

3-28-2018

## Effectiveness of Reading Intervention Program Types in Increasing Comprehension for Intermediate School Students

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# Effectiveness of Reading Intervention Program Types in Increasing Comprehension for Intermediate School Students

Donna Elizabeth Weikert  
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Concordia University–Portland  
College of Education  
Doctorate of Education Program

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Effectiveness of Reading Intervention Program Types in Increasing Comprehension for  
Intermediate School Students

Donna Elizabeth Weikert  
Concordia University–Portland  
College of Education

Dissertation submitted to the Faculty of the College of Education

in partial fulfillment of the requirements for the degree of

Doctor of Education in

Teacher Leadership

Audrey E. Rabas, Ph.D., Faculty Chair Dissertation Committee.

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Concordia University–Portland

2018

## **Abstract**

A quasi-experimental design investigated the effectiveness of three reading intervention types in increasing reading comprehension, both explicit and implicit, using a sample of 78 students, approximately 17% of the population of third through fifth grades at a single-school, rural, K-12, Central Texas school district with an enrollment of approximately 450. Data was gathered using the Development Reading Assessment (DRA2) and the Qualitative Reading Inventory (QRI-5), conducted during the first semester of the 2017-2018 school year. Reading intervention types included pull-out in a small group using part-to-whole language strategies, a computer-based reading intervention type, and an integrated reading intervention type using whole-to-part language strategies. Most students had a two-year growth in reading levels and an average of a 60% increase in reading comprehension implicitly, explicitly, or both. The strongest factor influencing outcomes was differentiation of reading intervention with a human element. Another strong factor was reinforcement of strategies integrating content and focusing on reading level of the student. Results of this study reinforce the need to intervene on an individualized level of the student, with relevant and meaningful content, and deliverable in a manner befitting learning style and preference. A framework for effective reading intervention program types is presented and supported by the results of this study. This study was unique because it investigated two types of reading comprehension, implicit and explicit, separately to determine the most statistically significant reading intervention type for intermediate students, grades third through fifth.

*Keywords:* reading intervention, struggling readers, differentiated, explicit comprehension, implicit comprehension

## **Dedication**

This dissertation is dedicated to all my former and future students who became my inspiration to do more, be more, and create more. I hope to have served you well in deepening your thirst for reading, as you develop self-efficacy and passions, and as you grow into the future you always imagined.

## **Acknowledgments**

I would like to express my deepest appreciation to my husband, Hank Weikert, who supported my quest for being the best advocate I can for students who need it most, my children who were patient and supportive of long work days and evenings, staff at both my previous district and current district who were encouraging and supportive of my impatience with systems and my drive to perfect them. My graduate professors who instilled in me a work ethic that is tireless and compassionate to the needs of many: Dr. Gwynne Ash fanned my passion for reading and grew my heart for struggling readers and pragmatic learning, Dr. Jane Saunders initiated my thirst for social justice and equitable programs for all in a socioculturally constructive way, Dr. Minda Lopez introduced third space and cultivated a need to create sociolinguistic harmony, and Dr. Carol Delaney fostered i-Search teaching, an embellished teaching toolbox, and furthered a critical thinking mindset focused on critical literacy.

I am profoundly thankful to Assistant Superintendent Erin Warren and Superintendent Tim Glover who accepted me, my proposal, and my passion for growing a love of reading in all of our students. With their support, I am excited to use this research to make our school the model for best practices in reading instruction.

I am genuinely grateful for my dissertation chairperson, Dr. Audrey Rabas, for her relentless passion for perfection that helped me be all that I could be as a researcher and student, my dissertation committee, Dr. Jill Bonds and Dr. Mary Robinson for all your wisdom, support and guidance as my dream became a reality, and my dissertation partner, Dr. Valerie Hoose, whose passion for perfection, drive to make a difference, and penchant for late-night researching matches my own.

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## **Chapter 1: Introduction**

### **Introduction to the Problem**

Reading scores for intermediate school students, grades three through five, demonstrate a 7% growth nationally and in Texas while scores for intermediate school students are on a decline, decreasing 2% nationally and 3% in Texas, according to the Nations Report Card (NAEP, 2015). State reading scores show only 45% of all intermediate school students tested in Texas met postsecondary readiness standard in reading, only 60% of intermediate school students in Texas met expected annual progress and only 16% exceeded annual progress expectations (Texas Education Agency, 2016a). The educational pendulum swings towards good practice and includes learner-centered instruction (Preus, 2007) but does not include best-practice and motivation for struggling readers beyond third grade (Rice, 2013; Vadasy, Sanders, & Abbott, 2008). Change occurs in teaching, in accordance with the proverbial pendulum, but a change mindset in most effective reading intervention programs has not occurred. Reading intervention is still focused on acquisition through third grade where a hopelessness sets in for those students not reaching reading milestones by the third grade (Pannell, 2012). Previous stale mindset supports “a student who cannot read on grade level by 3rd grade is four times less likely to graduate by age 19 than a child who does read proficiently by that time” (Sparks, 2011, para 3) even though a plethora of research supports a predictability model for struggling students. Kosanovich and Foorman (2016) offered suggestions for further academic intervention and testing. More needs to be done than predicting failure. Effective reading intervention programs need “ensure that each student reads connected text every day to support reading accuracy, fluency, and comprehension” (p. 73) because “reading proficiently by the end of 3rd grade is a crucial marker in a child’s educational development” (Why kids matter, p. 27) and be in place for

struggling readers before third grade, during third grade, and beyond intermediate school (K-3 reading: Communications toolkit, 2017).

