of students were identified as economically disadvantaged, with 42.2% receiving free or reduced-priced lunch. Twelve percent were classified as limited English proficient (LEP). The study occurred in two locations within the school. A group inservice took place in the principal's conference room at the elementary school. The

setting for literacy instruction was nine general education first-grade classrooms. Follow-up support including individual preconferences, coaching (e.g., supervisory, side-by-side), and feedback sessions took place in teachers' respective classrooms. Supervisory observations and side-by-side coaching sessions occurred during whole-class literacy instruction.

Teacher training. The group inservice occurred in the principal's conference room, located in the main office at the elementary school. The conference room housed a large, rectangular conference table with ten chairs. There was also a small whiteboard on one wall. In addition, a cart containing a projector was available. The experimenter used a personal laptop and speakers in conjunction with the school's projector to display the PowerPoint® presentation. The presentation was projected onto a white wall, and was visible to all participating teachers.

Daily beginning reading instruction. Daily phonemic awareness and phonics instruction took place in the respective teachers classrooms. There were 18 to 21 students in each classroom. Instruction took place either in the front of the classroom, with students seated on the floor in rows facing a whiteboard or SMART Board™, or at students' respective desks. Teachers provided beginning reading instruction based on the Common Core State Standards using a research-based core curriculum, *Imagine It!* (Bereiter et al., 2008). The phonemic awareness and phonics part of the daily lesson were identified as the "green band" in this curriculum. Each lesson began with daily warm-ups, which included daily language review (e.g., orally revising a written sentence) and a game (e.g., quick change, consonant riddle); however, not all teachers included these warm-ups in their daily green band instruction. Next, each lesson introduced or reviewed

sounds and sound spellings. Then, the lesson included a phonemic awareness task, a phonics task, or both. Phonemic awareness tasks were included one to two times per week and often included listening for sounds (e.g., initial, final) in words. For example, if students were learning long e, spelled e and e\_e, the teacher would read aloud a series of words that did or did not include long e and students would respond (e.g., preprinted response card, thumbs up) when they heard /ē/. Phonics tasks were included daily and always involved blending a series of words and sentences. Teachers used varying blending methods, depending on their training, but all wrote the words and sentences on the whiteboard or SMART Board™ for students to orally blend. Finally, the lesson concluded with a dictation activity (e.g., word building, whole word, sounds in sequence). For example, during word-building dictation students wrote a series of words, changing a letter or letters for each new word.

#### Experimenter

The experimenter for this study was a third-year doctoral student in special education at the University of North Carolina at Charlotte who served as the primary interventionist and data collector. She held a North Carolina Teaching License and Master's Degree in Special Education. She had 4 years experience teaching elementary students with high-incidence disabilities. The experimenter had been previously trained in and taught DI programs (i.e., Corrective Reading, Reading Mastery) for 4 years. Procedural reliability and interobserver agreement were collected by one other doctoral student in special education at the university.

#### Second Observer

To collect interobserver agreement, one additional doctoral student in special

education served as the second observer for the primary dependent variable (i.e., group instructional unit) across all teachers and phases of the study. Additionally, the second observer collected procedural reliability data by listening to audio recordings of the group inservices and feedback sessions following supervisory coaching. If teachers had required Level 3 support, a second observer would have also listened to all preconferences, side-by-side coaching sessions, and feedback sessions following side-by-side coaching.

### Data Collection

Dependent variable. Percentage of correctly implemented group instructional units (see Kretlow et al., 2011) was the dependent variable measured in this study. A group instructional unit was defined as a single three-term contingency, or series of three-term contingencies, that began with a correct teacher-provided antecedent and ended with a correct independent group unison response from students. It was measured by percentage of instructional units correctly implemented during 6-min segments of phonemic awareness and phonics instruction. The experimenter collected group instructional unit data on one 6-min segment per session for each participating teacher. Although the reading block was 90 min, the experimenter only listened to 6-min segments because (a) data were only collected during a small portion of the reading block (i.e., green-band instruction); (b) green-band session length varied across teachers; (c) green-band instruction lasted at least 6 min; and (d) as a convenience to the experimenter. It was collected using a group instructional unit data collection sheet (see Appendix D). It was calculated by dividing the number of correct group instructional units by the total number of group instructional units and multiplying by 100. Percentage was used because the number of opportunities for teachers to use correct group instructional units varied across



sessions and teachers. Data were graphed as percentage of correctly implemented group instructional units.

A group instructional unit was counted correct if the teacher correctly followed a (a) model-test format, (b) model-lead-test format, or (c) test-only format. To be counted correct, each format ended with a correct independent group unison response. In a model-test format, the teacher first modeled a skill and then tested students by providing an opportunity for students to practice the skill (e.g., “Listen. I’m going to segment the word mat, mmm-aaa-t. Your turn to segment mat.”). In the model-lead-test format, the teacher first modeled a skill, then led students through the skill, and then tested the students by providing an opportunity for students to independently practice the skill (e.g., “Listen. I’m going to segment the word mat, mmm-aaa-t. Segment mat with me, mmm-aaa-t. Your turn to segment mat.”). In a test only format, the teacher simply provided an opportunity for students to independently practice the skill (e.g., “Your turn to segment mat.”).

Two primary types of errors could have occurred during instruction: (a) unison errors and (b) task errors. A unison error occurred when students did not respond all together following a teacher’s signal. If a unison error occurred, a group instructional unit was only counted correct if the teacher immediately signaled for students to repeat the response and the final response was an independent group unison response. A task error occurred when students made an incorrect academic response. Error correction feedback and subsequent group instructional unit scoring for task errors were based on the majority response. If only a few students made an error during a new or review skill, a group instructional unit was only counted correct if the teacher confirmed the answer before

moving to a new skill. For example, if the teacher asked, “What sound does this letter make?” and only a few students (e.g., one to three) responded with an incorrect answer, the teacher provided affirmation of the correct response (e.g., “Good. This sound is /rrr/.”) before moving to a new skill. If the majority (e.g., one third or more) of students made an error during a new or review skill, a group instructional unit was only counted correct if the teacher followed a model-test or model-lead-test error correction format that ended in a correct independent group unison response. Group instructional units resulting in systematic error correction were only counted correct if the teacher stopped students and moved into the error correction procedure immediately following a student error. In a model-test error correction the teacher stopped the students following an error by presenting a model, followed by an opportunity for a group unison response using a test. For example, if the teacher asked, “What sound does this letter make?” and students responded with an incorrect answer, the teacher said, “This sound is /rrr/. Everyone, what sound?” In a model-lead-test error correction the teacher stopped students immediately following an error by presenting a model, then an opportunity for students to practice the skill with her (i.e., a lead), and then an opportunity for a group unison response (i.e., test). For example, if the teacher asked students to segment the word hot and students made an error, the teacher said, “My turn to break apart hot, h-ooo-t. Do it with me h-ooo-t. Now it’s your turn.”

Group instructional units ending in an independent group unison response were counted correct. If a teacher signaled for a group unison response and only one student responded, the group instructional unit was only scored as correct if the teacher immediately restated the task and/or signaled for, and received, a group unison response.

If a teacher moved on to the next task before having all students respond in unison, the group instructional unit was scored incorrect. If a teacher elicited an individual student response, one that could have been a group unison response, and did not follow it with an immediate independent group unison response, the group instructional unit was counted incorrect. For example, if the teacher asked students to blend the word coat, and called upon an individual student to respond, the group instructional unit was only correct if the teacher instructed the entire group to repeat the blended word elicited from the single student. However, if the teacher had already presented a series of tasks using a group unison response and proceeded to conduct a brief review of the tasks as an opportunity for individual student practice, thereby calling upon individual students to respond, the group instructional unit was not counted incorrect and was not scored. If the teacher elicited an individual student response for a task that could not be posed to the entire group of students, the group instructional unit was not scored. For example, if the teacher asked for a word that rhymed with coat, and called upon an individual student to respond, the group instructional unit was not counted because a group unison response could not be elicited (e.g., too many words rhyme with coat).

In addition to rules described in preceding paragraphs, the following scoring rules were also considered: (a) error correction, individual turns, and repetition of same question were counted as part of the original group instructional unit, not as a separate instructional unit; (b) only phonemic awareness and phonics tasks (e.g., segmenting, rhyming, blending, phoneme replacement) were scored; (c) activities involving calendar, morning message, writing, and comprehension were not scored; (d) teacher-provided directions that solicited a nonacademic group unison response were not scored (e.g.,

“You’re going to listen. Everyone, what are you going to do?”); and (e) teacher demonstrations of a task (e.g., initial model only) were not scored.

The experimenter and second observer independently scored 6-min audio recordings using the group instructional unit data collection sheet. When scoring a recording, the data collectors used the following procedures: (a) note date, teacher name, start time of audio recording, and duration of recording; (b) indicate whether it is a new or continued group instructional unit; (c) write a brief (e.g., 1-3 word) description of activity or teacher directive in the activity column; (d) mark whether a prompt for a group response occurred or whether it was a missed opportunity for a group response, and what type of group response was used (i.e., choral responding, response cards); (e) mark level of scaffolding used by the teacher (i.e., model-lead-test, model-test, test only); (f) mark occurrence and type of student errors (i.e., task error, unison error, no error); and (g) mark whether teacher used a controlled response (i.e., clear signal). Next, data collectors determined whether the entire instructional unit was correct (+) or incorrect (-). Finally, data collectors calculated the percentage of correct group instructional units that occurred during the 6-min recording.

Interobserver agreement. Interobserver agreement (IOA) for teacher behavior was collected across all phases of the study. A trained second observer listened to 35.2% (74 of 210) of all audio recordings across teachers and phases, and scored group instructional unit data. The experimenter and second observer listened to audio recordings and independently scored group instructional unit data. The experimenter determined the first task during green band instruction to score for each audio recording and the start time was documented on the group instructional unit data collection sheet.

Once 6 min elapsed, group instructional unit scoring ceased and the end time was also documented. Two raw scores were obtained for each 6-min recording: (a) number of correct group instructional units and (b) total number of group instructional units (i.e., correct plus incorrect). For IOA, the second observer adjusted the digital recording to match the experimenter's documented start time. This ensured both the experimenter and second observer scored the same 6-min segments of each audio recording. If 6 min elapsed in the middle of a group instructional unit, the experimenter noted the time immediately following the end of the group instructional unit. See Appendix D for group instructional unit data collection sheet. Because trial-by-trial agreement would be difficult to obtain, IOA for teacher fidelity was compared using a gross method comparison (Cooper et al., 2007). IOA on the number of correct group instructional units, as well as the total number group instructional units (correct plus incorrect) was scored for 35.2% of all audio recordings. IOA on number of correct group instructional units was calculated by dividing the smaller number of correct instructional units by the larger number of correct instructional units and multiplying by 100. IOA on total number of group instructional units was calculated by dividing the smaller number of total instructional units by the larger number of total instructional units and multiplying by 100.

The experimenter trained the second observer to use the group instructional unit data collection sheet by modeling the accurate method with one 6-min recording. The second observer was then provided with an opportunity to simultaneously score additional 6-min recordings and scoring was compared. The second observer practiced scoring until a minimum of 90% agreement was reached on two recordings.

Social validity data. Social validity data were collected to measure social acceptability of procedures and social significance of outcomes. Social validity data were collected upon completion of the study to explore teacher perceptions of the impact and practicality of multilevel support to embed instructional enhancements (i.e., unison responding, model-lead-test, error correction) during phonemic awareness and phonics instruction (see Appendix E). Each teacher in the study was provided a written questionnaire including 12 open-ended (e.g., Do you plan to continue use of any enhancements? Why or why not?) and 2 closed-ended items that evaluated instructional enhancements and multilevel training components (i.e., inservice, supervisory coaching, preconference, side-by-side coaching, feedback). One final open-ended question gave teachers an opportunity to provide additional feedback not addressed in the questionnaire. Teachers were also asked whether or not they used the instructional enhancements in other academic areas. To document generalization of these strategies to an area other than green-band instruction, an additional social validity measure was taken by school personnel. The school's literacy facilitator conducted a brief observation of teachers' use of enhancements during instruction in an academic area other than reading. The measure was obtained once during baseline and once during maintenance for each teacher. See Appendix F for checklist. Social validity data were also obtained from the school's literacy facilitator to explore perceptions on social importance of the goals and social acceptance of the procedures. The literacy facilitator was provided a written questionnaire including open- and closed-ended items to address issues of acceptability, effects, and importance of the multilevel support (see Appendix G).

In addition to the questionnaire, this study intended to determine whether or not

students at risk for reading failure taught by teachers who received professional development on instructional enhancements differed from the scores of students at risk taught by the same teachers using traditional instructional methods. However, the school district changed assessment measures for the current school year and meaningful comparisons of students risk status could not be made. If student data had been obtained, the following would have occurred. Student data would have been collected to evaluate the extent to which students' reading growth and performance differed as a result of teacher use of the instructional enhancements. Given that all teachers received professional development and only some received follow-up support, random selection of students could not occur. Therefore, reading performance (i.e., DIBELS) of an historical control group (i.e., second grade students) would have been used to compare reading performance of students selected to participate in the current study.

### Experimental Design

The experimental design was a single-case, multiple baseline across participants (i.e., teachers) design (Cooper et al., 2007) to evaluate the effectiveness of multilevel support on teachers' accurate use of research-based strategies during beginning reading instruction. This research design enabled the experimenter to introduce the intervention to each teacher participant at staggered points in time and examine if changes in the dependent variable occurred only when the intervention took place. Additionally, single-case design standards outlined in Kratochwill et al. (2010) were followed. There were three phases (i.e., initial baseline, post inservice, maintenance) and up to two additional phases (i.e., post supervisory coaching, post side-by-side coaching) for teachers who did not meet mastery criterion. Mastery criterion was defined as percent correct group

instructional units of greater than or equal to 80% for the final three data points in a phase. Initial baseline included a minimum of five data points or until a stable data path or decrease in teachers' behaviors was established for all teachers. Data were collected simultaneously across teachers to establish percentage of correctly implemented group instructional units during typical phonemic awareness and phonics instruction. Once data were stable across teachers, the group inservice occurred. The intervention condition included up to four phases: (a) post inservice, (b) post supervisory coaching, (c) post side-by-side coaching, and (d) maintenance. All teachers participated in a group inservice (i.e., Level 1 support); therefore, the post-inservice phase served as a second baseline and included a minimum of five data points. The teacher with less than 80% accuracy and the lowest baseline data during post-inservice data collection phase began individualized follow-up support (i.e., Level 2 support) once a minimum of five data points and a stable or decreasing trend was established. While the first teacher received the second level of support (i.e., supervisory coaching), data continued to be collected on all remaining teachers in the post-inservice condition. A second teacher not meeting the 80% accuracy criterion was introduced once a change in level or trend was identified for the initial teacher. The same procedure was used to introduce the intervention to remaining teachers. Teachers who did not meet mastery criterion (i.e., greater than or equal to 80% for the final three data points in a phase) after a minimum of five data points following Level 2 support were moved into Level 3 support (i.e., side-by-side coaching). Teachers who achieved mastery criterion in correctly implementing group instructional units, after a minimum of five data points, following Level 1 support (i.e., inservice) were exempt from individualized follow-up support and moved into the maintenance phase.



Remaining teachers were moved to maintenance once a minimum of five data points in intervention were collected and mastery criterion was met (i.e., at or above 80% accuracy in the final three sessions).

## Procedures

**Materials.** Teachers attending the inservice received a copy of the PowerPoint® presentation and sample teaching formats. Sample teaching formats were developed by the experimenter and used by teachers during opportunities for practice throughout the group inservice. A series of sample teaching formats were developed for each whole-class research-based strategy (used during group practice) and were adapted based on phonemic awareness and phonics tasks included in the *Imagine It!* teacher's manual. Adaptations were made to increase efficiency (e.g., use of a signal, blending method) and practicality (e.g., number of response cards provided). See Figure 2 and Figure 3 for sample adapted teaching formats used during the group inservice. During the inservice teachers also used preprinted and write-on response cards. Write-on response cards were 9.25" x 6.5" rectangular, erasable boards (e.g., masonite with a plastic coating). The experimenter provided each teacher with a class set of write-on response cards, dry-erase markers, and socks (i.e., erasers) for use during green-band instruction. Preprinted response cards were 2.5" x 3.5" alphabet letter cards (a to z). Each set of letter cards included approximately 25-30 cards per letter in the alphabet. Cards contained an uppercase letter on one side and the corresponding lower case letter on the alternate side. Each teacher already possessed a class set of alphabet cards for use as preprinted response cards, therefore no preprinted cards were provided. In addition to modeling, the experimenter also used video clips to provide a demonstration of the procedures for each

instructional enhancement (i.e., choral responding, response cards). Teachers also brought their current Imagine It! teacher's manual for use during the group inservice. In addition, the experimenter provided the lion puppet referenced in the Imagine It! teacher's manual for use during practice activities. Finally, teachers audio-recorded daily green-band instruction using either a Sony® (Model #s ICD-PX312 and ICD-PX820) or Olympus® (Model # WS-1110) battery-operated digital recorder, provided by the experimenter. Although the experimenter regularly checked remaining battery life, teachers were also supplied a set of back-up AAA batteries. Recorders contained a USB connector which enabled daily transfer of audio files from the recorder to the experimenter's password protected external hard drive.

Response Cards Practice 2 Dictation: Word Building Game						
From the Imagine It! Book:						
For this lesson, students will need the following <b>Alphabet Letter Cards</b> : <i>a, f, i, n, s, and t</i> .						
Use Routine 8, word building, to have students spell the following words:						
fin	fan	fat	fast	fist	fit	sit
Adapted to embed Write-On Response Cards:						
<b>Teacher:</b> Give each student a write-on response card, sock, and marker. Tell students you are going to say the sounds in words and you want them to write the sounds they hear to write the whole word. Remember, you won't hold up your card until I give you the signal. First word, fin, /fff/ /iii/ /nnn/. Write it. (Provide ample wait time). Get ready to show me your word. Signal.						
<b>Students:</b> display boards with <i>fin</i> .						
<b>Teacher:</b> Well done. Clear your boards. New word. /fff/ /aaa/ /nnn/. Write it. (Provide ample wait time). Get ready to show me your word. Signal.						
<b>Students:</b> display boards with <i>fan</i> .						
Follow the same script to present the remaining list of words (see list above).						

Figure 2. Sample adapted teaching format using response cards.

**Choral Responding Practice 3**  
**Phoneme Segmentation**

From the Imagine It! Book:

Tell students that you are going to say some words, and **Lion Puppet** will repeat the word sound by sound. Use the following demonstration:

Teacher: map  
Puppet: /m/ /a/ /p/

Teacher: hot  
Puppet: /h/ /o/ /t/

Have students take over for the puppet. Say the following words.

ant /a/ /n/ /t/	pan /p/ /a/ /n/	mud /m/ /u/ /d/
ran /r/ /a/ /n/	pin /p/ /i/ /n/	had /h/ /a/ /d/

---

Adapted to embed Choral Responding *with a signal*:

**Teacher:** Leo wants to play a game with us today. In this game, I'm going to say some words and Leo is going to repeat the word sound by sound. Listen. *map*

**Puppet:** /mmm/ /aaa/ /p/

**Teacher:** Listen again. *hot*

**Puppet:** /h/ /ooo/ /t/

**Teacher:** Now I want you to take over for Leo. Listen. *ant* (signal for each sound)

**Students:** /aaa/ /nnn/ /t/

**Teacher:** Nice work! Listen. *pan* (signal for each sound)

**Students:** /p/ /aaa/ /n/

Follow the same script to present the remaining list of words (see list above).

Figure 3. Sample adapted teaching format using choral responding.

General study procedures. During all conditions teachers provided and audio recorded daily phonemic awareness and phonics instruction (i.e., green band). Data were collected during recurring green-band lessons, and the experimenter listened to 6 min of the audio-recorded phonemic awareness and phonics segments daily. Teachers provided instruction based on the North Carolina Standard Course of Study using a research-based core curriculum, Imagine It!, published by SRA/McGraw-Hill. Imagine It! is a phonics-

based core reading program designed for students in kindergarten through sixth grade, and it incorporates the five big ideas in reading (i.e., phonemic awareness, phonics, fluency, vocabulary, comprehension) and many of the instructional practices recommended by the NRP (2000). In 2008, the program was reviewed by the What Works Clearinghouse (WWC); however, none of the studies evaluating effects of the program (n=30) met WWC evidence standards. The program included the following instructional areas organized into colored bands: (a) phonological and phonemic awareness (i.e., green band); (b) systematic, explicit phonics (i.e., green band); (c) fluency (i.e., red band); (d) vocabulary (i.e., red band); (e) text comprehension (i.e., red band); (f) inquiry (i.e., red band); and (g) writing (i.e., blue band). Data collection for the current study only occurred during green-band instruction. Typical activities occurring during green-band instruction included, but were not limited to, listening for missing sounds, rhyming, phoneme segmentation, and phoneme blending. Throughout daily lessons, the Imagine It! curriculum included some prompts for teachers to use the instructional enhancements (i.e., choral responding, response cards) teachers were trained to use in this study. However, given the lack of explicitness of directions (e.g., curriculum not explicit in directing teachers to use a signal), teachers were trained how to conduct daily phonemic awareness and phonics tasks more accurately. Further, teachers were also taught how to reconfigure daily lessons to embed the instructional enhancements. These adaptations made were an effort to increase practicality (e.g., number of response cards provided; preprinted versus write-on response card) and efficiency (e.g., use of a signal, blending method). For example, the adapted response card teaching format provided in Figure 2 addresses the issue of practicality. It may not

be practical for a group of 20 first-grade students to have seven preprinted response cards for use during a lesson. Use of the write-on response card not only decreases the number of materials each student requires for the dictation task, but writing the words serves an important function as well given the crossover between decoding and encoding. The adapted choral responding teaching format provided in Figure 3 is explicit in directing teachers to use a signal. Using a signal provides all students the opportunity to respond at the same time.

Multilevel support was provided based on an RtI delivery approach with three levels of intervention, thereby systematically increasing the level of support provided to teachers. Level 1 support (i.e., inservice) was provided to all teachers simultaneously. Level 2 support (i.e., supervisory coaching) was staggered systematically across identified teachers, while data were simultaneously collected on percentage of correctly implemented group instructional units. This second level of support was introduced based on whether or not teachers met mastery criterion. Teachers who did not require Level 2 support entered maintenance once mastery criterion was met and did not receive any additional follow-up support unless they fell below a mean of 80% accuracy. Level 3 support (i.e., side-by-side coaching) was provided to teachers who did not meet mastery criterion in Level 2 (i.e., supervisory coaching). Teachers who met mastery criterion following Level 2 support entered maintenance and did not receive any additional follow-up support unless they fell below a mean of 80% accuracy. Introduction of Level 3 support would have been staggered; however, no teachers in the current study required this intensive level of support.

**Baseline.** During baseline, no training was provided to teachers. Teachers were

asked to audio record phonemic awareness and phonics instruction to analyze typical beginning reading instruction delivery, and the experimenter calculated percentage of correctly implemented group instructional units. This was important considering the Imagine It! program includes some prompts for teachers to use the instructional enhancements teachers were trained to use in this study. This baseline was conducted in an effort to demonstrate that teachers were not implementing these strategies with fidelity within green band instruction, and were not generalizing use of instructional enhancements to activities that do not suggest use of the strategies. Teachers were notified the experimenter would be listening to each recording. Audio recording began in baseline to ensure reactivity to the recorder was not a confounding variable. In addition, audio-recorded data were collected to establish a baseline level of performance for each teacher. If changes in level or trend occurred following inservice and coaching, we could be confident the intervention was responsible for the change demonstrated in the dependent variable.

Level 1 support: inservice. Each of the teachers attended a half-day inservice following baseline. The experimenter delivered a one-half school day (i.e., 3 hr) group inservice. Teachers were split into two groups (i.e., group of four, group of five) and one group attended the inservice in the morning (n=5), and the second group attended the inservice in the afternoon (n=4). The inservice occurred during a regularly scheduled school day, and substitute teachers were provided to cover teachers classes. A PowerPoint® presentation was developed for the inservice. The group inservice provided information on the following: (a) rationale for increasing active student response (ASR); (b) research-based instructional enhancements including model-lead-test (MLT), choral

responding, and response cards; (c) error correction procedures; (d) video demonstrations of teaching procedures for each instructional enhancement; (e) live demonstrations of teaching procedures for each instructional enhancement within the context of phonemic awareness and phonics; (f) opportunities for teachers to practice using the enhancements with immediate feedback (e.g., strengths, error corrections) from the experimenter, and (g) opportunities for teachers to identify where enhancements could be embedded within the core reading curriculum.

Teachers attending the inservice received a copy of PowerPoint® slides, sample teaching formats for each whole-class research-based strategy (used during group practice), one class set of write-on response cards (e.g., masonite with a plastic coating), and a class set of dry-erase markers and socks (i.e., erasers). Teachers already possessed a class set of alphabet cards (a to z) for use as preprinted response cards, therefore no preprinted cards were provided. Upon conclusion of the inservice, teachers were prompted to begin using the instructional enhancements within their core-reading curriculum during phonemic awareness and phonics instruction. Audio recording continued, and data were collected on the percentage of correctly implemented group instructional units. This post-inservice phase was considered a second baseline to document percent group instructional unit accuracy so comparisons could be made with post-intervention levels (i.e., introduction of Level 2 support). This secondary level of support allowed for staggered introduction to the intervention.

Level 1 data: post-inservice. After completion of the half-day inservice, data were collected on percentage of correctly implemented group instructional units during green-band instruction. Teachers were scored using a group instructional unit data collection

form. The experimenter did not provide prompting, praise, or corrective feedback for teachers during this second baseline phase. Teachers who did not achieve mastery criterion ( $\geq 80\%$  on final three data points) on percentage correct group instructional units after five data points and who did not have an increasing trend remained in Level 1 support with staggered introduction into Level 2 support. Once a minimum of five data points and a stable or decreasing trend was established, the teacher with the lowest baseline began intervention (Level 2 support: supervisory coaching) first. Teachers who achieved mastery criterion ( $\geq 80\%$  on final three data points) on percentage correct group instructional units after five data points and who did not have a decreasing trend were entered into maintenance.

Level 2 support: supervisory coaching. Supervisory coaching consisted of two components: (a) observation during beginning reading instruction and (b) feedback meeting. During the observation the experimenter observed and took note of teacher's use of instructional enhancements. Following the observation, the experimenter and teacher met for approximately 20-min (i.e., feedback meeting) to discuss strengths and recommendations for improvement identified during the lesson. Demonstrations of recommended instructional enhancements for a beginning reading skill were provided when appropriate. If a demonstration was provided, the teacher was given an opportunity to practice the skill with feedback from the experimenter. Teachers were asked to discuss any strengths and difficulties in implementing the instructional enhancements. The teacher was also given the opportunity to ask questions and the experimenter discussed strengths and provided corrections if necessary. All feedback meetings occurred the afternoon of the observation with only the experimenter and teacher (e.g., no students



present). These meetings were audio-recorded for the purpose of obtaining IOA.

Following the feedback meeting, the experimenter instructed the teacher to continue use of instructional enhancements and implement those discussed as a result of the observation. Data continued to be collected via audio recordings on the percentage of correctly implemented group instructional units. If the teacher did not achieve mastery criterion ( $\geq 80\%$  on final three data points) on percentage of correct group instructional units after five data points and did not have an increasing trend, they moved into Level 3 support.

Level 3 support: side-by-side coaching. In this study, teachers did not require the third, most intensive level of support. However, if needed, the following methods would have been included. Level 3 support would have consisted of three components including (a) individual preconference, (b) side-by-side coaching session, and (c) an individual feedback meeting. Each component would have been audio-recorded for the purpose of obtaining IOA. Preconferences would have lasted approximately 20-30 min. Based upon information gleaned from audio-recorded data following Level 2 support, the teacher would have been provided with targeted feedback on strengths and opportunities for improvement in using the research-based instructional enhancements discussed during inservice and supervisory coaching session. During the preconference, the teacher and experimenter would have also planned the side-by-side coaching session. Together they would have reviewed the upcoming (i.e., following days) green-band lesson to determine the appropriate instructional strategies to use based on the targeted skills for that lesson.

Following the preconference, the experimenter would have attended the next beginning reading lesson to model and coach the targeted skills using the instructional

enhancements discussed during the preconference. Side-by-side coaching sessions would have lasted the length of green band instruction. During side-by-side coaching, the experimenter would have modeled specific skills interspersed throughout phonemic awareness and phonics instruction. When possible, and as necessary, the experimenter would have also modeled correct error correction procedures during instruction (within the group instructional unit). Following each model, the experimenter would have prompted the teacher to try a minimum of two group instructional units within the same skill modeled. The experimenter would have provided feedback (i.e., praise, corrective feedback) per skill demonstrated by the teacher.

Following the coaching session, the experimenter would have instructed the teacher to continue use of instructional enhancements. Data would have been continued to be collected via audio-recordings on the percentage of correctly implemented group instructional units. After a minimum of three sessions following side-by-side coaching, the experimenter would have provided a 20-min feedback meeting with the teacher. This would have provided the teacher with an opportunity to implement the targeted skills modeled during the coaching session. During the feedback meeting, the experimenter would have followed up on the skills addressed in the preconference and modeled during the coaching session. The teacher would have had an opportunity to ask questions and the experimenter would have discussed strengths and provided corrections if necessary. If a teacher did not reach a mean of 80% correctly implemented group instructional units after 3 sessions (following the initial side-by-side coaching session), the feedback meeting would have also served as a preconference for a second coaching session. See Table 4 for descriptions of multilevel support.

Table 4: Descriptions of multilevel support

Level of Support	Type of Support	Description of Support
Level 1	Inservice	Inservice consisted of a half-day workshop providing participating teachers information on the rationale for increasing ASR; research-based instructional enhancements (i.e., MLT, choral responding, response cards, systematic error correction); video and live demonstrations of enhancements; and opportunities for teachers to practice use of enhancements with feedback.
Level 2	Supervisory Coaching	Supervisory coaching consisted of one observation during beginning reading instruction and one feedback meeting. During the observation, the experimenter observed teacher's use of instructional enhancements. During the feedback meeting, the experimenter provided targeted feedback on strengths and recommendations for improvement identified during the observed lesson.
Level 3	Side-by-side Coaching	Side-by-side coaching would have consisted of an individual preconference, side-by-side coaching session, and an individual feedback meeting. During the preconference, the experimenter would have provided targeted feedback on strengths and opportunities for improvement in using instructional enhancements. During the side-by-side coaching session (e.g., next beginning reading lesson), the experimenter would have observed the teacher implementing instructional enhancements, interceded during the lesson to model and coach the targeted skills identified during the preconference, and provided the teacher an opportunity to practice the same skills as modeling occurred, with immediate feedback from the experimenter. During the feedback meeting, the experimenter would have followed up on skills addressed in the preconference and modeled during the coaching session.

Maintenance. Data were collected continually during intervention phases until mastery criterion ( $\geq 80\%$  on final three data points in a phase) was reached. Once the specified criterion was met, teachers moved into the maintenance phase. When a teacher moved into maintenance, the experimenter sent a brief feedback email outlining their strengths in implementing the enhancements addressed in the group inservice. Strengths

addressed were derived from teachers' audio recordings and were tailored for each teacher. Maintenance data were collected a minimum of once per week for at least three weeks following the different levels of intervention. Teachers who fell below a mean of 80% correct group instructional units in maintenance would have received follow-up support; however, no teachers fell below this criterion. Level of support provided would have been determined by when the teacher moved into maintenance. For example, if a teacher moved into maintenance following Level 1 support (i.e., inservice), they would have been provided Level 2 support (i.e., supervisory coaching). If a teacher moved into maintenance following Level 2 support (i.e., supervisory coaching), they would have been provided Level 3 support. If a teacher moved into maintenance following Level 3 support (i.e., side-by-side coaching), they would have received an additional side-by-side coaching session.

Procedural reliability. Procedural reliability on multilevel support was scored by a second observer. It served as the primary method of demonstrating accuracy of implementation of the intervention across all levels of support including (a) inservice, (b) supervisory coaching, and (c) side-by-side coaching. To measure procedural reliability, a series of checklists were developed and used to mark occurrence or non-occurrence of prescribed steps included by the experimenter (see Appendix H). These sessions were audio-recorded and the second observer listened to each recording to score procedural reliability. Procedural reliability data were collected on the inservice and all levels of follow-up support (i.e., supervisory coaching, side-by-side coaching). Procedural reliability was calculated by dividing the number of procedural steps followed correctly by the total number of procedural steps to be observed, and multiplied by 100.

## Data Analysis

Multilevel support. To analyze the impact of multilevel support the experimenter used Microsoft Excel<sup>®</sup> to graph the percent of correctly implemented group instructional units across all nine teachers. Visual analysis of the graphs involved four steps and six variables as outlined in Kratochwill et al. (2010). The four steps included (a) documentation of predictable baseline pattern of data, (b) examination of data within each phase to assess within-phase patterns and determine whether there were sufficient data to demonstrate a predictable pattern of responding, (c) comparison of data from each phase with data in adjacent phase to assess whether manipulation of the independent variable was associated with predicted change in pattern, and (d) demonstration of effect at least three different points in time. Visual analysis was used to determine changes in level, trend, variability, immediacy of effect, overlap, and consistency of data patterns (Kratochwill et al., 2010) across all phases of the study for the dependent variable. Using the multiple baseline across teachers design, experimental control was demonstrated if improvements in teachers' level, trend, and variability of correct group instructional unit delivery were replicated across tiers as Level 2 support (i.e., first level of intervention following baseline: Level 1 support) was individually applied. With this design, causal inferences can be made with a minimum of three demonstrations of the intervention effect.