The quandary is which intervention type is most effective and can best serve students. For educators, the choices are to revamp instruction to teach reading strategies within the classroom, create small group pull-out support based on reading comprehension gaps, or small group pull-out support for specific foundational skills. This research study searches for the answer and considers effects of reading, instruction, reading intervention, and cultural expectations on performance outcomes, instructional and intervention strategies, methodologies, and relationships between types of intervention and comprehension growth.

**Effects of reading.** Struggling readers continue to expand in the intermediate school setting. The skill gaps are growing exponentially and the chasm between on-level and below-grade-level reading is widening. If the chasm continues to expand, a torrent of skill gaps mixed with insecurities and low self-esteem of the reader may create a sinkhole. Analyzing a growth mindset perspective, Yeager et al. (2016) discovered direct teaching of students built relationships of trust and redirected their academic struggles to ones they can overcome.

Successful reading begins with a connection between the reader and the text. Motivation to read comes from an immersion into the story, into the information, or into the procedure the text promises. Intrinsic motivation to read is the most sustainable. Reading to discover a new character in a familiar series or development of plot brings a desire to continue to read; intrinsically. Extrinsic motivation is fueled by rewards attached to the duration of reading or the completion of reading task, usually supported by a parent or a teacher. Motivational theory describes how individuals work towards a goal and supports learning success (Hosier, 2009;

Yeager et al., 2016). Ash (2002) suggested students struggle with literacy as teachers struggle with making students' needs "a focus of instruction" (p. 2).

**Effects of instruction.** Successful reading instruction begins with differentiated learning and pedagogical practices. Teachers strive to change the way teaching impacts students using effective teaching strategies aligned to Vygotsky's (1978) scaffolding of instruction and processing activities aligned with Bloom's Taxonomy (Akey, 2007) throughout content areas and vertically aligned throughout intermediate school learning experiences. Engagement should reach beyond a typified transactional literacy model by discussion-provoking queries and modeling of rich discussion (Lapp & Fisher, 2010; Rosenblatt, 2005). Rosenblatt (2005) continued to promote relevant and meaningful exploration to promote culturally aware literacy development and Lapp and Fisher (2010) supported fostering habitual responses to the world around us, with a transactional mindset. Content introduced in 6<sup>th</sup> grade continues to be built upon, and scaffolded or weaved through 8th grade and in the future (Saunders, 2012). Using a growth mindset, instruction is allowed to foster and expand through discussion and experience and not corrected during the experience to build confidence in meaningful exploration (Hudley & Mallinson, 2010). Some sociocultural perspectives assume that the key to begin thinking about change and applying of world concepts is through modifying input and interaction techniques (Lightbown & Spada, 2006). Changing the learning mindset is key to changing educational outcomes. Students make choices based on a fixed mindset that is established through prior knowledge, personal experiences; culturally and socially diverse, generative, situational, and complex (Assaf & Delaney, 2013; Dweck & Leggett, 1998).

**Effects of reading intervention.** Successful reading intervention weaves differentiated instruction strategies, cultural awareness, and meaningful expectations into effective reading



intervention experiences. Reading Intervention strategies within classrooms are not all research-based or consistent between teacher groups. Teachers strive to personalize learning and differentiate instruction, based on the needs of the student. Instructional strategies may comprise of within context strategies, such as summarization, explicit detail recall, worksheet questions, discussion questions, graphic organizers, and students reading aloud with peers. Research supports the development of relevant instructional strategies that both teachers and students can access (Faggella-Luby, Schumaker, & Deshler, 2007) and embed into daily literacy, highly engaging learning experiences (Woodward & Talbert-Johnson, 2009), which are scaffolded to ensure deeper understanding of leveled texts. Vygotsky (1978) proposed “a divergence of concepts” (p. 55), a schema, to build a foundation of learning and internalization of behavior. Reading intervention is expected to be provided in intermediate school, prior to middle school, except for students identified with a reading disability. Students identified with a reading disability receive individualized support; students not identified do not receive any support. These *bubble* students are expected to read on or above grade level, keeping up with the depth and rigor state standards demand of students. Without appropriate and continued reading support, struggling readers are predicted to fail academically and socio-emotionally and not graduate high school.

Intervention outside of content classrooms occurred in pull-out programs, based on Response to Intervention (RTI) stages or Tiers. King, Lemons, and Hill (2012) suggested, “The studies of RTI at the intermediate level currently serve as the frame of reference for initial efforts in secondary schools” (p. 6). Motivation to use RTI to support struggling students comes from the reauthorization of the Individuals with Disabilities Education Act (2004) and the allowance of using student’s lack of progress, while using RTI strategies, as the determination of a student

having a specific learning disability (Fuchs & Fuchs, 2006). States do not require the implementation of RTI, but many are using the multiple tiers of increasingly intensive instruction in an attempt to prevent academic failure (Vaughn, Wexler, Roberts, & Barth, 2010).

Tier I is inclusive of in-class intervention support by classroom teachers. Tier II is Tier I plus additional frequency, duration, and intensity of instruction within the classroom. Support continues in both in-class and pull-out programs through Tier III where pull-out support increases in frequency, duration, and intensity. Research supports students receiving a tertiary, pull-out targeted intervention, over a consistent and lengthy period (Denton, Fletcher, Anthony, & Francis, 2006; Kim, Samson, Fitzgerald, & Hartry, 2010). Chapter 1 will explore current and relevant literature related to types of support for struggling adolescent readers, types of reading intervention, history of failure, and history of success. The conceptual framework for this study will be explored tying in theories to the problem and consequent purpose of this study.