Impact of multilevel support on students at risk. This study intended to examine the impact of embedding instructional enhancements into Tier 1 beginning reading instruction on at-risk students' acquisition of beginning reading skills. Specifically, it intended to determine whether or not DIBELS benchmark scores for students at risk for

reading failure taught by teachers who received professional development on instructional enhancements differed from the scores of students at risk taught by the same teachers using traditional instructional methods. However, the school district changed assessment measures for the current school year and meaningful comparisons of students risk status could not be made. If comparisons could have been made, the following methods would have been included. Given that not all teachers would have met mastery criterion on percentage of correctly implemented group instructional units following Level 1 support (i.e., inservice), the experimenter would have only evaluated at-risk students' DIBELS data for teachers who had a minimum of eight data points greater than or equal to 80%. An historical control group would have been used as the comparison group (i.e., 2011-2012 at-risk first grade students). These groups would have been comparable because the 2011-2012 first-grade students (e.g., who were in second grade at the time of the study) had kindergarten teachers in 2010-2011 and first-grade teachers in 2011-2012 who did not receive professional development on instructional enhancements. To determine if there was a difference between the two groups, the experimenter would have run an independent t-test because the sample of at-risk students would be different across each group. The following data would have been reported: (a) t-statistic, (b) degrees of freedom, (c) significance, (d) mean difference, (e) standard error of the difference, and (f) confidence interval. SPSS analysis would have indicated whether or not the two groups were equivalent going into the analysis. If the groups were not equivalent, the experimenter would have corrected for the difference.

## CHAPTER 4: RESULTS

This chapter presents results in several sections. Results for interobserver agreement and procedural reliability data are reported first, followed by the results for each research question. The final section reports results of the social validity questionnaire regarding teacher perceptions of the impact and practicality of multilevel support to embed instructional enhancements, as well as the literacy facilitator's perceptions of acceptability, effects, and importance of multilevel support.

### Interobserver Agreement

A trained second observer scored 35.2% (n=74) of all teachers' audio recordings (n=210) across phases. For each recording, group instructional unit data were scored. Specifically, each recording yielded two interobserver agreement (IOA) scores: (a) percent correct group instructional units and (b) percent total group instructional units. Overall, IOA on percent correct group instructional units ranged from 91.3% to 100%, with a mean of 99.6%. Overall, interobserver agreement (IOA) on total of correct group instructional units ranged from 92.9% to 100%, with a mean of 99.8%. Across teachers, IOA data were collected across 35.7% of initial baseline audio recordings (e.g., teacher implementation of research-based instructional enhancements) with a correct group instructional unit mean of 99.3% and range of 90% to 100%, and a total group instructional unit mean of 99.8% and range of 96.3% to 100%. IOA data were collected across 30.4% of post Level 1 support audio recordings during the second baseline

condition (i.e., post inservice) with a correct group instructional unit mean of 98.6% and range of 92.1% to 100%, and a total group instructional unit mean of 99.6% and range of 92.9% to 100%. IOA data were collected across 35.3% of post Level 2 support audio recordings (i.e., post supervisory coaching) with a correct group instructional unit mean of 99.1% and range of 94.7% to 100%, and a total group instructional unit mean of 99.2% and range of 95% to 100%. IOA data were collected across 42.9% of maintenance sessions with a correct group instructional unit mean of 98.9% and range of 91.3% to 100%, and a total group instructional unit mean of 99.7% and range of 95% to 100%.

Percent of correct group instructional unit IOA data are reported for individual teachers in Table 5 below. Percent total group instruction unit IOA data are reported for individual teachers in Table 6 below. Three teachers (i.e., Ms. Ace, Ms. Pandora, Ms. Fiji) required Level 2 support (i.e., supervisory coaching) and these data are presented first. The remaining six teachers (i.e., Ms. Capri, Mr. Brooks, Ms. Market, Ms. Anson, Ms. Hughes, Ms. Gwinn) did not require additional support beyond the inservice (i.e., Level 1 support).

Table 5: Summary of IOA for correct instructional units across teachers and conditions

Teacher	Conditions				Overall IOA	
	Baseline Mean	L1-PI Mean	L2-PSC Mean	Maintenance Mean	Mean	Range
Ms. Ace	100%	100%	100%	98.7%	99.6%	96.2-100%
Ms. Pandora	100%	95.6%	100%	97.5%	97.7%	92.5-100%
Ms. Fiji	100%	100%	97.4%	100%	99.5%	94.7-100%
Ms. Capri	90%	100%	X	100%	98%	90-100%
Mr. Brooks	100%	98.7%	X	100%	99.4%	96-100%
Ms. Market	100%	100%	X	97.1%	98.8%	91.3-100%
Ms. Anson	100%	98.6%	X	100%	99.3%	97.1-100%



Table 5 (continued)

Ms. Hughes	100%	99.3%	X	100%	99.7%	97.2-100%
Ms. Gwinn	100%	97.1%	X	97.5%	97.8%	92.1-100%

Note. L1-PI = level 1 post inservice, L2-PSC = level 2 post supervisory coaching, X = teacher did not receive L2-PSC.

Table 6: Summary of IOA for total instructional units across teachers and conditions

Teacher	Conditions				Overall IOA	
	Baseline Mean	L1-PI Mean	L2-PSC Mean	Maintenance Mean	Mean	Range
Ms. Ace	100%	100%	100%	100%	100%	n/a
Ms. Pandora	100%	100%	100%	99%	99.8%	98-100%
Ms. Fiji	100%	99.5%	97.5%	100%	99.3%	95-100%
Ms. Capri	96.3%	100%	X	100%	99.3%	96.3-100%
Mr. Brooks	100%	100%	X	100%	100%	n/a
Ms. Market	100%	100%	X	100%	100%	n/a
Ms. Anson	100%	99.4%	X	100%	99.7%	97.4-100%
Ms. Hughes	100%	100%	X	100%	100%	n/a
Ms. Gwinn	100%	98.6%	X	97.5%	98.7%	92.9-100%

Note. L1-PI = level 1 post inservice, L2-PSC = level 2 post supervisory coaching, X = teacher did not receive L2-PSC, n/a = not applicable.

The majority of disagreements between the experimenter and second data collector were related to unison errors. There was also one teacher-led error (i.e., teacher stated the answer with students rather than requiring students to answer independently) disagreement and one task error disagreement. It is important to note the disagreements related to unison errors may have been a function of using audio recordings rather than video recordings or live observations.

#### Procedural Reliability

To ensure the inservice and supervisory coaching sessions were implemented as designed and with fidelity, the second observer listened to audio recordings of the group

inservices and supervisory coaching feedback sessions. To measure procedural reliability, a series of checklists were developed and used to mark occurrence or non-occurrence of prescribed steps included by the experimenter (see Appendix I). Overall mean procedural reliability was 100%. Procedural reliability data were collected across 100% of group inservices (n=2) with a mean of 100% accuracy. Supervisory coaching procedural reliability was collected across 100% of sessions (n=3) and was 100% for Ms. Ace, Ms. Pandora, and Ms. Fiji.

#### Effects of Multilevel Support on Teachers' Use of Research-Based Strategies

Research Question 1: What was the effect of multilevel professional development support on teachers' accurate use of research-based strategies during beginning reading instruction?

All nine teachers received Level 1 support (i.e., 3-hr group inservice); however, only three of the nine teachers required additional follow-up support in the form of supervisory coaching (i.e., Level 2 support). Results demonstrating the percentage of correct group instructional units during beginning reading instruction across all phases for the three teachers (i.e., Ms. Ace, Ms. Pandora, Ms. Fiji) requiring supervisory coaching are shown in Figure 4. The graph illustrates results across baseline, post Level 1 support (i.e., inservice), post Level 2 support (i.e., supervisory coaching), and maintenance phases. Data for teacher behaviors are shown as a percentage, calculated by dividing the number of correct group instructional units by the total number of group instructional units and multiplying by 100. Six teachers did not receive supervisory coaching because they reached mastery criterion (i.e.,  $\geq 80\%$  on final three data points in a phase) following Level 1 support. Of these six teachers, three teachers (i.e., Ms. Capri,

Mr. Brooks, Ms. Market) achieved mastery criterion and moved into maintenance when the first teacher received Level 2 support (i.e., session 15). Results demonstrating the percentage of correct group instructional units during beginning reading instruction across all phases for these three teachers are shown in Figure 5. The remaining three of six teachers did not meet mastery criterion (i.e., Ms. Hughes, Ms. Gwinn) or demonstrated a descending trend (i.e., Ms. Anson) when the first teacher received Level 2 support. These three teachers remained in the Level 1 support condition in order to continue monitoring group instructional unit data. Each of these teachers achieved mastery criterion, moved into maintenance, and did not receive any follow-up support. Results demonstrating the percentage of correct group instructional units during beginning reading instruction across all phases for these three teachers are shown in Figure 6. No teachers required follow-up support in the form of side-by-side coaching (i.e., Level 3 support).

All nine teachers demonstrated low, variable initial baselines and all nine teachers increased the percentage of correct group instructional units following Level 1 support (i.e., 3-hr inservice). However, given that all nine teachers received the 3-hr inservice as a group, five teachers attended in the morning and four attended in the afternoon, a functional relation between Level 1 support and improvements in percentage correct group instructional units cannot exist. Therefore, the post-inservice phase was considered a second baseline and was used to document percent correct group instructional unit accuracy so comparisons could be made with post-intervention levels (i.e., introduction of Level 2 support). Visual analysis of the data indicates a second change in both level and variability following Level 2 support for the three teachers who received supervisory

coaching, demonstrating a functional relation between supervisory coaching and improvements in percent correct group instructional units. Visual analysis of the data indicates replication of the positive effects of supervisory coaching across three teachers, and at three different points in time, since each teacher's instructional accuracy improved immediately following supervisory coaching. Therefore, results indicate a functional relation between supervisory coaching and an increase in teachers' accurate implementation of research-based instructional enhancements during beginning reading instruction, as demonstrated by an increase in percent correct group instructional unit data. See Figures 2, 3, and 4 for the graphic displays of the data for teachers' research-based instructional enhancement implementation in multiple baseline design format.

Ms. Ace. Ms. Ace's group instructional unit accuracy scores during initial baseline were low with some variability, ranging from 15% to 37%, with a mean of 22.6%. Following Level 1 support (i.e., L1-PI), scores initially improved, but then showed a stable, decreasing trend (except for the observation data point), with a range of 46% to 80%, and a mean of 68.3%. Following Level 2 support (i.e., supervisory coaching), there was an immediate change to a high level of accuracy with little variability, with a range of 87% to 97%, and a mean of 90.8%. Although her final three data points indicate a decreasing trend, group instructional unit accuracy scored remained above the criterion. During maintenance, Ms. Ace's data path remained relatively high, with scores ranging from 83% to 94%, and a mean of 88.5%.

Ms. Pandora. Ms. Pandora's group instructional unit accuracy scores during initial baseline showed a low, slightly variable data path with no trend, and ranged from 15% to 38%, with a mean of 22.6%. Following Level 1 support (i.e., L1-PI), scores initially

improved, but then showed a stable, decreasing trend, with variability in the data path, with a range of 58% to 92%, and a mean of 72.8%. Following Level 2 support (i.e., supervisory coaching), Ms. Pandora's data path demonstrates an immediate change to a high level of accuracy with little variability and no trend, with a range of 86% to 94%, and a mean of 92.2%. During maintenance, Ms. Pandora's data path remained at a relatively high level, with scores ranging from 89% to 96%, and a mean of 94.3%.

Ms. Fiji. Ms. Fiji's group instructional unit accuracy scores during initial baseline were low with some variability, ranging from 22% to 38%, with a mean of 27.5%. Following Level 1 support (i.e., L1-PI), scores initially improved, but then showed a stable, decreasing trend, with variability in the data path and a range of 23% to 100%, with a mean of 61%. Following Level 2 support (i.e., supervisory coaching), there was an immediate change to a high level of accuracy with little variability, with a range of 90% to 100%, and a mean of 92.2%. Although her final three data points indicate a decreasing trend, Ms. Fiji's group instructional unit accuracy scores remained above the criterion. During maintenance, Ms. Fiji's data path was stable and remained at a high level, consistently scoring 100% accuracy.

Ms. Capri. Ms. Capri's group instructional unit accuracy scores during initial baseline were low and variable, ranging from 21% to 52%, with a mean of 36.7%. Following Level 1 support (i.e., L1-PI), scores improved to a high level, demonstrating an increasing trend with some variability in the data path and a range of 75% to 97%, with a mean of 88.3%. During maintenance, Ms. Capri's data path was stable and remained at a high level over time, with a range of 91% to 96%, and a mean of 93.2%.

Mr. Brooks. Mr. Brooks' group instructional unit accuracy scores during initial

baseline were low and variable, ranging from 14% to 37%, with a mean of 23.4%. Following Level 1 support (i.e., L1-PI), scores improved indicating a change in level, with some variability in the data path and a range of 56% to 100%, with a mean of 87.6%. During maintenance, Mr. Brooks' data path was stable and remained at a high level over time, with a range of 80% to 93%, and a mean of 87.4%.

Ms. Market. Ms. Market's group instructional unit accuracy scores during initial baseline were low and variable, ranging from 0% to 25%, with a mean of 15.6%. Following Level 1 support (i.e., L1-PI), scores improved to a high level and demonstrated an increasing trend, with a range of 76% to 91%, and a mean of 84.6%. During maintenance, Ms. Market's data path remained at a high level over time, with a range of 92% to 100%, and a mean of 95.9%.

Ms. Anson. Ms. Anson's group instructional unit accuracy scores during initial baseline were low and variable, ranging from 22% to 56%, with a mean of 40.8%. Following Level 1 support (i.e., L1-PI), scores improved to a high level with some variability in the data path, and a range of 80% to 100%, with a mean of 89.3%. During maintenance, Ms. Anson's data path remained at a high level demonstrating an increasing trend with a range of 81% to 100%, and a mean of 89.2%.

Ms. Hughes. Ms. Hughes' group instructional unit accuracy scores during initial baseline were low and stable, ranging from 2% to 11%, with a mean of 7.8%. Following Level 1 support (i.e., L1-PI), scores improved to a high level with variability in the data path, and a range of 71% to 96%, with a mean of 86.5%. During maintenance, Ms. Hughes' data path remained at a high level with a range of 91% to 96%, and a mean of 93.2%.

Ms. Gwinn. Ms. Gwinn's group instructional unit accuracy scores during initial baseline were low and variable, ranging from 14% to 48%, with a mean of 27.8%. Following Level 1 support (i.e., L1-PI), scores improved to a high level with an increasing trend, and a range of 66% to 97%, with a mean of 83.3%. During maintenance, Ms. Gwinn's data path remained at a high level with a range of 86% to 100%, and a mean of 95.6%.

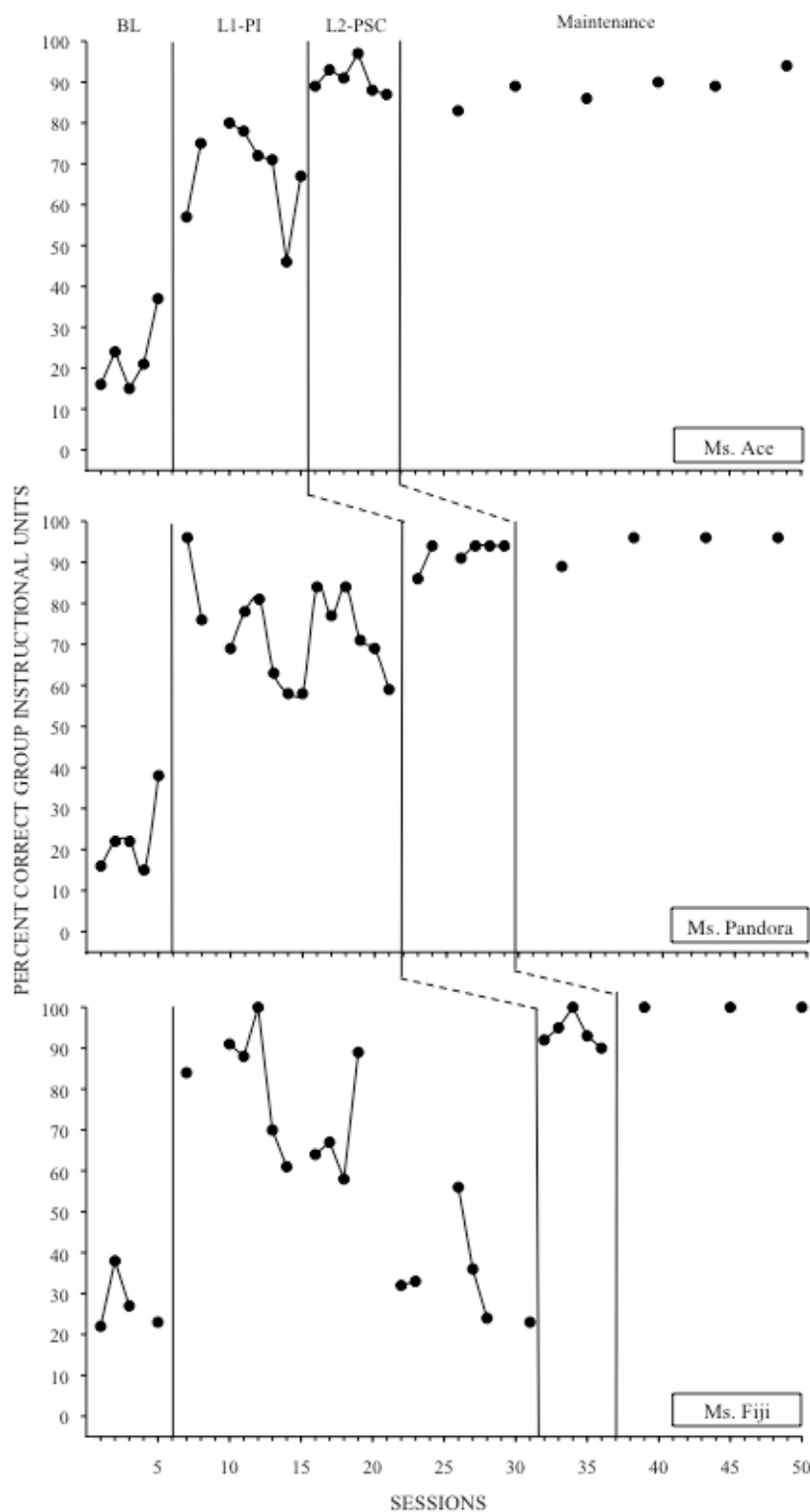


Figure 4. Percent correct group instructional units in beginning reading instruction following Level 1 support (i.e., inservice) for Ms. Ace, Ms. Pandora, and Ms. Fiji. Note. BL = baseline, L1-PI = level 1 post inservice, L2-PSC = level 2 post supervisory coaching.



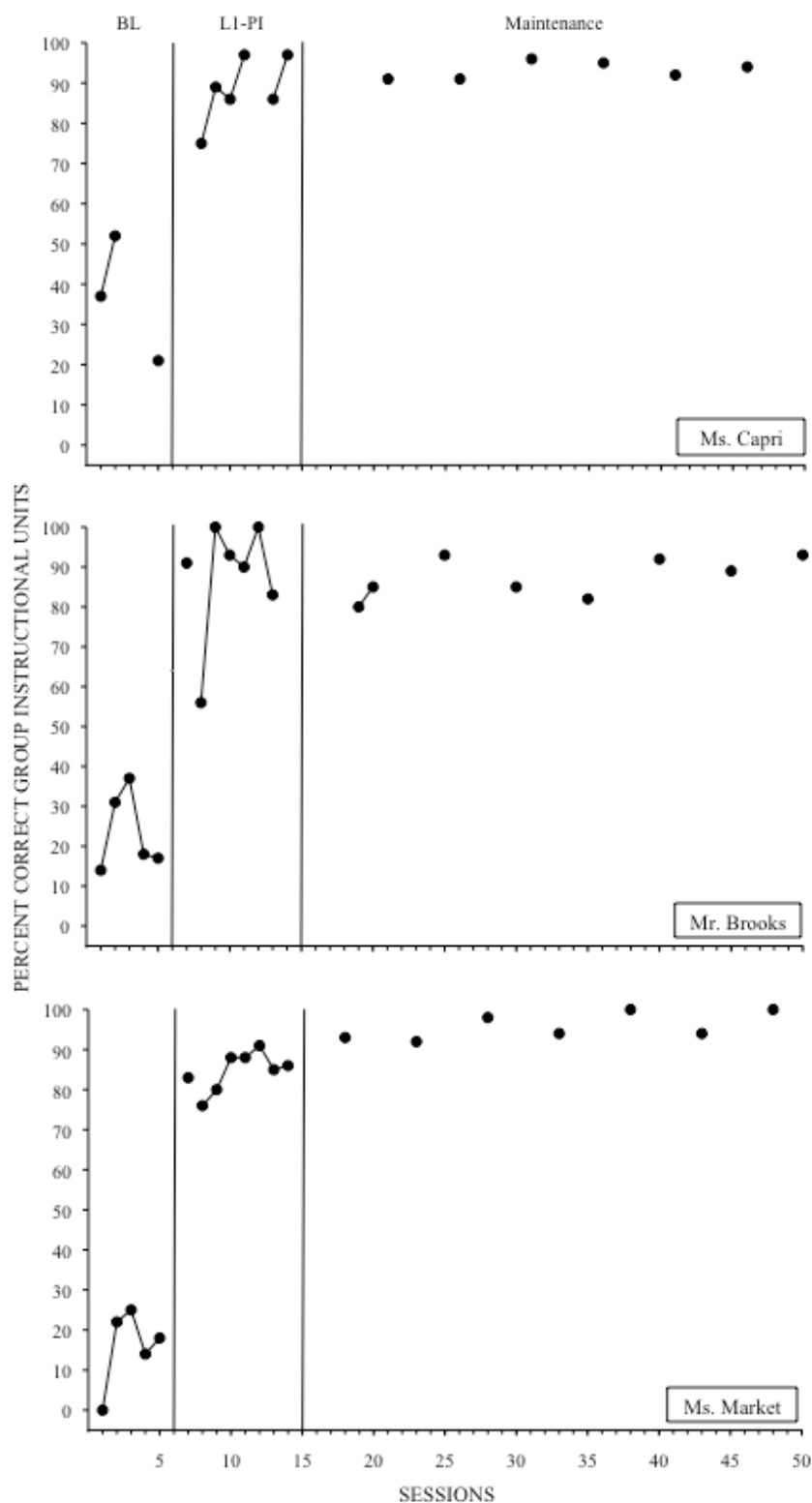


Figure 5. Percent correct group instructional units in beginning reading instruction following Level 1 support (i.e., inservice) for Ms. Capri, Mr. Brooks, and Ms. Market. Note. BL = baseline, L1-PI = level 1 post inservice.

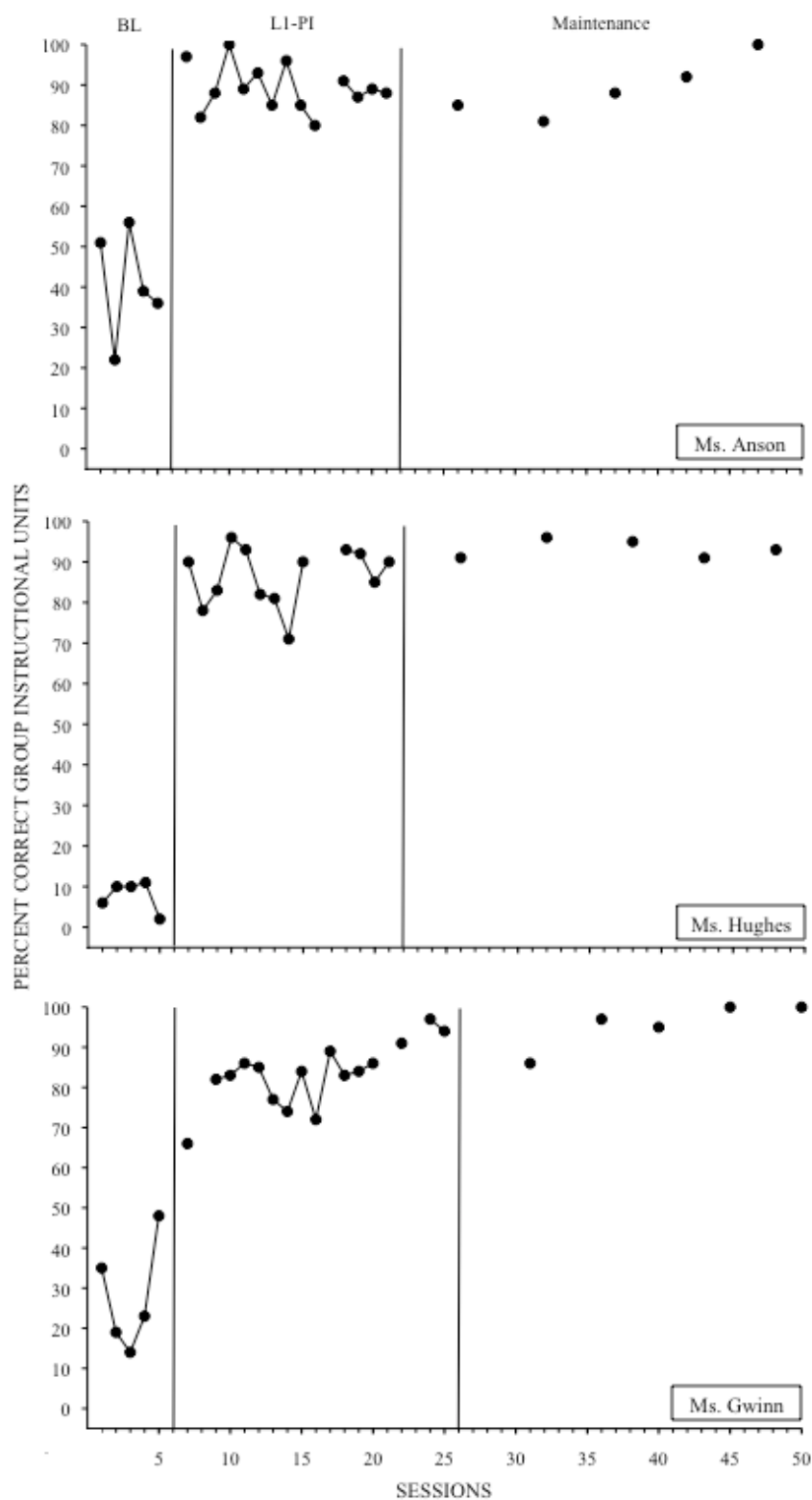


Figure 6. Percent correct group instructional units in beginning reading instruction following Level 1 support (i.e., inservice) for Ms. Anson, Ms. Hughes, and Ms. Gwinn. Note. BL = baseline, L1-PI = level 1 post inservice.

Research Question 2: How did performance on DIBELS Letter Naming Fluency,

Phoneme Segmentation Fluency, and Nonsense Word Fluency measures differ between first grade students who received enhanced Tier 1 instruction and first grade students who did not?

The experimenter intended to examine the impact of embedding instructional enhancements into Tier 1 beginning reading instruction on at-risk students' acquisition of beginning reading skills. Specifically, the experimenter intended to determine whether or not DIBELS benchmark scores for students at risk for reading failure taught by teachers who received professional development on instructional enhancements differed from the scores of students at risk taught by the same teachers using traditional instructional methods. However, the school district removed DIBELS benchmark assessments for the 2012-2013 school year and instead administered Measures of Academic Progress (MAP) assessments as a fall benchmark in September and mCLASS: Reading 3D as a winter benchmark in January. Therefore, meaningful comparisons of students' risk status could not be made and these data were not examined.

#### Social Validity

Research Question 3: What were participating teachers' opinions of multilevel support for instruction and use of research-based strategies during beginning reading instruction?

Social validity data were collected to measure social acceptability of procedures and social significance of outcomes. At the conclusion of the study, a social validity questionnaire was given to teacher participants in an effort to explore teacher perceptions of the impact and practicality of multilevel support to embed instructional enhancements

(i.e., unison responding, model-lead-test, error correction) during phonemic awareness and phonics instruction (see Appendix E). Each teacher in the study was provided a written questionnaire including 12 open-ended and 2 closed-ended items that evaluated research-based instructional enhancements and multilevel training components (i.e., inservice, supervisory coaching, preconference, side-by-side coaching, feedback). One final open-ended question gave teachers an opportunity to provide additional feedback not addressed in the questionnaire. Of nine teachers, four indicated the inservice was “very helpful” and five indicated it was “somewhat helpful.” When asked to explain, teachers indicated that they learned simple ideas to increase active engagement and involve more students. Teachers also indicated that the strategies made them more aware of student responses (e.g., error correction) and that it was helpful to be provided with the materials they were trained to use (e.g., write-on response cards). All nine teachers indicated they would recommend other teachers participate in a similar inservice for use of instructional enhancements with their students. Of the three teachers who received Level 2 support in the form of supervisory coaching, one teacher indicated the supervisory coaching session was “very helpful” and the other two indicated it was “somewhat helpful.” Teachers indicated this feedback session allowed them to perfect areas of weakness and that it was helpful to have a one-on-one conversation. When asked what changes they would make to the training and follow-up support eight teachers indicated they wouldn’t make any changes and one teacher suggested expanding training beyond green band instruction.

Teachers were also asked about use of the instructional enhancements. All teachers indicated they felt the enhancements improved their teaching during green-band

instruction. When asked to explain, six teachers indicated there was increased student participation and engagement. Other cited reasons included more emphasis on student responses, blending became easier, instruction moved more quickly, and that teaching was more methodical and deliberate. When asked to indicate the level of difficulty teachers had using the enhancements, seven teachers indicated that model-lead-test and choral responding were “very easy” to use. When asked to explain, teachers indicated these were strategies they were already using, but also suggested that they were perfected and became easier through practice. When asked about implementation of response cards, five teachers indicated response cards were “very easy” to use and four indicated they were “somewhat easy” to use. The following statements are some examples teachers provided when asked to explain: “I was already using dry erase boards, and now I feel I am using them more effectively,” “a bit time consuming passing out and collecting, but overall worth it,” “kids love it and all could respond,” and “response cards were easy to use, and helpful.” For implementation of error correction procedures, two indicated it was “very easy” to use, four indicated it was “somewhat easy to use,” and three indicated a “medium” level of difficulty with implementation. When asked to explain teachers made comments such as, “I am still working on/adjusting to this one,” “had to work on this as I often went into too long an explanation,” “have to be consistent,” and “not sure I always did this correctly, but tried.” Others indicated, “loved ending it with the kids doing it independently” and “proved useful and easy to learn.” When asked what challenges teachers faced in using the instructional enhancements, six cited time constraints, one indicated kids wanted to draw on whiteboards, and two indicated they didn’t face any challenges. When asked what materials, feedback, and/or support would have made it

easier to use the instructional enhancements, eight teachers wrote “none” and one teacher suggested providing individual feedback sooner. It is important to note that this teacher was the last to receive supervisory coaching. When asked whether or not they planned to continue using the instructional enhancements in the future, all nine teachers indicated yes. Some reasons cited for continued use included: “I feel that they are effective and good teaching practices,” “they provided greater participation,” “love the engagement piece,” “I don’t want to change routine,” and “I like the response I get from students.” Teachers indicated instructional enhancements decreased off-task behavior, increased student engagement and participation, and motivated students.

To document generalization of these strategies (i.e., choral responding, response cards, independent group unison response, systematic error correction) to an area other than green-band instruction, an additional social validity measure was collected by school personnel. The school’s literacy facilitator conducted a brief observation of teachers’ use of enhancements during instruction in an academic area other than reading. The measure was obtained once during baseline and once during maintenance for each teacher. All teachers were observed during mathematics instruction, both during baseline and maintenance. During baseline, none of the nine teachers used any of the strategies during the brief observation. On the social validity questionnaire administered at the end of the study, eight teachers indicated they used these strategies in other academic areas including calendar and math, and one teacher indicated she also used them in science and social studies. Although eight of nine teachers (i.e., Ms. Fiji, Ms. Pandora, Ms. Ace, Ms. Gwinn, Ms. Market, Ms. Hughes, Ms. Anson, Ms. Capri) indicated the inservice helped them use these strategies in other academic areas, only two teachers (i.e., Ms. Hughes,

Ms. Gwinn) were observed using them in math during the maintenance phase observation. Specifically, these teachers used choral responding and provided an opportunity for an independent group unison response. Ms. Hughes used them during calendar review and Ms. Gwinn used them during a counting activity. However, it is also important to note that of the remaining seven teachers, six of them had students engaged in teacher small group and/or independent centers, rather than whole-class instruction. The final teacher had one student leading calendar review.

Research Question 4: What were the literacy facilitator's opinions of providing multilevel support to teachers?

Social validity data were also obtained from the school's literacy facilitator to explore perceptions on social importance of the goals and social acceptance of the procedures. At the conclusion of the study, a social validity questionnaire was given to the literacy facilitator to gather information regarding perceptions of teachers' ability to engage all students during instruction and the multilevel professional development process and outcomes. The questionnaire (see Appendix G) consisted of 13 closed-ended items and one open-ended item. In terms of academic engagement of students, the literacy facilitator strongly agreed with the following statement: "improving teachers' ability to engage all students during instruction is important for students at risk." When asked about the inservice, the literacy facilitator strongly agreed with the following statement: "time spent training the teachers to embed instructional enhancements into beginning reading instruction was adequate for effective teaching of skills." The literacy facilitator also strongly agreed that "the level of skill involved in the intervention is appropriate for these teachers" and that "involvement in the intervention would be

appropriate for all teachers.” When asked about multilevel professional development support for teachers, the literacy facilitator strongly agreed that multilevel support for general education teachers is important and that it helped ensure each teacher was successful in applying what they learned in the inservice. When asked about teachers’ ability to embed instructional enhancements and provide increased opportunities for all students to respond during the intervention, the literacy facilitator indicated she agreed. When asked questions related to her role as a literacy facilitator, she strongly agreed that identifying and providing support to teachers who need it would be a more effective and efficient use of her instructional support time. In addition, she agreed it would be beneficial for her to identify teachers who need follow-up support after provision of a professional development activity. She indicated she would definitely recommend this training to other K-2 teachers and that if the school was provided the training materials used in the current study it would be very practical for a literacy facilitator to implement within the school setting. For the open-ended question, the literacy facilitator stated, “excellent professional development with direct impact for students and immediate feedback for teachers.” Results from the literacy facilitator’s social validity questionnaire are shown in Table 7.