**Effects of culture.** Successful reading intervention embraces the differences of each student and what experiences drive the reading culture in students and families. Cultural awareness includes not only language variations but economic variations and cognitive level variations as well. Variations in the way we use language may affect the understanding of academic and social language and nuances of language. Language variations include differences between primary and secondary languages that may merge into a tertiary language variation. Variations in socioeconomic status may affect access to language support beyond the school day. Variations in cognitive levels may affect processing speed of information, short-term memory retrieval and effective layering of learning. Students are individuals and as the student population varies and changes, there is a prerequisite to address learning needs to promote mastery of reading. Hudley and Mallinson (2010) discovered the necessity of adjusting teaching

to incorporate the voice and language variations of linguistically challenged and culturally diverse students to create new linguistic schema. Peercy, Martin-Beltrán, Silverman, and Nunn (2015) discovered collaboration is key in understanding how readers read, which shaped how to respond to language and cultural variations. Language variation plays a significant part in certain communities of learners and impacts making meaning for students affected. Economic variations also contribute to learning differences and views of literacy.

### **Background, Context, History, and Conceptual Framework for the Problem**

Previous research on effective reading and writing strategies for primary schools is intensive; availability of intermediate student research is lacking. Applicability to a variety of learning environments remains inconsistent (Flynn, Zheng, & Swanson, 2012) and further suggests increased and complex demands placed on students contribute to unsuccessful mastery of skills necessary to master academic content (Flynn et al., 2012; Woodward & Talbert-Johnson, 2009). Intermediate schools integrate reading and writing within content areas and have a separate block of reading and writing, focusing both on skill development and application beginning in early literacy throughout fifth grade, while secondary students often focus on literacy elements and not integrating reading and writing skills (Wuebbels, 2014).

The target of this study was the population neglected, the struggling readers. NAEP (2015) reported 36% of 4th and 34% of 8th grade students are proficient readers. The National Center for Learning Disabilities (NCLD, 2015) reported 1.22 million students repeated a grade and 76% had not yet been identified with a learning disability. Students identified with learning disabilities or English language deficits are usually identified by the end of first grade and are provided support in pull-out programs. Research reports positive cross-linguistic strategies transfer for children of certain native languages, such as Spanish and Italian (Lovett et al., 2008).

Research supports continued instruction in comprehension skill development with content enhancements and structured cognitive practice (Ko & Hughes, 2015). Research also explores if pull-out support is best or if integrated reading support can effectively be embedded using a variety of content curriculum to provide enough intervention to promote success (Boulay, Goodson, Frye, Blocklin, & Price, 2015; Vernon-Feagans, Bratsch-Hines, Varghese, Bean, & Hedrick, 2015).

### **Statement of the Problem**

Reading Intervention is a vital aspect of systematic learning for struggling students who need additional support in developing skills to improve comprehension (Boulay et al., 2015) and read at grade level. However, a problem lies in the determination of which types of reading interventions serve the needs of struggling readers. This includes best- guided reading groups, within the construct of core classes or pull-out program with intensive instruction delivered in small group learning environments; therefore, further research is needed.

Exploring ways to support students is relevant to increased expectations for students “being literate and productive member of society” (Akey, 2007, p. 23). With the declining reading scores and increased rigor in instruction, reading intervention practices need to be explored and infused into disciplines (Alvermann, Unrau, & Ruddell, 2013). The state of Texas has determined that rigor needs to be increased to match the national rigor of other countries resulting in widening of performance gaps in Texas. Nationwide, English instruction traditionally focuses on literacy, not isolated reading skills nor socio-cognitively (Gee, 2007). Students need to rise to the higher demands increased rigor presents and reading intervention needs to rise to the challenge of increasing comprehension of texts read in intermediate school for students struggling in reading skill mastery (Wilson, Faggella-Luby, & Wei, 2013; Wuebbels,

2014). There is an opportunity to review standardized reading scores and increase explicit and implicit comprehension by retooling reading intervention programs. What matters is providing students the best chance for success- at the intermediate level and beyond. This study aimed to determine best intervention types and change reading intervention perspectives and practice at intermediate levels.

### **Purpose of the Study**

The intent of the study was to analyze research-based intervention programs to discover the most effective reading intervention type for struggling readers in intermediate school. Improved systematic and targeted intervention, based on the reading needs of students, creates a personalized learning plan for improvement. Focusing on successful strategies and the most successful learning environment for each student promotes self-efficacy for the student, provides best practice support for educators and improves hope for positive literacy outcomes for the community of stakeholders.

Assessment drives change and is a necessary component of any proposed program (Brozo, 2010; Fisher & Ivey, 2006). Determining areas of need is imperative in providing relevant and purposeful instruction to fill in reading gaps, language acquisition, and generalizing reading skills to other content areas. Bennett, Gardner, Ramnath, & Council (2017) suggested “third grade may be too late to attempt meaningful gains” (p. 146). History, Science, and Math all need effective readers to navigate through content and discover meaning and purpose of curricula read. Struggling readers struggle not only in English class but across all content areas as well. Determining which intervention type serves student needs best will serve to change the way reading intervention is promoted in intermediate schools (Ralston, Waggoner, Tarasawa, & Jackson, 2016). My personal philosophy of serving students and facilitating their contextual and

constructivistic exploration of learning drives the conceptual framework that establishes this study.