Table 7: Literacy facilitator social validity questionnaire

Statements/Questions	Response
1. Improving teachers’ ability to engage all students during instruction is important for students at risk.	SA
2. Time spent training the teachers to embed instructional enhancements (i.e., choral responding, response cards, model-lead-test, error correction) into beginning reading instruction was adequate for effective teaching of skills.	SA
3. Involvement in the intervention would be appropriate for all teachers.	SA



Table 7 (continued)

4. The level of skill involved in the intervention is appropriate for these teachers.	SA
5. The multilevel professional development support for general education teachers is important.	SA
6. The multilevel professional development support for teachers helped to ensure each teacher was successful in applying what they learned at the inservice.	SA
7. Teachers' ability to embed research-based instructional enhancements increased during the intervention.	A
8. Teachers' ability to provide increased opportunities for all students to respond during instruction increased during the intervention.	A
9. As a literacy facilitator, it would be beneficial for me to identify teachers who need follow-up support after provision of a professional development activity.	A
10. Identifying and providing support to those teachers who need it would be a more effective use of my instructional support time.	SA
11. Identifying and providing support to those teachers who need it would be a more efficient use of my instructional support time.	SA
12. To what extent would you recommend this training to other teachers (K-2)?	DR
13. If your school was given the training materials used for this study, to what extent do you think this intervention would be practical for a literacy facilitator to implement within the school setting?	VP
14. Please provide any additional comments regarding the usefulness, effectiveness, and/or importance of this multilevel professional development support for improving teachers' implementation of practices learned and the impact on students at risk.	
○ Excellent professional development with direct impact for students and immediate feedback for teachers,	

Note: SA = strongly agree, A = agree, D = disagree, SD = strongly disagree, DR = definitely recommend, R = recommend, PR = possibly recommend, WNR = would not recommend, VP = very practical, P = practical, SP = slightly practical, NP = not practical.

## CHAPTER 5: DISCUSSION

The purpose of this study was to extend current research and examine effects of multilevel support on first-grade teachers' use of research-based strategies during beginning reading instruction and the extent to which teachers maintained use of these strategies. A multiple baseline across teachers design was used to evaluate instructional accuracy during beginning reading instruction (i.e., phonemic awareness, phonics). Results indicated an increase in level and decrease in variability for group instructional unit accuracy following Level 1 support (i.e., 3-hr group inservice) for six teachers. For the remaining three teachers, results indicated an increase in level for group instructional unit accuracy following Level 1 support (i.e., group inservice), and a second increase in level and decrease in variability following Level 2 support (i.e., supervisory coaching), indicating a functional relation between supervisory coaching and group instructional unit accuracy. Results indicated all teachers were able to maintain use of these strategies. In addition, teachers reported the training and support were helpful and provided information on strategies to increase active engagement of all students. The school's literacy facilitator indicated identification of teachers requiring additional support following an initial training would be an effective and efficient use of instructional support time. Discussions related to these results are presented in this chapter, and are organized by the four research questions previously presented. In addition, specific contributions of the study, recommendations for future research, and implications for

practice are discussed.

### Effects of Intervention on the Dependent Variable

Research Question 1: What are the effects of multilevel professional development support on teachers' accurate use of research-based strategies during beginning reading instruction?

Previous professional development literature suggests coaching is effective for improving academic instruction (Fisher, Frey, & Lapp, 2011; Kretlow & Bartholomew, 2010; Menzies, Mahdavi, & Lewis, 2008; Rudd, Lambert, Satterwhite, & Smith, 2009). Findings from the current study demonstrate a functional relation between supervisory coaching and teachers' accurate use of instructional enhancements (e.g., research-based strategies such as group unison responding) during beginning reading instruction. All nine teachers demonstrated low levels of correct group instructional unit accuracy during baseline. Following Level 1 support (i.e., 3-hr inservice) all teachers' data demonstrated an immediate increase in level; however, not all teachers achieved mastery criterion (i.e.,  $\geq 80\%$  on final three data points). Specifically, three teachers required Level 2 support in the form of supervisory coaching. Each of these teachers demonstrated a second immediate increase in level and decrease in variability following introduction of Level 2 support. The remaining six teachers achieved mastery criterion (i.e., greater than or equal to 80% accuracy for three consecutive sessions) following Level 1 support (i.e., inservice), moved into maintenance and did not receive any additional follow-up support. No teachers in the study required Level 3 support (i.e., side-by-side coaching). All nine teachers maintained a high level of correct group instructional unit accuracy for a range of 3 to 7 weeks. These results align with previous research and suggest professional

development be directly tied to classroom practice and include demonstrations and opportunities for practice, as well as provide follow-up support in the form of coaching (Bursuck et al., 2004; Kretlow et al., 2011; Kretlow et al., 2012; Schnorr et al., in preparation). However, these results also suggest that follow-up support be multileveled to meet the varying needs and abilities of teachers, rather than providing a “one size fits all” approach for all teachers, as suggested in previous research (Myers et al., 2011; Schnorr et al., in preparation).

Teachers in the current study were trained to use research-based instructional enhancements that increase academic responding of all students and have demonstrated positive effects on student achievement, particularly for students at risk. First, group unison responding, signals, and correction procedures are components of Direct Instruction (DI) that promote effective teacher-student interactions (Watkins & Slocum, 2004). Specifically, model-lead-test (MLT), choral responding, response cards, and systematic error correction have demonstrated positive effects on student achievement (e.g., Barbetta et al., 1994; Hollingsworth & Woodard, 1993; Randolph, 2007; Sterling et al., 1997). Second, embedding research-based strategies into core reading and math curriculum to enhance Tier 1 instruction has shown promise (Bursuck et al., 2004; Kretlow et al., 2011; Kretlow et al., 2012; Schnorr et al., in preparation). Third, the specialized knowledge and skills included in special education teacher programs are not typically included in general education teacher programs (Brownell et al., 2009; Brownell et al., 2005). However, in early intervention models (e.g., RtI), general education teachers are responsible for providing Tier 1 instruction for all students in the classroom. Similar to previous research, this study extends current literature to support the use of whole-

class, research-based strategies typically found in special education into general education classrooms (Bursuck et al., 2004; Kretlow et al., 2011; Kretlow et al., 2012; Schnorr et al., in preparation) and confirms that general education teachers can be trained to enhance existing core curricula.

In addition to training teachers to use research-based instructional enhancements during beginning reading instruction, teacher training in the study was aligned with criteria set forth in NCLB (2002). According to NCLB (2002), high-quality professional development (a) is sustained, intensive, and content focused; (b) is aligned with academic standards and assessments; (c) improves teacher content knowledge; (d) improves teachers' use of evidence-based instructional methods; and (e) is evaluated for student and teacher effects. First, this study provided sustained, intensive, and content-focused professional development that improved content knowledge. Specifically, teachers were provided a 3-hr inservice that focused on the rationale to increase active student responding, as well as provided information on instructional enhancements that could be embedded within core curricula. During the inservice, teachers were provided live and video demonstrations of the enhancements, opportunities to practice using the enhancements within the core reading program, and immediate feedback (e.g., praise, error correction) from the experimenter. Furthermore, teachers who required additional support for using the instructional enhancements received sustained follow-up support in the form of coaching. Next, this study trained teachers to embed these instructional enhancements into the core reading program, *Imagine It!*, which is aligned with academic standards (e.g., Common Core State Standards). Teachers were also provided opportunities to identify phonemic awareness and phonics tasks within the *Imagine It!*

program that could be enhanced using the learned strategies. Third, this study improved teachers' use of research- and evidence-based instructional methods during beginning reading instruction. Teachers were trained to use low-cost, easy to implement research- and evidence-based instructional enhancements including choral responding, systematic error correction, MLT, and response cards. Finally, this study evaluated effects of multilevel support on changes in teacher instruction. Specifically, percentage correct group instructional units were used to evaluate use of research-based strategies during beginning reading instruction. Given the multiple baseline design, the experimenter was able to document a functional relation between supervisory coaching and improvements in instruction.

Results of this study also support previous research indicating provision of performance feedback following professional development results in improved teacher instruction (Bethune & Wood, in press; Kretlow et al., 2011; Kretlow et al., 2012; Myers et al., 2011; Schnorr et al., in preparation). Previous research indicates coaching has been effective in increasing teachers' accurate use of research-based strategies in math (Kretlow et al., 2011; Kretlow et al., 2012) and reading (Schnorr et al., in preparation), teacher praise in an RtI model (Myers et al., 2011), and function-based interventions (Bethune & Wood, in press). Results of this study suggest that the targeted feedback provided to individual teachers, based on audio-recorded instruction and one classroom observation, was effective in increasing group instructional unit accuracy. Blakely (2001) conducted a survey and results suggested an ideal professional development model should include both supervision and coaching, which supports the suggestion by Myers et al. (2011) and Schnorr et al. (in preparation) to provide a multileveled professional

development model. Not only would this model provide an initial training for teachers (i.e., inservice), but also an opportunity for individualized feedback following observations (i.e., supervisory coaching), and more intensive support through live demonstrations occurring during instruction while students are present (i.e., side-by-side coaching). Therefore, instead of providing a “one size fits all” approach, the coach could systematically increase the level of support provided based on documented need of teachers.

This study also adds to the paucity of research on multilevel professional development support for teachers. Myers et al. (2011) investigated the relationship between teachers’ use of specific, contingent praise and an RtI approach to teacher training and performance feedback. Results suggested teachers respond differently, so the same level of professional development may not be appropriate for all teachers. Additionally, Schnorr et al. (in preparation) investigated the effects of inservice and side-by-side coaching on teachers’ use of research-based strategies during beginning reading instruction. Results suggested only three of nine participating teachers required side-by-side coaching to improve instruction. The remaining six teachers demonstrated improved instruction following the inservice. Authors suggested multilevel support may be necessary to meet the varying needs of teachers. This study supports a multileveled approach to teacher training. Results of the current study are consistent with Myers et al. (2011) and Schnorr et al. (in preparation) demonstrating teachers may need varying levels of professional development support.

This study also differs from previous professional development and coaching literature in several ways. First, the results of this study differ from previous professional

development literature because changes in teaching behaviors occurred immediately following Level 1 support (i.e., inservice) alone. Previous literature suggests inservice alone may not be enough for teachers to implement learned strategies to specified criterion, and that teachers need some form of follow-up support (e.g., coaching) (Kretlow et al., 2011; Kretlow et al., 2012; Myers et al., 2011; Rudd et al., 2009); however, results of this study indicate that inservice alone may be sufficient for teachers to implement learned strategies. Similar to teachers in a study by Bethune and Wood (in press), some teachers in the current study achieved mastery criterion following the inservice and did not receive individual follow-up support. Further, no teachers required the most intense third level of support (i.e., side-by-side coaching). Results from the current study do not support results from previous research on traditional professional development, which suggests professional development produces poor results in terms of changing teacher behavior in the classroom (Yoon et al., 2007). However, it is important to draw attention to two potential reasons for these differences. The 3-hr inservice teachers received in the current study may not be comparable to a “traditional” professional development activity. First, teachers participated in a small group inservice of only four or five teachers. This is unlike traditional professional development in which large numbers of teachers are present. Second, the inservice was aligned with NCLBs (2002) definition of high-quality professional development. In addition, Joyce and Showers (2002) suggest professional development encompassed with demonstration, practice, and coaching (e.g., feedback) leads to an increase in knowledge, implementation, and application. Specifically, the inservice in the current study included live demonstrations via modeling by an expert (i.e., experimenter), video demonstrations,



and opportunities to practice with immediate feedback. Demonstrations and opportunities to practice occurred across each strategy (i.e., choral responding, response cards, MLT, error correction). This study is more closely aligned with Nichols et al. (2006), which indicated providing teachers an opportunity to practice with immediate feedback during professional development gives teachers the confidence to apply learned strategies in the classroom. The professional development in the current study is unlike traditional professional development that typically lacks efficiency, provides little opportunity for teachers to practice skills learned, and often provides no feedback on performance (Desimone et al., 2002).

Second, research on supervisory coaching indicates changes in teacher behavior were documented following an initial inservice or workshop (e.g., 2 hr, 3 hr, full day, 2 day) and as few as four supervisory coaching sessions to a maximum of two 30 to 45 min supervisory coaching sessions per week (Fisher et al., 2011; Kohler et al., 1997; Morgan et al., 1994; Powell et al., 2010; Rudd et al., 2009). Research on side-by-side coaching indicates changes in teacher behavior were documented following an initial inservice or workshop (e.g., 2 hr, 3 hr, 2 day) and as few as one side-by-side coaching session to a maximum of six side-by-side coaching sessions (Bethune & Wood, in press; Kretlow et al., 2011; Kretlow et al., 2012; Maheady et al., 2004; Schnorr et al., in preparation). The current study is more consistent with studies by Bethune and Wood (in press), Kretlow et al., (2011), Kretlow, et al., (2012), and Schnorr et al. (in preparation) which found high levels of implementation accuracy with fewer hours of inservice and coaching; however, the current study provided fewer contact hours following an initial inservice than the previously described studies. In addition, follow-up support used supervisory coaching

(i.e., observation, feedback meeting) rather than side-by-side coaching (i.e., pre-conference, coaching session, post-conference).

Third, limited research has investigated the extent to which teacher performance maintains. Maintenance data were not collected in the studies by Kretlow et al. (2011) or Kretlow et al. (2012), so there is no literature to support whether or not teachers trained in DI methods are able to maintain learned strategies. Further, no maintenance data were collected in Schnorr et al. (in preparation), so there is no previous research to support whether or not non-DI teachers are able to maintain the strategies they have learned at an initial inservice. In a recent study, Bethune and Wood (in press) documented teachers were able to maintain implementation of function-based interventions following inservice and coaching. The current study demonstrates teachers without DI training were able to maintain strategies learned following Level 1 (i.e., inservice) and Level 2 (i.e., supervisory coaching) support. Teachers maintained use of these strategies for a range of 3 to 7 weeks.

Fourth, Kretlow et al. (2012) found that teachers generalized learned strategies to an untrained academic area; however, both areas measured were math. Bethune and Wood (in press) found teachers were able to generalize implementation of function-based interventions to untrained situations. Although the current study employed only a descriptive measure, rather than collection of generalization data, results indicate teachers did not generalize to an untrained academic area (i.e., math).

Fifth, Kretlow et al. (2011) recommended future research investigate providing inservice and coaching to general education teachers not trained in DI programs and suggested the possibility that “a more robust or extended professional development

program would be needed” (p. 242). However, the current study contradicts this suggestion. Similar to Schnorr et al. (in preparation), this study investigated training non-DI teachers to use instructional enhancements. Results of the current study indicate six of nine teachers did not require follow-up support to increase correct use of instructional enhancements during beginning reading instruction. Results also indicate teachers without DI training did not require more frequent or intensive support in order to reach high levels of group instructional unit accuracy. Conversely, even the three teachers who received Level 2 support in the current study required less support than trained DI teachers to use research-based strategies (Kretlow et al., 2011; Kretlow et al., 2012).

Research Question 2: How does performance on DIBELS Letter Naming Fluency,

Phoneme Segmentation Fluency, and Nonsense Word Fluency measures differ between first grade students who receive enhanced Tier 1 instruction and first grade students who do not?

Previous research suggests coaching teachers can lead to increased student achievement (Fisher et al., 2011; Powell, Diamond, Burchinal, & Koehler, 2010; Zakiersky & Siegal, 2010). Schnorr et al. (in preparation) investigated the impact of embedding research-based instructional enhancements into beginning reading instruction on at-risk students’ acquisition of beginning reading skills. Using an historical control (i.e., students receiving typical instruction the year prior to implementation of enhanced instruction) and treatment group (i.e., students receiving enhanced instruction), overall results indicated there were no significant differences in performance on middle of year and end of year DIBELS measures (i.e., LNF, PSF, NWF) between the two groups of students. However, an explanation for this lack of significant difference between the two

groups is likely due to sample size. Schnorr et al. compared only students falling between the 10<sup>th</sup> and 25<sup>th</sup> percentiles, which yielded samples below 19 in each group (i.e., historical control, treatment). Authors suggest future research include larger samples with power large enough to accurately evaluate differences. The current study intended to extend previous research of Schnorr et al. by using a larger sample size. However, the school district removed DIBELS benchmark assessments for the 2012-2013 school year and administered Measures of Academic Progress (MAP) assessments as a fall benchmark in September and mCLASS: Reading 3D as a winter benchmark in January. Therefore, meaningful comparisons of students' risk status could not be made and these data were not examined.

#### Discussion of Social Validity Findings

Research Question 3: What are participating teachers' opinions of multilevel support for instruction and use of research-based strategies during beginning reading instruction?

This study sought to examine the social validity of multilevel support based on teachers' views. Of nine teachers, four indicated the inservice was "very helpful" and five indicated it was "somewhat helpful." Specifically, teachers in the study reported that the inservice presented and incorporated "great ideas," "showed how the strategies were to be implemented," and that it provided them an opportunity to "practice the strategies." Teachers also indicated it was beneficial to receive materials necessary for implementation (e.g., whiteboards). Three teachers in the current study also indicated they improved their blending instruction as a result of the demonstrations provided in the inservice and/or follow-up support. These results are consistent with previous research on

high-quality professional development which suggests it is important (a) to provide demonstrations and opportunities for practice (e.g., Joyce & Showers, 2002), (b) to ensure it is content-focused and active (Leko & Brownell, 2009), and (c) to provide teachers with the necessary resources for implementation (Boardman et al., 2005).

These results are also consistent with research on teacher preferences regarding expert demonstrations. In a survey conducted by Blakely (2001) results indicated side-by-side coaching was the preferred coaching model; however, teachers identified a demonstration lesson by the coach as the component of coaching that was most helpful in acquiring new teaching techniques. Teachers indicated that observing a demonstration by the coach enabled them to better understand a particular strategy. Blakely (2001) also suggests coaching may be more effective than traditional after school meetings to change teacher behavior. Teachers who received Level 2 support in the current study indicated, “it was helpful to have a 1:1 conversation,” “able to perfect blending and error correction,” “made it move quicker, like new blending” and that “the coaching helped me correct the errors I was making.”

Teachers were also asked to indicate the level of difficulty they had implementing the instructional enhancements. In previous research, teachers indicated instructional enhancements were “easy” or “somewhat easy” to implement (Kretlow et al., 2011; Kretlow et al., 2012). In the current study, teachers rated MLT as “very easy” or “somewhat easy.” Teachers rated choral responding “very easy” or “medium.” It should be noted that many teachers were already using choral responding during their green-band instruction prior to the study; however, many were not using a signal to elicit a group unison response. Teachers who received Level 2 support indicated they “had to

work on this to perfect it,” “it took practice (and patience) to tighten choral responding,” and “this became easier as we continued to practice and reinforce.” Teachers not receiving follow-up support indicated previous use of choral responding. For example, one teacher also stated “heard lots of participation, engaged” and another stated, “Love the signal! We use it all the time.” Teachers rated response cards “very easy” or “somewhat easy.” Teachers cited passing out and collecting response cards as the greatest barrier regarding its use in the classroom. However, teachers also indicated that students enjoyed using response cards, response cards increased responding of all students, and that response cards were easy to use and helpful. Teachers also indicated that it was helpful to be provided with the materials (i.e., whiteboards, markers, socks), making them easily accessible. This is consistent with previous research suggesting teachers be provided with necessary resources for implementation when receiving professional development (Boardman et al., 2005). Teachers indicated systematic error correction was “very easy,” “somewhat easy,” or “medium.” It is important to note that teachers in previous research (e.g., Kretlow et al., 2011; Kretlow et al., 2012) had been previously trained in and taught DI programs. Therefore, the differences in perceived level of difficulty of implementing the instructional enhancements of teachers in the current study may be a result of the lack of formal DI training. In sum, results of the current study suggest teachers not trained in DI were able to use the instructional enhancements during beginning reading instruction with a high level of fidelity (i.e.,  $\geq 80\%$  correct group instructional units) and this confirms the research of Bursuck et al. (2004) and Schnorr et al. (in preparation) which demonstrated general education teachers could be trained to embed research-based strategies into a beginning reading program (i.e., Harcourt, Open

Court, Imagine It!) during whole-class, Tier 1 instruction.

Teachers were also asked to describe their perceived impact of instructional enhancements on student outcomes. Teachers indicated they (a) increased overall student engagement, (b) motivated students, (c) reinforced correct answers, (d) increased error correction, (e) improved participation, (f) decreased disruptions, and (g) increased responding of all students. Specifically, teachers indicated, “students are more engaged overall,” “greater student engagement,” “made more students engaged and responsible for their learning,” “it made blending easier and more involved for everyone,” “using whiteboards for choral response/response cards improved participation,” “my lower students would copy off other response cards, thus reinforcing the correct spellings, etc.” and “students had errors corrected more often.” Eight teachers cited a decrease in off-task behaviors and stated, “there are more opportunities for whole class participation,” “less disruptions,” “using the techniques allowed me to observe those who were exhibiting the desired response,” and “students were more involved and engaged so they had less time to get off task.” It is interesting to also note that two teachers indicated students were more involved and motivated by the teacher/student game. Teachers were not specifically trained to use the teacher/student game during the inservice; however, the experimenter suggested teachers consider a group contingency (e.g., teacher/student game) for appropriately timed responses and silence when managing choral responding. Based on the audio recorders, five of nine teachers used the teacher/student game in their classrooms following the group inservice.

Finally, to document generalization of the instructional strategies to an area other than green-band instruction, the school’s literacy facilitator conducted a brief observation

of teachers' use of the strategies during instruction in an academic area other than reading. The measure was obtained once during baseline and once during maintenance for each teacher, and occurred during mathematics instruction. During baseline, teachers did not use any of the strategies. Although eight of nine teachers indicated on the social validity questionnaire that the inservice helped them use the strategies in other academic areas (i.e., calendar, math, social studies), only two teachers were observed using them in math during the maintenance condition. Specifically, these teachers used choral responding and provided an opportunity for an independent group unison response during math. Although descriptive, these results differ from previous research that indicates teachers can generalize use of these enhancements to an untrained area (i.e., Kretlow et al., 2012). However, in the current study the brief observation was designed as a walkthrough (e.g., snapshot) and the literacy facilitator spent only a short amount of time in each classroom for the observation. Depending on the activity observed during the snapshot, there may not have been an opportunity for teachers to use the strategies. For example, of the remaining seven teachers, one teacher had a student leading calendar review and six teachers had students engaged in small group and/or independent centers, rather than whole-class instruction.

Research Question 4: What are the literacy facilitator's opinions of providing multilevel support to teachers?

The literacy facilitator indicated that identification of teachers requiring additional support and provision of those services only to those teachers who need it would be a more effective and efficient use of her instructional support time. She also indicated that multilevel support for general education teachers is important and that it helped ensure



each teacher was successful in applying what they learned in the inservice. Further, she indicated that time spent training the teachers to embed instructional enhancements into beginning reading instruction was adequate for effective teaching of skills. Finally, she indicated she would recommend this training to other K-2 teachers and noted that if the school was provided the training materials used in the current study it would be very practical for a literacy facilitator to implement within the school setting.

### Specific Contributions of this Study

This study contributes to the literature in a number of important ways: (a) this study adds to the paucity of research on multilevel professional development support, (b) it provides support for characteristics of high-quality professional development, (c) it provides a model for the type and quantity of coaching required to produce changes in teachers' instruction, and (d) it demonstrates varying levels of support needed by non-DI teachers to apply research-based strategies. First, this study makes a substantial contribution as the second study to investigate the effects of multilevel teacher support. Myers et al. (2011) suggested a multileveled approach to teacher training and support rather than a traditional professional development activity; however, results indicated a functional relation between multileveled professional development and teacher behavior did not exist. Results of this study suggest teachers do need varying levels of support, and a functional relation between supervisory coaching and changes in teacher behavior was demonstrated. Provision of multilevel support for general educators may be integral, given the importance of providing at-risk students with strong Tier 1 instruction (Fuchs et al., 2012). This study provides initial empirical evidence for a multilevel professional development model for use in schools to support teachers' acquisition of new skills.

Second, this study provides support for characteristics of high-quality professional development and may provide a model for training general educators to use efficient, low-cost research-based strategies that have been previously demonstrated to improve academic engagement and achievement in Tier 1 reading instruction. Although teachers have positive perceptions towards use of research-based practices, given a lack of time and lack of access to sources, research suggests teachers are unlikely to use these practices in the classroom (Williams & Coles, 2007). While professional development is one way to provide general educators with the knowledge and skill to use research-based practices, traditional professional development (e.g., 1-day inservice or workshop) often produces poor results in terms of changing teacher behavior in the classroom (Yoon et al., 2007). Given the research design used and the fact that all teachers received the 3-hr group inservice at the same time, a functional relation cannot be documented between the inservice and subsequent increases in correct group instructional unit accuracy. However, it is important to note that these changes may have been a result of the high-quality professional development provided. Providing multileveled professional development may be one way to provide teachers instruction in the use of research-based strategies and may be used in an effort to close the documented research-to-practice gap (Cook & Schirmer, 2006; Denton et al., 2003).

Third, this study provides a model for the type and quantity of coaching required to improve changes in teachers' instruction. Previous research has suggested future studies investigate the type and quantity of coaching required to improve teachers' instruction (e.g., Kretlow, Cooke, et al., 2011; Myers et al., 2011; Tschannen-Moran & McMaster, 2009). Research on supervisory coaching indicates changes in teacher

behavior were documented following an initial inservice or workshop (e.g., 2 hr, 3 hr, full day, 2 day) and as few as four supervisory coaching sessions to a maximum of two 30 to 45 min supervisory coaching sessions per week (Fisher et al., 2011; Kohler et al., 1997; Morgan et al., 1994; Powell et al., 2010; Rudd et al., 2009). This study demonstrated that for the three teachers requiring follow-up support in the form of supervisory coaching, changes in teachers' instruction occurred following a 3-hr inservice and only one supervisory coaching session (i.e., observation and feedback meeting). Overall, teachers requiring follow-up support engaged in fewer than 4 contact hrs, while remaining teachers made substantial changes to instruction following only 3 contact hrs (i.e., group inservice). Comparable to Bethune and Wood (in press), teachers received approximately 20 min of coaching. Results of the current study demonstrate not all teachers require follow-up support in the form of coaching and that supervisory coaching was implemented in a brief period of time, yet produced positive changes in teaching behaviors.

Fourth, this study demonstrates varying levels of support needed by non-DI teachers to apply learned strategies. Kretlow et al. (2011) suggested non-DI teachers may need more frequent, intensive support to accurately apply learned strategies with a high level of fidelity. However, results of the study do not support this suggestion. First, results of the current study indicate six teachers did not require follow-up support to increase correct use of instructional enhancements during beginning reading instruction. In addition, teachers in the current study required fewer contact hours (e.g., 3 to 4 hrs) to increase group instructional unit accuracy than Kretlow et al. (2011) and Kretlow et al. (2012) with teachers trained in DI (i.e., fewer than 5 hrs).

Moreover, this study addresses several of the limitations noted in previous studies (Kretlow et al., 2011; Kretlow et al., 2012; Myers et al., 2011; Schnorr et al., in preparation). Specifically, this study (a) included a maintenance data phase to show maintenance of teacher behavior, (b) collected interobserver agreement across all phases of the intervention, (c) investigated level of support necessary for non-DI teachers to embed the instructional enhancements into reading instruction, and (d) investigated multilevel professional development support provided in reading.

#### Limitations and Recommendations for Future Research

Despite positive outcomes, several limitations are important to note. In this section, each limitation is followed by a suggestion for future research. Additional considerations for future research are also provided. First, the study did not address coaching using a natural implementer (e.g., literacy facilitator). Instead, the experimenter was the coach. The literacy facilitator indicated that if the school were provided with the training materials, it would be very practical for her to use this professional development model in the school. However, since the experimenter provided multilevel support in this study, the extent to which school personnel could provide multilevel support is unknown. There are a number of school personnel who could be trained to implement multilevel support including a literacy facilitator, instructional facilitator, special education teachers, or general education teachers. Future research should investigate the impact of natural implementers (e.g., literacy facilitator, special education teacher, general education teacher/peer) as the coach and what type of training is required for those not considered an “expert.” Further, although it is likely the literacy facilitator or other school personnel could be trained to use the group instructional unit score sheet to document accuracy in

use of instructional enhancements; use of this recording system would not be feasible in the natural setting (i.e., school). Future researchers replicating this study with a natural implementer may consider an alternate measure of the dependent variable. For example, a natural implementer could use the fidelity score sheet from the core reading program; however, this fidelity sheet would also need to include checks for use of instructional enhancements (e.g., unison responding, error correction). It would also be important that a frequency count of each enhancement be included, with a decision rule on mastery criteria, in order to identify teachers requiring follow-up support.

A second limitation of this study was the group size and design of the inservice. It may be that teachers in the current study were successful because of the small group size (i.e., four or five teachers). This provided teachers an opportunity to be more engaged in the inservice, particularly during practice activities. Each teacher had an opportunity to practice each strategy while their peers acted as students. Further, the experimenter (i.e., coach) provided immediate feedback, including praise and error correction following each teacher's opportunity to practice. Teachers who received error correction were then provided an additional opportunity to practice the strategy. With traditional professional development, teachers may have few or no opportunities to practice; and the practice often does not include immediate feedback, or any feedback, from the presenter.

Additionally, organization and design of the inservice, as well as the content presented were aligned with previous literature outlining components of effective professional development that lead to changes in instructional practices. Not only was the inservice aligned with NCLBs (2002) five criteria, but also many additional recommendations noted in previous literature including: (a) presentation of the theory behind the practice,

demonstrations and opportunities for practice, and prompt feedback as teachers practice skills learned (Showers, Joyce, & Bennett, 1987); (b) in direct relation to both school and teacher needs, coupled with follow-up support in implementation, and should provide teachers with the necessary resources for implementation (Boardman et al., 2005); and (c) coherent, content-focused, active, and collaborative (Leko & Brownell, 2009). Previous research on traditional professional development suggests that teachers receive few opportunities for professional development targeting students at risk and that it often does not match their students' needs and lacks sufficient support in aiding them in selecting and implementing practices (Boardman et al., 2005). In the current study, each instructional strategy was isolated and included multiple live demonstrations, a minimum of one video demonstration, opportunities for each teacher to practice, and immediate feedback on strengths, as well as suggestions for improvement from the experimenter. Teachers who received corrective feedback were provided an additional model from the experimenter and an additional opportunity to practice the strategy following the demonstration. Traditional professional development is often not efficiently designed, and provides little opportunity for teachers to practice and receive feedback on new skills learned (Desimone et al., 2002). Further, the follow-up support provided to teachers in the study allowed for fairly immediate feedback on their instruction. In this case, supervisory coaching occurred on the same day as observations. It appears results of this study align with results from Peterson et al. (2009), which concluded teachers benefit from targeted feedback from coaches based on observational data, in addition to the opportunity to engage in collaborative reflection. Traditional professional development often does not provide any follow-up support following the initial inservice or workshop.

Future research should consider providing and evaluating a “traditional” inservice. Researchers could survey teachers about their recent professional development experiences in order to prepare, deliver, and evaluate a more “typical” inservice or workshop. Researchers could then provide the “typical” inservice as Level 1 support and systematically increase the support provided in subsequent levels. For example, Level 2 support may be a small group workshop aligned with high-quality professional development criteria (e.g., provide rationale, demonstrations, opportunities for practice and feedback). Then, Level 3 and Level 4 support could include supervisory and side-by-side coaching, respectively. This may provide additional information on what type and level of follow-up support is necessary to change teacher instruction following a traditional inservice.

A third limitation of this study is the use of audio recordings, rather than face-to-face observations or video recordings. There were certain phonemic awareness and phonics tasks that could not be scored using the audio recordings. For example, if teachers provided students with preprinted response cards for use during a listening-for-initial-or-final-sounds activity, there was no way to document via the audio recording whether or not students responded in unison. In addition, there was no way to tell whether or not feedback was provided based on the majority response. Further, the majority of disagreements between the experimenter and second data collector were related to unison errors, which may have been a function of using audio recordings rather than video recordings or live observations. Future studies could consider alternate data collection methods (i.e., video recordings).

Fourth, only a descriptive measure of generalization data was used. Previous

research indicates teachers can generalize use of the enhancements to an untrained academic area (Kretlow et al., 2012); however, research is needed to determine whether teachers can generalize to an untrained, alternative academic area. Results of the generalization observation suggest teachers did not generalize use of the trained research-based instructional enhancements to an untrained academic area (i.e., math). The current study used a descriptive generalization measure for two primary reasons. First, the experimenter felt it would be difficult to capture generalization to an alternate area in reading (e.g., vocabulary, fluency, comprehension) because the district only used the Imagine It! curriculum for phonemic awareness and phonics instruction. The remaining literacy instruction followed a balanced literacy approach in which teachers were not likely to use the instructional enhancements. Second, the experimenter was unable to capture generalization data using audio-recordings that occurred on the primary dependent variable. Further, the experimenter was concerned that audio recording instruction in an area outside of reading could be a potential confounding variable. Future research should investigate the extent to which teachers can generalize use of research-based instructional enhancements, or other programs for which they have received training, to untrained academic areas.

Fifth, student data were not collected. Impact of multilevel support for teachers on changes in student behaviors (e.g., increased participation, decreased off-task behavior) and student achievement is important for a few reasons. First, Tier 1 instruction is designed to provide effective instruction and address the needs of the majority of students (Vaughn et al., 2007). Lembke et al. (2010) suggested use of additional instructional components for improved academic achievement within core programs. The study trained



teachers to enhance the core reading curriculum using research-based instructional enhancements designed to increase student engagement and demonstrated to improve student achievement; however, because student data (behavior or academic) were not collected this study cannot confirm or oppose the effectiveness of these strategies. Future research should investigate the impact of embedding these instructional enhancements into whole-class core reading instruction on student engagement. Next, training teachers to use effective teaching strategies that improve student learning within the classroom is essential, but evaluating the impact of embedding instructional enhancements into Tier 1 beginning reading instruction on at-risk students' acquisition of beginning reading skills is critical. Significant reading research indicates beginning and at-risk readers benefit from explicit, systematic instruction in phonemic awareness and phonics to improve reading achievement (Adams, 1990; Ehri et al., 2001; Mathes et al., 2005; National Reading Panel, 2000; Torgesen et al., 2001; Wanzek & Vaughn, 2007). To identify the impact multilevel support has on students at risk, future single-case researchers may consider use of an historical control group, similar to Schnorr et al. (in preparation). Overall results of that study indicated there were no significant differences in performance found between groups, likely a result of small sample sizes. Therefore, future research should include larger samples with power large enough to accurately evaluate differences. Unfortunately, given the small number of teachers often included when using a single-case design, there are a small number of students at risk for consideration in a sample. Future research may also consider a group experimental study so equivalent groups of students are randomly assigned to treatment and control groups. With a greater number of participants, researchers may want to examine impact on all

students (e.g., academically gifted, students with disabilities), not just those at risk.