### **Research Questions**

A quantitative analysis was used to research a variety of reading intervention programs and investigate which intervention type increases comprehension in struggling readers. Methods of intervention included overall reading skill development to enhance comprehension and the computer-based method, all are scaffolded, systematic basic language skills reading intervention that includes phonics and phonological awareness in applied skills in practices with oral reading and whole language application. The outcome of this study supports improvements and changes to existing and future reading intervention types provided for struggling readers. The following questions guide the exploration into the relationship between intervention type and increased comprehension:

RQ<sub>1</sub>: Is direct, pull out (part-to-whole) reading intervention effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment?

H<sub>1,0</sub>: Direct, pull-out (part-to-whole) reading intervention is not effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.

H<sub>1,A</sub>: Direct, pull-out (part-to-whole) reading intervention is effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.

RQ<sub>2</sub>: Is direct, systematic, computer-based reading intervention effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment?

H<sub>2,0</sub>: Direct, systematic, computer-based reading intervention is not effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.

H<sub>2,A</sub>: Direct, systematic, computer-based reading intervention is effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.

RQ<sub>3</sub>: Is direct, integrated-content (whole-to-part) reading intervention effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment?

H<sub>3,0</sub>: Direct, integrated-content (whole-to-part) reading intervention is not effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.

H<sub>3,A</sub>: Direct, integrated-content (whole-to-part) reading intervention is effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.

RQ<sub>4</sub>: What differences exist among three types of reading interventions, pullout, computer-based, and integrated-content in their effectiveness on implicit and explicit student growth in reading comprehension?

H<sub>4,0</sub>: There is no difference among three types of reading interventions, pullout, computer-based, and integrated-content in their effectiveness on implicit and explicit student growth in reading comprehension

H<sub>4,A</sub>: There is a difference among three types of reading interventions, pullout, computer-based, and integrated-content in their effectiveness on implicit and explicit student growth in reading comprehension.

### **Rational, Relevance, and Significance of the Study**

The results of this study may provide reading specialists and administrators a guide to develop reading intervention types, based on individual student need, and in a socio-constructivist or transactional manner and as a resource to consider integrating reading skill development into content areas to improve comprehension skills in all content areas (Kibler, 2009; Moll, 2014). This study can also help educators develop effective strategies for supporting reading development within the context of math, science, and social studies. Embedding reading skill support in all areas provides a layering of learning that is systematic and purposeful (Kosanovich & Foorman, 2016). Ko and Hughes (2015) purported reading success is dependent upon opportunities for “teachers to reflect on their own instructional practices with colleagues and using student data to drive their instruction decisions” (p. 434). Furthermore, instruction must match student need.

Previous research does not indicate a strong presence of transactional learning in intermediate school reading intervention programs nor constructivism learning in intermediate



school reading intervention programs. Deficiencies in research include types of successful reading intervention, the negative effect of cultural disconnectedness and reading progress, and the diverse population of pre-adolescent and adolescent struggling readers (Gainer, 2016; Kaminski, Powell-Smith, Hommel, McMahon, & Aguayo, 2014). It was the intention of the researcher to remedy these deficiencies and provide a study from which longitudinal studies may arise to determine long-term effects of skills developed in intermediate school and if these skills transfer to rigorous high school courses and post-secondary readiness skills.

### **Definition of Terms**

For the purpose of this study, conceptual terms related to literacy, reading intervention, and reading skill development that are integral and critical to this study are operationally defined.

**Balanced literacy.** Balanced literacy encompasses a variety of whole language and skills-based instruction with an embedded understanding of the reading and writing skills developed mutually (Shaw & Hurst, 2012).

**Best practices.** Best practices denote instructional strategies that are proven more effective with consistent results in recent research studies (Ko & Hughes, 2015; Marzano, Pickering, & Pollock, 2001).

**Comprehension strategies.** Comprehension strategies refer to specific and successful deepening understanding strategies within content texts used in classroom intervention and in pull-out models of instruction which commonly includes summarizing, questioning, monitoring comprehension, graphic organizers, story structure, explicit and implicit skill development, reciprocal teaching, making connections, and metacognition (Ash, 2002; Faggella-Luby et al., 2007; Ko & Hughes, 2015; McKeown, Beck, & Blake, 2009).

**Computer-based.** Computer-based is an intervention approach to reading and math intervention using systematic, program addressing instructional part-to-whole reading skills, such as phonemic awareness, phonics, fluency, vocabulary, and reading comprehension (Pindiprolu & Forbush, 2009; Reed, 2013).

**Cultural awareness.** Cultural awareness is a state of being when an individual aware that multiculturalism exists all around and that everyone has equitable rights that go beyond tolerance and is embedded in culturally responsive teaching and a collective sociocultural consciousness (Gay, 2010; Lapp & Fisher, 2010).

**Differentiated instruction.** Differentiated instruction is tiered instruction based on a student's level of understanding and needs without diminishing content (Gagliardi, 2011; Rosengarten, 2010).

**Explicit reading comprehension.** Explicit reading comprehension is recall of specific facts and details right there in the text read (Leslie & Caldwell, 2011; Peterson, 2016).