There are also additional considerations for future research. First, future studies may consider providing feedback by using videotapes during coaching sessions. Morgan et al. (1994) investigated effects of supervisory coaching on improvements of DI teaching behaviors (e.g., signal, wait time, error correction) of teachers during Reading Mastery sessions. Coaching occurred twice per week for 30-45 min using video recordings of teachers' instruction. Specifically, coaches evaluated videotapes of teachers, provided detailed feedback on observed teaching behaviors, modeled as needed, and collaborated with the teacher to establish objectives for improved performance. If future investigations use videotapes instead of audio recordings for data collection, these videotapes could be used to provide subsequent feedback during follow-up support meetings. Although not included in the study by Morgan et al., future studies could also use portions of these videotapes to provide teachers a demonstration of their strengths and opportunities for improvement discussed during the feedback meeting.

Next, future studies may consider investigating effects of technologically mediated delivery of follow-up support in comparison to face-to-face or in vivo support. Powell et al. (2010) conducted a randomized controlled trial to examine comparative effects of a 2-day workshop followed by technologically mediated versus in-person delivery of literacy-focused supervisory coaching on Head Start teachers' instructional practices and student outcome data. Results indicated statistically significant gains for changes in teachers' instruction in classrooms where coaching had occurred; however, no significant differences were found among teachers who received on-site coaching versus those who received remote coaching. Remote supervisory coaching included teacher-

submitted videotapes (i.e., approximately 15 min) of targeted instructional practices and feedback was provided using computer software that incorporated a split-screen. One side of the screen displayed coach-selected video segments and the opposite side displayed written feedback from the coach. Feedback also included hyperlinks to relevant videos or materials as needed.

Finally, the current study evaluated teachers' maintenance of performance, but long-term maintenance data were not collected. Future studies should investigate sustainability and whether multilevel support produces changes that last well beyond the initial inservice and follow-up support (e.g., 6 months).

#### Implications for Practice

Results of this study provide several implications for practice. First, this study suggests inservice training alone may be sufficient to help teachers use new strategies with fidelity, if the inservice or workshop is aligned with the components of high-quality professional development. Specifically, professional development should (a) include a rationale, (b) be coherent and content focused; (c) embed demonstrations (e.g., live, video) of teaching procedures and opportunities to practice strategies or techniques with prompt feedback provided throughout training activities, (d) be in direct relation to school and teacher needs, and (e) provide teachers with necessary resources for implementation, (Boardman et al., 2005; Leko and Brownell, 2009; Showers, Joyce, & Bennett, 1987). In addition, it should be closely aligned with the components of high-quality professional development (e.g., intensive, content focused, evaluated for student and teacher effects) as outlined by NCLB (2002).

Second, given that inservice alone is not always sufficient in changing teacher

behavior, school district and building administrators might consider adopting a multilevel support model in order to provide teachers additional individualized support by a coach following an initial professional development activity. Districts may be able to use district support specialists (e.g., curriculum specialists, program specialists) and schools may be able to use on-site personnel including the literacy facilitator, special education teachers, or highly effective general education teachers (peers) as coaches. Focus could then be on those teachers who need follow-up support instead of providing the same support for all teachers across all professional development activities. In the current study, follow-up support (i.e., supervisory coaching) lasted less than an hour, including both the observation and feedback meeting. The literacy facilitator in the current study indicated identification of teachers requiring additional support, and provision of those services only to those teachers who need it, would be a more effective and efficient use of her instructional support time. Further, she indicated it would be very practical for a literacy facilitator to implement the training used in the current study if the school were provided the training materials.

Third, district and school personnel should conduct fidelity checks on teachers' implementation of core research- and evidence-based programs used, particularly in reading and math. Although the Imagine It! program includes some of these instructional enhancements (i.e., choral responding, preprinted response cards), baseline data from the current study suggest teachers were not implementing the program with a high level of fidelity. Given the responsibility placed on general education teachers to meet the needs of students in Tier 1 instruction, school personnel should focus on supporting teachers to implement core-reading curricula with fidelity using fidelity checklists provided with the

programs.

A fourth implication is provision of feedback to teachers. In the study by Schnorr et al. (in preparation) teachers who did not receive coaching indicated that it would be helpful to receive feedback on progress and the extent to which strategies were being used properly. In the current study, teachers received an email on the day they achieved mastery criterion following either Level 1 or Level 2 support. Emails were individualized for each teacher and addressed strengths in using the strategies learned during the inservice, as well as those discussed during the Level 2 feedback meeting (for teachers requiring Level 2 support). Teachers commented that the emails were “nice and reassuring” and that they “encouraged good habits and instructional changes.” Although feedback in the current study occurred via email, other technology may be used to support this feedback as well (e.g., Skype, FaceTime).

Fifth, previous research suggests many schools and colleges of education may not be adequately providing preservice elementary general education teachers the skills to teach literacy aligned with findings of the National Reading Panel, and they may be unprepared to meet the needs of struggling students, specifically those at risk for reading failure (Helfrich & Bean, 2011; McCombes-Tolis & Spear-Swerling, 2011; Walsh et al., 2006). In the Schnorr et al. (in preparation) study, kindergarten general education teachers indicated using the instructional enhancements improved their phonemic awareness and phonics instruction. Teachers stated, “I never realized how important it was to have all students respond together – it keeps them engaged, focused, and challenged throughout the lesson,” “the inservice helped open my eyes to new strategies that have made a tremendous difference in my instruction,” and “I can’t believe I never

learned these strategies before now.” In the recent study, teachers suggested use of enhancements during phonemic awareness and phonics tasks made instruction easier. Teachers stated, “I feel like I was more methodical and deliberate in my teaching,” “after the inservice I felt like I’d actually been making green band harder (the way I learned to do blending)” and all teachers indicated they would recommend other general education teachers participate in the inservice for use of instructional enhancements with their students. Within RtI, general educators must be prepared to meet the needs of all students, and they have a significant role in RtI implementation. They are required to provide research-based core instruction, possess knowledge of evidence-based practices for remediation, and acquire a strong foundation in assessment and progress monitoring procedures (Brownell et al., 2010). Teachers’ opinions from the current study suggest that they (i.e., general education teachers) found it important to increase engagement of all students during instruction by embedding these instructional enhancements into instruction and that they would recommend other general education teachers participate in a similar training. These findings suggest that it may be beneficial for preservice and inservice general education teacher preparation programs to prepare teachers to meet the needs of students at risk by embedding research-based strategies into appropriate courses (e.g., reading, inclusion, introduction to special education) via instruction, application activities, and field experiences.

Finally, the research-based instructional enhancements used in this study are free (i.e., choral responding, error correction, MLT) or low-cost (i.e., response cards) and can be easily embedded into district or school-selected core curricula, and across academic areas. Further, they can be used to increase engagement of all students, not just those with

documented risk status or with disabilities. In addition, embedding these strategies into existing curricula does not require extensive teacher preparation; there is evidence that teachers can learn these strategies from high-quality inservice and follow-up coaching.

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## APPENDIX A: PRINCIPAL CONSENT FORM FOR PARTICIPATION IN EDUCATIONAL RESEARCH



### **Principal Consent Form for Participation in Educational Research** (Consent for 2012-2013 school year)

████████████████████,

The following information is provided to determine whether ██████ Elementary School would like to participate in a research study titled, *Effects of Multilevel Support on First Grade Teachers' Use of Research-Based Strategies During Beginning Reading Instruction*. As the principal of the school, you should be aware that you are free to decide not to participate or to withdraw at any time without consequences.

The purpose of this study is to investigate the effects of multilevel professional development support on teachers' use of research-based instructional enhancements during whole-group phonics and phonemic awareness instruction. Instructional enhancements include unison responding (i.e., choral responding, response cards), model-lead-test, and systematic error correction. A second purpose is to identify the impact embedding these instructional enhancements has on students identified at risk in reading. Anticipated outcomes will be teachers' confidence and ability to implement research-based strategies, increased opportunities for all students to respond during instruction, and a potential decrease in the number of students identified as at risk in reading. Possible benefits to students involved in the study include helping them make fewer errors during reading instruction and increasing phonemic awareness and phonics skills. The study will involve first-grade teachers who provide written consent to participate. The investigator will train the teachers how to embed the research-based instructional enhancements into beginning reading instruction. This training will occur during a half-day inservice. Following the inservice, teachers may receive follow-up support in the form of supervisory or side-by-side coaching. This study is a replication of the study that was conducted with your kindergarten teachers during the 2011-2012 school year.

Teachers will be required to audiotape green band instruction for data collection on use of instructional enhancements. Audio recording will occur each day during the regular

classroom routine. The investigator will make all attempts to minimize any disruptions to your school or the participating teachers' school day. The audiotapes will be used with confidentiality to collect data and for follow-up support only. Follow-up support in the form of coaching may also occur, and these sessions may be videotaped. These videotapes will be used as a tool for feedback when meeting with teachers. We may also use audio or video clips for teacher professional development to illustrate what we have learned from this study. The videos will not be used for general publicity, and teachers will have the opportunity to indicate if they prefer we do not use audio or videotapes for presentations or professional development in the future. Additionally, DIBELS data from teachers' current and former students will be collected (if the teacher taught first grade at [REDACTED] Elementary in the previous year). These data will be obtained from the [REDACTED] and will be de-identified (i.e., we will not be given the identity of the students). Teachers will also be notified that their performance in the study and possible need for follow-up support (i.e., coaching) will not be a part of performance reviews or evaluations required by the school.

Please do not hesitate to ask any questions regarding the research study prior to, during, or after the study. Once the study is complete, study results will be made available to you and participating teachers. Confidentiality for the school, students, and teachers will be strictly maintained at all times.

There are no foreseeable risks or discomforts to participants associated with this study. However, it is possible that unforeseeable risks do exist. It may be possible that teachers experience "psychological stress" if they feel anxious about being observed, evaluated, and/or coached. Benefits include increased knowledge of research-based enhancements that can be embedded into daily reading instruction, and a possible decrease in the number of students identified as at risk in reading.

Please sign this consent form if you agree for [REDACTED] Elementary School to participate in the study. A copy of this form will be provided to you for your records.

Respectfully,

Crystalyn I. Schnorr  
Doctoral Student

\_\_\_\_\_  
Name (PLEASE PRINT)

\_\_\_\_\_  
Signature

\_\_\_\_\_  
DATE

This study is approved for 1 year beginning on \_\_\_\_/\_\_\_\_/\_\_\_\_ and ending on \_\_\_\_/\_\_\_\_/\_\_\_\_.



## APPENDIX B: TEACHER INFORMED CONSENT FORM FOR PARTICIPATION IN EDUCATIONAL RESEARCH



### **Teacher Informed Consent Form for Participation in Educational Research** (Consent for 2012-2013 school year)

You are invited to participate in a research study titled, *Effects of Multilevel Support on First-Grade Teachers' Use of Research-Based Strategies During Beginning Reading Instruction*. The purpose of this study is to investigate the effects of multilevel professional development support on teachers' use of research-based instructional enhancements during whole-group phonics and phonemic awareness instruction.

#### **Investigators**

Data will be collected by the principal investigator, Crystalyn Schnorr, a doctoral student at UNC Charlotte who specializes in early literacy skills for at-risk learners. An associate professor, Dr. Charles Wood, is the responsible faculty for this research study. A second doctoral student will be trained as a second observer and will assist with data collection.

#### **Description of Participation**

You will be one out of up to nine participants. If you agree, the principle investigator will provide you with a half-day inservice. The inservice will be approved by the principal and conducted during a half-day of school with a substitute provided to cover your class. It will include a review of research-based strategies (i.e., unison responding, model-lead-test, error correction) as well as instruction on how to embed these strategies into the core *Imagine It!* curriculum during whole group literacy instruction. You will then be asked to incorporate these strategies into your daily phonemic awareness and phonics whole group instruction (i.e., green band instruction). We will ask that you audio record your green band instruction each day. In addition, you may have the opportunity to receive coaching which may include a brief pre-conference, supervisory coaching, side-by-side coaching during regular instruction, and/or post-conference feedback. Data will be collected throughout the course of the study to evaluate the effectiveness of the inservice and follow-up support. Additionally, DIBELS data (i.e., LNF, PSF, NWF) from your current and former (if you taught in [REDACTED] at the same grade level in the previous year) students

will be collected. These data will be obtained from the [REDACTED] and will be de-identified (i.e., we will not be given the identity of the students). Your performance in the study and possible need for follow-up support (i.e., coaching) will NOT be a part of your performance reviews or evaluations required by the school.

### **Inclusion Criteria**

Teachers will be selected based on the following criteria: (a) holds a North Carolina teaching license in elementary education, (b) teaches first grade, (c) has not previously taught a Direct Instruction (DI) program, (d) will be the primary classroom teacher during the study, (e) teaches whole-class literacy using an established researched-based curriculum; and (f) provides written consent to participate in the study.

### **Length of Participation**

This study will take place from September through December 2012/January 2013. The study will last approximately 2-3 months. Individual coaching will occur on an as needed basis. You may receive coaching only once or up to as many as 4 times with a coaching session occurring no more than once per week. Length of coaching will include approximately 20-min for the preconference, an observation during green band instruction for supervisory coaching, a side-by-side coaching session lasting the length of your green band instruction, and/or a 20-min post-conference. Pre- and post-conference meetings will not interfere with your other instruction and will occur at a mutually agreed upon date/time. At the end of the research study you will be asked to complete a short survey. This will provide information regarding your impression of the research (e.g., feedback regarding inservice and coaching, ease of implementation, and usefulness). This survey will take 10-15 minutes to complete.

### **Risks and Benefits of Participation**

There are no foreseeable risks to participants as part of this study. However, it is possible that unforeseeable risks do exist. It is possible that you may experience “psychological stress” if you feel anxious about being observed, evaluated, and/or coached. Individual participation will remain confidential. Potential benefits are acquisition of effective teaching strategies which may improve basic reading skills for at-risk students.

### **Volunteer Statement**

You are a volunteer. The decision for you to participate in this study is completely up to you and your confidentiality will be upheld at all times. If you decide to participate in the study, you may stop at any time. You will not be treated differently if you decide not to participate in the study or if you stop once you have started. You may also inform the researchers during or after the study if you decide later that you do not want your audio recordings or videotapes to be used for presentations or professional development training in the future.

### **Confidentiality Statement**

Any information about your participation, including identity, is completely confidential. The following steps will be taken to ensure this confidentiality:

- Your name will not be used in any final report or presentations that may be developed in reference to this study; instead all names will be replaced with pseudonyms.
- Any data collected (including audio and video recordings) will be stored on a password protected USB drive. Data will be stored in a locked cabinet in the principal investigator's office and will be accessed only by the experimenters listed in this document. Seven years after the conclusion of the study all data will be destroyed.

### **Statement of Fair Treatment and Respect**

UNC Charlotte wants to make sure that you are treated in a fair and respectful manner. Contact the University's Research Compliance Office (704-687-3309) if you have any questions about how you are treated as a study participant. Please contact the principal investigator, Crystalyn Schnorr ([REDACTED] or [REDACTED]), or Dr. Charles Wood ([REDACTED] or [REDACTED]), with any questions about the project.

### **Audio and Video Recording**

By signing this document you are also providing permission to audio record your phonics and phonemic awareness instruction daily. The audiotapes will only be used to record data on the use of instructional enhancements. In addition, you are providing permission for us to videotape your instruction at the conclusion of the study. Videotapes may be used in future presentations and/or professional development training outside of this research. The audio and videos will not be used for general publicity. Below, you have the option to "opt out" if you do not want your audio or videotapes to be used for presentations or professional development in the future. You may also provide a request to the investigators, should you decide at a later time (e.g., after the study has ended) that you do not want your videotape to be used for presentations or professional development.

### **Teacher Consent**

I have read the information in this consent form. I have had the chance to ask questions about this study and my participation in the study. My questions have been answered to my satisfaction. I am at least 18 years of age, and I agree to participate in this research study. I understand that I will receive a copy of this form after it has been signed by me and the principal investigator of this research study.

Please check one:

☐ I agree to participate in this research project.

☐ I agree to participate in this research project. However, I do NOT want video or audiotapes of my instruction used for presentations or professional development training in the future.

\_\_\_\_\_  
Teachers Name (PLEASE PRINT)

\_\_\_\_\_  
Teacher's Signature

\_\_\_\_\_  
DATE

\_\_\_\_\_  
Investigator

\_\_\_\_\_  
DATE

This study is approved for 1 year beginning on \_\_\_\_/\_\_\_\_/\_\_\_\_ and ending on \_\_\_\_/\_\_\_\_/\_\_\_\_.

**APPENDIX C: TEACHER PARTICIPANT DEMOGRAPHIC INFORMATION  
FORM**

The following is a set of questions designed to gather background information on your experiences as a teacher. Completion of this form will help me describe your teaching experiences. Please remember that your name will remain confidential and will not be used when describing this research study in the future. Thank you in advance for taking the time to complete this form.