**Implicit reading comprehension.** Implicit reading comprehension is drawing inferences based on text evidence, implied or suggested but not clearly stated (Leslie & Caldwell, 2011; Peterson, 2016).

**Literacy acquisition.** Literacy acquisition is identifying how pre-adolescent and adolescent readers attain reading skills and the instructional shift from direct reading instruction to independent reading acquisition in intermediate school (Flynn et al., 2012; Hasselbring & Goin, 2004).

**Metacognition.** Metacognition is the ability to use prior knowledge to plan, problem solve, reflect, evaluate, and modify strategy, of a pending learning task (Akey, 2007; Ash, 2005; Edmonds et al., 2009).

**Part to whole instruction.** Part to whole instruction refers to a systematic approach to reading beginning with sounds or concepts in isolation and working up to skills instruction in the passage. Skills are usually acquired in isolation and generalized in whole passages (Joshi, Dahlgren, & Boulware-Gooden, 2002).

**Pull-out intervention.** Pull-out intervention occurs when students are pulled out into small groups targeting specific skills. Groups are either homogeneous by skill deficits or by grade level and consequently are heterogeneous by grade level or by skill deficits (Wilson et al., 2013; Woodward & Talbert-Johnson, 2009).

**Reading intervention type.** Reading intervention type refers to the specific program that focuses on eliminating skill gaps which may include pull-out strategic instruction in comprehension strategies to strengthen specific literacy deficits within content texts or to generalize reading skills within the content area texts (Klubnik & Ardoin, 2010; Woodward & Talbert-Johnson, 2009).

**Reciprocal teaching plus.** Reciprocal teaching plus is an instructional method that uses five reading strategies to improve comprehension: questioning, clarifying, predicting, summarizing, and evaluating (Ash, 2002, 2005).

**Response to Intervention (RTI).** Response to Intervention (RTI) is a targeted and systematic response system to the needs of struggling students. Tier I instruction is available to all students and is good instruction based on research-based strategies. After explicit instruction is delivered and the student is still struggling, the student receives Tier II instruction which includes Tier I plus additional support in frequency, duration, and intensity. If the student still struggles, Tier III intervention- increased pull-out or assigned 5-days-a-week support plus a

recommendation for further testing occurs (Kibler, 2009; Lim & Oei, 2015; Woodward & Talbert-Johnson, 2009).

**Scaffolding.** Scaffolding is the process of layering instruction across learning opportunities to deepen meaning (Foster, 2008; Hancock, 2012; Ivey & Fisher, 2006; Kim et al., 2010).

**Struggling reader.** Struggling reader refers to students who have not mastered literacy skills in decoding, fluency, and comprehension by intermediate school (Boulay et al., 2015; Nanda, Greenberg, & Morris, 2014; Paterson & Elliott, 2006).

**Transfer of learning.** Transfer of learning occurs when literacy skills transfer ownership from Teacher to Student and is usually done gradually over time (Foster, 2008; Ivey & Fisher, 2006).

**Whole-to-part instruction.** Whole-to-part instruction is reading support that begins with reading whole passages, then paragraphs, sentences, to sounds, as needed and only if needed. Students learn to decode and read in passages and build fluency through the context the words are in (Louanne, 2003).

### **Assumptions, Delimitations, and Limitations**

For the purpose of any study, it was important to consider assumptions, delimitations, and limitations prior to conducting the study. The study aligned to the participating district's vision of providing personalized learning experiences according to the determined educational need of students. The study, therefore, factored in several assumptions related to this study and addressed correlating concerns to mitigate any ethical issues that threaten validity, reliability, and fidelity of this study. Assumptions included expectations for teaching, organization of materials,

use in instruction and intervention, attention to classroom management consistency, and assessment of student need.

It was assumed that the teachers participating in this study have similar teaching strategies. Participating teachers had taught between 2 and 5 years, have completed similar teaching certification programs, and have been ingrained in the district's way of teaching. Teachers were vertically aligned with scope and sequence and have participated in professional development and modeling workshops to further develop instructional strategies. Teaching styles and instructional strategies may differ, but I further assumed, fundamentally remained the same.

It was assumed that the organization and presentation of material of participating teachers would remain consistent. Teachers have a history of vertical planning and implementing research-based strategies. It was assumed that teachers would base teaching on the needs of the students, as determined by school-wide assessments conducted by the Instructional Coach prior to the onset of the study. Teachers primarily use common assessments at the beginning and end of every term to evaluate mastery of unit of study and effectiveness of instruction.

It was assumed that classroom management techniques would be consistent and appropriate so that behavior and detractions from the study would not jeopardize the fidelity of intervention implementation. This is important to maintain so that reading deficits and consequent gains are a product of the intervention, not of classroom management techniques. School-wide positive behavior supports on every campus will continue to be supported and common expectations will be taught to students and modeled by all staff. Students will be expected to arrive on time and be prepared for instruction, as described by school-wide plans. Students will be versed in classroom expectations and expected to sign a social contract with the

teacher. Expectations will be made clear and concise and rewards for positive behavior will be part of the campus culture.

It was also assumed that students participating in this study were adequately identified with a comprehension deficit through initial school-wide screeners and that intervention groups were appropriately grouped. All students had access to research-based instruction and reading opportunities throughout the day, in every class. Independent reading opportunities are part of the emboldened literacy culture that was implemented during the school year of which the research took place. This is important for the fluidity of instruction to occur. Students not homogeneously grouped may become distracted if the momentum of instruction or intervention is interrupted by the need to reteach or revisit a concept for the minority of the class.

Delimitations naturally limited the school population to boundaries set forth by the researcher. Delimitations for the intermediate school remain the same, including qualifiers for small group assignment and participation in push-in integrated support. Delimitations pertaining to this study include organization of reading intervention groups, identifying the participating students, and the finite timeline of study. Delimitations contributed to the study's validity, reliability, and fidelity.

Delimitations in this study included participating students in reading intervention groups. Students needing reading intervention were identified by failing the standardized state assessment, assessed to be reading one to two grade levels below their peers, or identified as having a potential specific learning disability. Another potential identifier is through the Response to Intervention (RTI) process students still struggle after receiving Tier I and II support in the classroom. Students participating in a pull-out intervention program potentially benefited from more intense attention to reading skills than students participating in integrated reading

instruction in the classroom.

Reading intervention participation delimited the ability for other students to participate in reading skill development. Effective pull-out reading intervention was conducted in a small group setting of five or fewer students so not all students were able to participate in the same small group. Additional groups were not formed since no additional students were identified as struggling readers either through the RTI process or additional assessments. Integrated reading intervention is more likely to include other students through observation of skills taught or indulging in conversation with participating peers.

Delimiting intervention to research timelines may have hindered student progress for the remainder of the school year but allowed research outcomes to be reported within one school year and inform decisions for the following school year. Geographical delimitations of researching only intermediate school students in one district limited the breadth of correlational results. Delimiting the study to specific intervention types limited the connection between increased comprehension and intervention type, and fluency is supported, not part of the intervention, but a natural consequence of instruction.

Limitations in this study included unavoidable factors that may or may not affect validity, reliability, and fidelity of this study. Limitations are factors not controlled by the researcher and may occur naturally within the scope of the study. Limitations included cultural variations of participating students, fidelity of instruction across the participating schools, and prior knowledge or the reading context, which may skew baseline data. Limitations that were unforeseen and effect scope of this study, such as student mobility which decreased sample size, will be discussed at the end of the study.

Limitations concerning cultural variations of participating students included literacy

practices among participants outside of the school day, influencing outcomes but was unavoidable. Family literacy practices vary with culture and may or may not support increased comprehension of texts read. Repeated reading of a text is a strategy that increases comprehension and fluency and is an unavoidable consequence of increased family involvement. Proposed Family Literacy Nights were added to campus activities this year which may unavoidably influence posttest outcomes.

Fidelity of instruction was encouraged, but not guaranteed by participating teachers. The participating school district was determined to increase rigor in reading and math, focused on research-based instructional practice. Teachers were encouraged to think outside the box and create unique, empowering learning opportunities for students. Limitations of this teaching modality variation may or may not have influenced fidelity of reading intervention type across both campuses. Aligning of instructional styles were limitations of this study.

Prior knowledge of reading context may influence the baseline of the cold read and comprehension of the passage but was unavoidable in this study. Pre- and posttest reading passages in the Quantitative Reading Inventory (QRI-5) are designed to be of high interest and unique to the reader, but it is impossible to guarantee uniqueness of the passages to all readers. Increased district foci to reading skill development may encourage more independent reading beyond the school day and Family Literacy Night also increases exposure to literature, providing multiple opportunities for prior knowledge to affect assessment outcomes.

## **Summary**

The current study was inspired by a desire to make a difference in reading intervention for struggling students, in the absence of an established, effective program for struggling pre-adolescent and adolescent students. This study is grounded in the theoretical frameworks of



sociocultural constructivism and pragmatic learning (Moll, 2014; Peregoy & Boyle, 2000; Vygotsky, 1978), and behaviorism and transactional learning theories (Ash, 2002; Connell, 2008; Kibler, 2009). An implication of this study is that student needs vary and reading intervention must differentiate according to individual needs of struggling students (Cooks, 2002; Sanacore & Palumbo, 2010). Historically significant literature was reviewed and aligned with the intent of this study; using research-based instructional strategies in a variety of reading intervention-type programs to determine significance and effectiveness of each type.

The extent of literature in Chapter 2 is used to inform, analyze, and prepare the foundation for this study. Different types of reading intervention are explored as well as a variety of research methodological literature and a synthesis of research findings to inform this study. Chapter 3 details the methodology used to organize this research across two campuses. This quantitative study used a quasi-experimental design with convenience sampling to determine the relationship between reading intervention type and comprehension increases between pre-and post-tests. Chapter 4 will share findings and supporting data, while Chapter 5 will discuss outcomes and implications for future studies.

## Chapter 2: Literature Review

### Introduction

Teachers need to work together to provide reading support in all areas of literacy, spelling-reading, writing ability and efficacy across all content areas, using evidence-based practice to ensure the success of all learners. Effective change begins with observing present systems, analyzing past research, and preparing effective solutions to areas of concern. Observing the present systems for reading, it is noted effective reading programs do not necessarily transcend beyond third grade. Students are still struggling with reading skills. Analyzing previous research consists of looking for trends in successful strategies and solutions, considering theories that work, and projecting historical success on proposed intervention programs.

There is an alarming rate of students with the inability to read grade-level texts, as evidenced by state assessment data and compounding failure rates. According to the National Institute for Literacy, forty-five million Americans cannot read above a fifth- grade level and are considered functionally illiterate (Literacy Project, 2016, para 4). State assessments are sometimes viewed as an excessive assessment tool but reading scores in Texas showed a five percent decrease for intermediate school students and six percent decrease for intermediate school students on the last two STAAR state Reading assessments which aligned with content area failure rates.