**Name:**

**How many years have you taught?** \_\_\_\_\_

**How many years have you taught first grade?** \_\_\_\_\_

**Highest degree earned:**

**Additional certifications earned (if any):**

**What teaching licenses do you currently hold? Please circle/list all that apply.**

**Elementary (K-5/K-6)**

**Special Education: List category** \_\_\_\_\_

**Other** \_\_\_\_\_

**Have you ever taught a Direct Instruction program (e.g., Reading Mastery, Corrective Reading)?**

**If yes, which one(s)?**

**Have you ever been trained to teach a Direct Instruction program?**

**If yes, which one(s)?**

## APPENDIX D: GROUP INSTRUCTIONAL UNIT DATA COLLECTION FORM

Date	Data Collector		Teacher		Start Time	Duration
New or Continued GIU	Activity	Group Response (right check: opportunity provided to whole class; left check: missed opportunity)	Model-Lead-Test; Model-Test; or Test Only	Errors: Task Error, Unison Error, No Error	Controlled Response	Notes
<input type="checkbox"/> New <input type="checkbox"/> Continued		<input type="checkbox"/> CR <input type="checkbox"/> <input type="checkbox"/> RC <input type="checkbox"/>	<input type="checkbox"/> Model <input type="checkbox"/> Lead <input type="checkbox"/> Test	<input type="checkbox"/> T <input type="checkbox"/> U <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<input type="checkbox"/> New <input type="checkbox"/> Continued		<input type="checkbox"/> CR <input type="checkbox"/> <input type="checkbox"/> RC <input type="checkbox"/>	<input type="checkbox"/> Model <input type="checkbox"/> Lead <input type="checkbox"/> Test	<input type="checkbox"/> T <input type="checkbox"/> U <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<input type="checkbox"/> New <input type="checkbox"/> Continued		<input type="checkbox"/> CR <input type="checkbox"/> <input type="checkbox"/> RC <input type="checkbox"/>	<input type="checkbox"/> Model <input type="checkbox"/> Lead <input type="checkbox"/> Test	<input type="checkbox"/> T <input type="checkbox"/> U <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
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<input type="checkbox"/> New <input type="checkbox"/> Continued		<input type="checkbox"/> CR <input type="checkbox"/> <input type="checkbox"/> RC <input type="checkbox"/>	<input type="checkbox"/> Model <input type="checkbox"/> Lead <input type="checkbox"/> Test	<input type="checkbox"/> T <input type="checkbox"/> U <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
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<input type="checkbox"/> New <input type="checkbox"/> Continued		<input type="checkbox"/> CR <input type="checkbox"/> <input type="checkbox"/> RC <input type="checkbox"/>	<input type="checkbox"/> Model <input type="checkbox"/> Lead <input type="checkbox"/> Test	<input type="checkbox"/> T <input type="checkbox"/> U <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<input type="checkbox"/> New <input type="checkbox"/> Continued		<input type="checkbox"/> CR <input type="checkbox"/> <input type="checkbox"/> RC <input type="checkbox"/>	<input type="checkbox"/> Model <input type="checkbox"/> Lead <input type="checkbox"/> Test	<input type="checkbox"/> T <input type="checkbox"/> U <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
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<input type="checkbox"/> New <input type="checkbox"/> Continued		<input type="checkbox"/> CR <input type="checkbox"/> <input type="checkbox"/> RC <input type="checkbox"/>	<input type="checkbox"/> Model <input type="checkbox"/> Lead <input type="checkbox"/> Test	<input type="checkbox"/> T <input type="checkbox"/> U <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<input type="checkbox"/> New <input type="checkbox"/> Continued		<input type="checkbox"/> CR <input type="checkbox"/> <input type="checkbox"/> RC <input type="checkbox"/>	<input type="checkbox"/> Model <input type="checkbox"/> Lead <input type="checkbox"/> Test	<input type="checkbox"/> T <input type="checkbox"/> U <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<input type="checkbox"/> New <input type="checkbox"/> Continued		<input type="checkbox"/> CR <input type="checkbox"/> <input type="checkbox"/> RC <input type="checkbox"/>	<input type="checkbox"/> Model <input type="checkbox"/> Lead <input type="checkbox"/> Test	<input type="checkbox"/> T <input type="checkbox"/> U <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
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<input type="checkbox"/> New <input type="checkbox"/> Continued		<input type="checkbox"/> CR <input type="checkbox"/> <input type="checkbox"/> RC <input type="checkbox"/>	<input type="checkbox"/> Model <input type="checkbox"/> Lead <input type="checkbox"/> Test	<input type="checkbox"/> T <input type="checkbox"/> U <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<input type="checkbox"/> New <input type="checkbox"/> Continued		<input type="checkbox"/> CR <input type="checkbox"/> <input type="checkbox"/> RC <input type="checkbox"/>	<input type="checkbox"/> Model <input type="checkbox"/> Lead <input type="checkbox"/> Test	<input type="checkbox"/> T <input type="checkbox"/> U <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<input type="checkbox"/> New <input type="checkbox"/> Continued		<input type="checkbox"/> CR <input type="checkbox"/> <input type="checkbox"/> RC <input type="checkbox"/>	<input type="checkbox"/> Model <input type="checkbox"/> Lead <input type="checkbox"/> Test	<input type="checkbox"/> T <input type="checkbox"/> U <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
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Number of correct opportunities ____ / ____ Number of Total Opportunities ____ x 100 = ____ %						

*Note.* Adapted from “Effects of Tier 1 Enhancement Training on Teachers’ Percentage of Correctly Implemented Instructional Units” by A. G. Kretlow, 2009, Dissertation, University of North Carolina at Charlotte, p. 109.

## APPENDIX E: SOCIAL VALIDITY QUESTIONNAIRE (TEACHERS)

Teacher: \_\_\_\_\_ Date: \_\_\_\_\_

- Did you think the enhancements (i.e., choral responding, response cards, I do-we do-you do) improved your teaching during green band instruction (i.e., phonemic awareness, phonics)? Please explain.
- Please indicate the level of difficulty you had using the following enhancements.

<b>I Do-We Do-You Do</b>				
Very Easy <input type="checkbox"/>	Somewhat Easy <input type="checkbox"/>	Medium <input type="checkbox"/>	Difficult <input type="checkbox"/>	Very Difficult <input type="checkbox"/>
Please explain:				
<b>Choral Responding</b>				
Very Easy <input type="checkbox"/>	Somewhat Easy <input type="checkbox"/>	Medium <input type="checkbox"/>	Difficult <input type="checkbox"/>	Very Difficult <input type="checkbox"/>
Please explain:				
<b>Response Cards</b>				
Very Easy <input type="checkbox"/>	Somewhat Easy <input type="checkbox"/>	Medium <input type="checkbox"/>	Difficult <input type="checkbox"/>	Very Difficult <input type="checkbox"/>
Please explain:				
<b>Error Correction</b>				
Very Easy <input type="checkbox"/>	Somewhat Easy <input type="checkbox"/>	Medium <input type="checkbox"/>	Difficult <input type="checkbox"/>	Very Difficult <input type="checkbox"/>
Please explain:				



3. How helpful were the following training activities you received?

<b>Inservice (3-hr Workshop with Crystalyn)</b>			
Not helpful <input type="checkbox"/>	Somewhat helpful <input type="checkbox"/>	Very helpful <input type="checkbox"/>	
Please explain:			
<b>Supervisory Coaching Feedback Session (following green band observation)</b>			
N/A <input type="checkbox"/>	Not helpful <input type="checkbox"/>	Somewhat helpful <input type="checkbox"/>	Very helpful <input type="checkbox"/>
Please explain:			
<b>Preconference (15-20 min meeting before coaching session)</b>			
N/A <input type="checkbox"/>	Not helpful <input type="checkbox"/>	Somewhat helpful <input type="checkbox"/>	Very helpful <input type="checkbox"/>
Please explain:			
<b>Demonstration/Side-by-Side Coaching Session (co-teaching during green band)</b>			
N/A <input type="checkbox"/>	Not helpful <input type="checkbox"/>	Somewhat helpful <input type="checkbox"/>	Very helpful <input type="checkbox"/>
Please explain:			
<b>Feedback Session (10-15 min meeting following coaching session)</b>			
N/A <input type="checkbox"/>	Not helpful <input type="checkbox"/>	Somewhat helpful <input type="checkbox"/>	Very helpful <input type="checkbox"/>
Please explain:			

4. In what ways did the enhancements (i.e., choral responding, response cards, I do-we do-you do) impact your students? Please explain.
  
  
  
  
  
  
  
  
  
  
5. Did you notice a decrease in off-task behavior as a result of using the enhancements? Please explain.
  
  
  
  
  
  
  
  
  
  
6. Please describe any added effects the individual coaching had on your use of enhancements.  
(☐ Not Applicable)
  
  
  
  
  
  
  
  
  
  
7. Did the 3-hr inservice you received in phonemic awareness and phonics help you use the enhancements in any other academic areas? Please explain.
  
  
  
  
  
  
  
  
  
  
8. Did the demonstration and coaching session you received in phonemic awareness and phonics help you use the enhancements in any other academic areas? Please explain.  
(☐ Not Applicable)
  
  
  
  
  
  
  
  
  
  
9. Did you use the enhancements in any other academic areas? Please explain.

10. Do you plan to continue using any of the enhancements (i.e., choral responding, response cards, I do-we do-you do) in the future? Why or why not?
11. What challenges did you face in using the enhancements?
12. What changes would you make to the training and follow-up support (i.e., inservice, coaching)?
13. Would you recommend other teachers participate in this training for use of instructional enhancements with their students?
14. What materials/feedback/support would have made it easier to use enhancements in your classroom?
15. Any additional information/suggestions/comments you would like to provide?

*Note.* Adapted from “Effects of Tier 1 Enhancement Training on Teachers’ Percentage of Correctly Implemented Instructional Units” by A. G. Kretlow, 2009, Dissertation, University of North Carolina at Charlotte, pp. 110-112.

# APPENDIX F: INSTRUCTION SNAPSHOT

<b>Teacher</b>	
<b>Date</b>	
<b>Academic Area Observed</b>	

Mark an 'X' next to each instructional enhancement observed during the instruction snapshot:

- ☐ Using unison responding
  - ☐ Response Cards
  - ☐ Choral Responding
- ☐ Providing students an opportunity to answer independently (e.g., teacher not answering with students)
- ☐ Corrects students' errors immediately using model-lead-test or model-test format

**Comments:**

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## APPENDIX G: SOCIAL VALIDITY QUESTIONNAIRE (LITERACY FACILITATOR)

Date \_\_\_\_\_

*Please indicate your response to each item by circling one of the four responses on the right.*

Note: SA = strongly agree, A = agree, D = disagree, SD = strongly disagree, DR = definitely recommend, R = recommend, PR = possibly recommend, WNR = would not recommend, VP = very practical, P = practical, SP = slightly practical, NP = not practical.

Statements/Questions		Responses			
1.	Improving teachers' ability to engage all students during instruction is important for students at risk.	SA	A	D	SD
2.	Time spent training the teachers to embed instructional enhancements (i.e., choral responding, response cards, model-lead-test, error correction) into beginning reading instruction was adequate for effective teaching of skills.	SA	A	D	SD
3.	Involvement in the intervention would be appropriate for all teachers.	SA	A	D	SD
4.	The level of skill involved in the intervention is appropriate for these teachers.	SA	A	D	SD
5.	The multilevel professional development support for general education teachers is important.	SA	A	D	SD
6.	The multilevel professional development support for teachers helped to ensure each teacher was successful in applying what they learned at the inservice.	SA	A	D	SD
7.	Teachers' ability to embed research-based instructional enhancements increased during the intervention.	SA	A	D	SD
8.	Teachers' ability to provide increased opportunities for all students to respond during instruction increased during the intervention.	SA	A	D	SD
9.	As a literacy facilitator, it would be beneficial for me to identify teachers who need follow-up support after provision of a professional development activity.	SA	A	D	SD
10.	Identifying and providing support to those teachers who need it would be a more effective use of my instructional support time.	SA	A	D	SD
11.	Identifying and providing support to those teachers who need it would be a more efficient use of my instructional support time.	SA	A	D	SD
12.	To what extent would you recommend this training to other teachers (K-2)?	DR	R	PR	WNR
13.	If your school was given the training materials used for this study, to what extent do you think this intervention would be practical for a literacy facilitator to implement within the school setting?	VP	P	SP	NP
14.	Please provide any additional comments regarding the usefulness, effectiveness, and/or importance of this multilevel professional development support for improving teachers' implementation of practices learned and the impact on students at risk.				

## APPENDIX H: PROCEDURAL RELIABILITY CHECKLISTS

*Inservice Procedural Reliability Checklist*

	YES	NO	N/A
Researcher explains the rationale for increasing active student responding			
Researcher explains the critical features of choral responding			
Researcher demonstrates the choral responding procedures (live demo and video)			
Researcher provides opportunity for all teachers to practice choral responding			
Researcher provides specific praise to teachers during practice			
Researcher provides error correction to teachers during practice			
Researcher leads teachers in identifying places to use choral responding in teacher-provided phonemic awareness/phonics lessons			
Researcher explains the critical features of write-on response cards			
Researcher explains the critical features of preprinted response cards			
Researcher demonstrates the response card procedures (live demo and video)			
Researcher provides opportunity for teachers to practice using response cards			
Researcher provides specific praise to teachers during practice			
Researcher provides error correction to teachers during practice			
Researcher leads teachers in identifying places to use response cards in teacher-provided phonemic awareness/phonics lessons			
Researcher explains critical features of model-lead-test (I do-We do-You do)			
Researcher explains the critical features of error correction			
Researcher demonstrates the error correction procedures (live demo)			
Researcher explains the rules for correcting unison errors			
Researcher provides opportunity for teachers to practice error correction			
Researcher provides specific praise to teachers during practice			
Researcher provides error correction to teachers during practice			
Researcher instructs teachers to begin using enhancements in daily phonemic awareness/phonics sessions			

*Note.* Adapted from “Effects of Tier 1 Enhancement Training on Teachers’ Percentage of Correctly Implemented Instructional Units” by A. G. Kretlow, 2009, Dissertation, University of North Carolina at Charlotte, p. 115-116.

*Supervisory Coaching Procedural Reliability Checklist*

	YES	NO	N/A
<b>OBSERVATION FEEDBACK MEETING</b>			
Researcher states agenda of the meeting			
Researcher asks guiding questions to lead the teacher to indicate his/her strengths and weaknesses in embedding enhancements since inservice			
Researcher provides specific praise for at least one enhancement the teacher is implementing			
Researcher provides specific opportunities for improvement (based on lesson recordings and supervisory observation)			
Researcher and teacher review upcoming lesson			
If necessary, researcher explains how enhancements can be strategically placed into upcoming lesson to enhance activities			
If necessary, researcher asks guiding questions to lead the teacher to place enhancements for remaining activities in lesson			
If necessary, researcher demonstrates how enhancements can be embedded in one section identified by teacher			
If necessary, researcher asks teacher to model another enhancement that can be embedded in next lesson			
Researcher identifies up to three areas for teacher to focus on during upcoming lessons			

*Side-by-Side Coaching Procedural Reliability Checklist*

	YES	NO	N/A
<b>PRECONFERENCE</b>			
Researcher states agenda of the meeting			
Researcher explains demonstration/coaching process			
Researcher provides specific praise for at least one enhancement the teacher is implementing			
Researcher provides specific opportunities for improvement (based on lesson recordings)			
Researcher and teacher review upcoming lesson			
If necessary, researcher explains how enhancements can be strategically placed into upcoming lesson to enhance activities			
If necessary, researcher asks guiding questions to lead the teacher to place enhancements for remaining activities in lesson			
Researcher highlights up to 3 target behaviors for teacher to watch for during coaching session (e.g., MLT, EC, signaling)			
<b>DEMONSTRATION/COACHING</b>			
Researcher models each target behavior identified in preconference and when possible, across skills (e.g., EC for phoneme segmentation, EC for blending phonemes, EC for saying the wrong word aloud)			
Researcher models learning trials correctly (e.g., provides EC when necessary, does not lead on old skills)			
Immediately after modeling each skill, researcher prompts teacher to try at least 2 learning trials within the same skill			
Researcher gives specific praise to teacher at least once for each skill			
Researcher provides corrective feedback if teacher does not implement instructional unit correctly			
Researcher provides another opportunity for the teacher to implement an instructional unit after corrective feedback			
<b>FEEDBACK MEETING</b>			
Researcher provides specific praise for teacher performance during side-by-side coaching			
Researcher discusses the 1-3 target behaviors identified during preconference and demonstrated during side-by-side coaching session			
Researcher asks guiding questions to lead the teacher to indicate his/her strengths and weaknesses since side-by-side coaching session			
Researcher asks guiding questions to lead teacher to identify sections of upcoming lessons where she can embed instructional enhancements			
Researcher demonstrates (i.e., models) how enhancements can be embedded in one section identified by teacher			
Researcher asks teacher to model another enhancement that can be embedded in next lesson			
Researcher identifies up to three target areas for teacher to focus on during upcoming lessons			

*Note.* Adapted from “Effects of Tier 1 Enhancement Training on Teachers’ Percentage of Correctly Implemented Instructional Units” by A. G. Kretlow, 2009, Dissertation, University of North Carolina at Charlotte, p. 117.