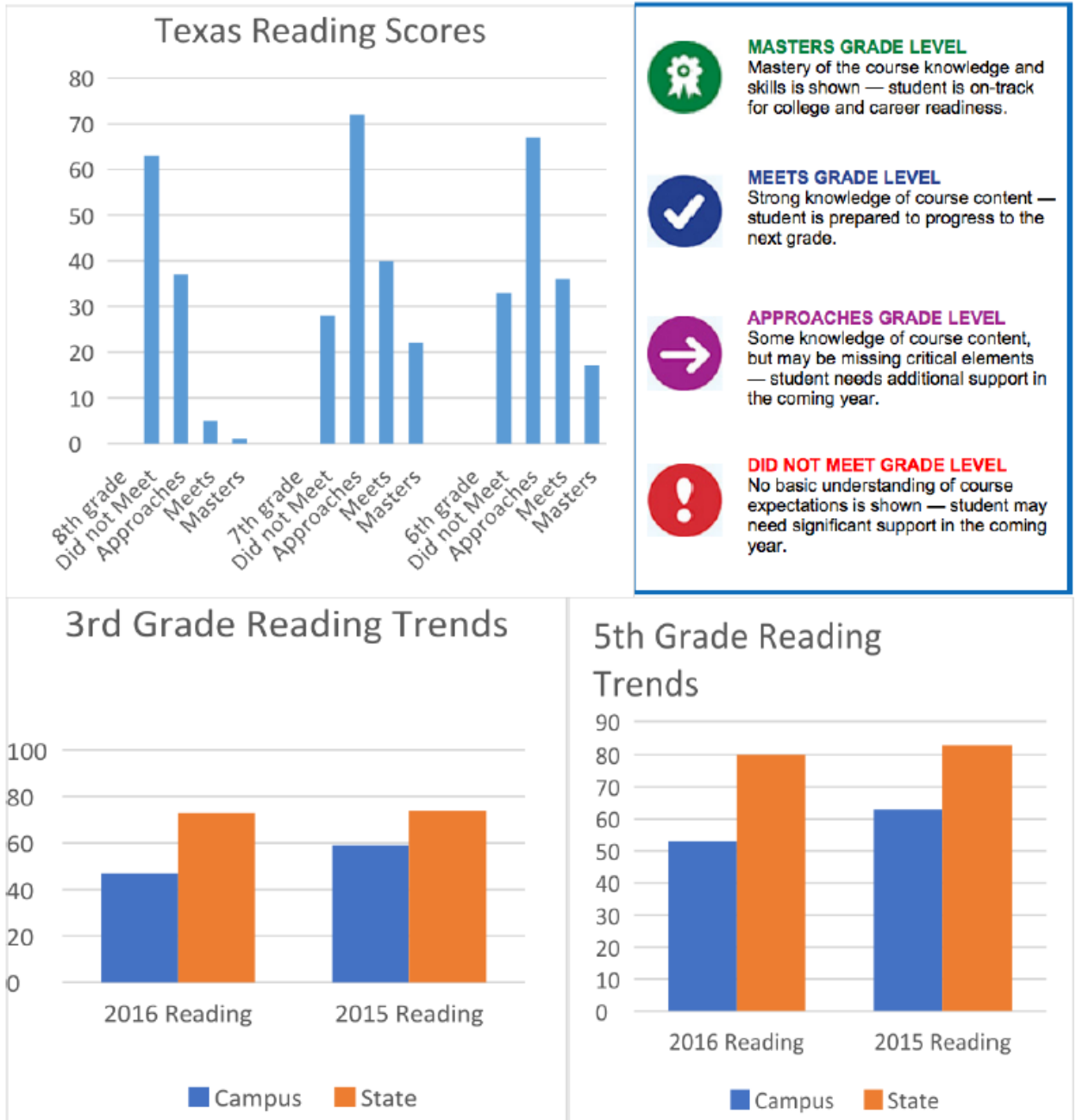
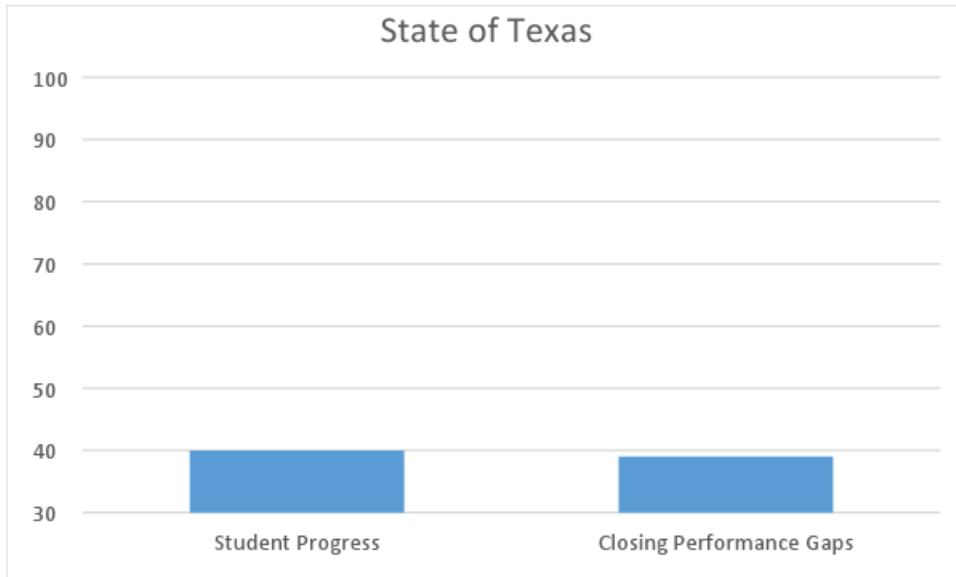


Figure 1. 2016 Texas reading scores and trends (Texas Education Agency, 2016a).



*Figure 2.* 2016 Texas student progress and performance gaps (Texas Education Agency, 2016a).

The Texas Education Agency (TEA; 2016a) reported that 73% of third graders met the reading standard of demonstrating a strong knowledge of course content, 74% of fourth graders met the standard, 80% of fifth graders met the standard, 36% of sixth graders met the standard, 40% of seventh graders met the standard, and 5% of eighth graders met the standard. The trend continues to decrease dramatically in secondary schools. Additionally, TEA reported that only 40% of students made progress and 39% of students closed performance gaps in 2016 (Texas Education Agency, 2016a). Failed scores and learning gaps impacted future class standing which affected future college and career opportunities for students. Brozo (2010) discovered an alarming rate of high school graduates are not prepared for college-level writing and approximately 40 percent of those do not have adequate literacy skills for the workforce.

Intervention is imperative at the intermediate school levels and provides systematic and targeted instruction for struggling students. Previously debunked theory stated that if students do not master reading by third grade, acquisition and mastery is impossible (Kosanovich & Foorman, 2016). As a transformational leader, I refused to accept that reading improvement

ends in childhood. I believed in the passion and power of motivation and self-efficacy, the effectiveness of engagement and self-discovery, and the individualization of learning stages in pre-adolescent and adolescent readers.

In analyzing programs and researching successful solutions of effective, research-based interventions; I came across a plethora of articles delineating areas of need and implications for future research. These two varying reading intervention models provided different types of support, and I researched the effectiveness of both models, pull-out and in-class reading intervention support. In the Literature Review section, I analyzed similarities/continuities found as well as dissimilarities or discontinuities found in current research in intermediate school classrooms. Guiding the reading intervention models are two different theoretical frameworks.

Socio Constructivist theory considers how students constructed their own learning through scaffolding, rich-discussion, and hands-on, targeted approaches. Vygotsky (1978) promoted Zone of Proximal Development to ensure discovery that supports learning. Moll (2014) motivated the transfer of learning from teacher to students and Gee (2001) described situational learning as the point where learning becomes a connectedness with culture. Clarke and Whitney (2009) suggested that instruction include “deconstruction, reconstruction, and social action” (p. 532) to immerse critical literacy in strategy development. Assaf and Delaney (2013) discovered “not all teachers will feel the same commitment to teaching critical literacy, we need to prepare them in ways that facilitate feelings of empowerment so that they can discover their own voices and teach to improve their world” (p. 162). As educators, reading instruction became marginalized by a single literacy approach instead of building upon students’ rich cultural diversity, social perspective, and background knowledge to create critical literacy experiences.

Behaviorism and Transactional theories considered the immersion of strategy development motivating students to dig deep and discover their social perspectives through literacy experiences (Lapp & Fisher, 2010). Critical Literacy development builds upon the voice, language variation, and situational experiences of students connecting meaning to reading (Gainer, 2016; Lapp & Fisher, 2010; Park, 2012). Transactionalism is the resulting schema that incorporated people, culture, and the flow of learning, and defined learning action as a connectedness to a third space. Third space, a place where culture informed reading choice and consequent reading experiences created a new reading schema (Jiménez, Smith, & Teague, 2009).

Success for struggling intermediate readers may lie in retooling the innovator's mindset, defined by Couros (2015) as a state of being where abilities are developed, alongside intelligence and talents, which lead to the creation of new ideas, or modern-day schema. Learning from research conducted and adapting successful strategies and solutions to current needs, effective reading intervention programs can be proposed. Socioculturalism, behaviorism, and transactionalism all have a purpose in forming our instructional methodologies and allowing students to form their own learning. Reading Intervention can be grounded in each one with differing presentations and outcomes. Determining the most effective intervention for struggling pre-adolescent and adolescent readers is the motivation in the current study.

### **Problem Statement**

It was not known which reading intervention type, pull-out and targeting instruction to specific reading deficits, computer-based, or integrated reading strategies within content texts, is most effective with intermediate school students struggling with reading skills. It was also not known which targeted instructional strategies work best to ensure deep meaning, comprehension,

and fluency development. Lapp and Fisher (2010) suggested textual exploration and learning how to critically traverse contexts are valuable learning experiences resulting in a gradual release of responsibility. Reading practice occurred naturally within the context of core classes but struggled with the pragmatics of reading—decoding, word recognition, and connecting meaning to context—hindered progress, the continuance of learning, and self-efficacy with reading with peers. Ash (2002) suggested a pragmatic framework to merge successful strategies and critical literacy. Reading Intervention changes in intermediate schools and traditionally does not include fluency development or decoding skills, nor does it traditionally include critical literacy approaches to reading. Intermediate school students who struggled tended to fall into gaps or chasms that stifled the enjoyment of reading and promoted barriers to learning. Considering the research-based strategies of Lapp and Fisher (2010) and Ash (2002), types of reading support should include exploring text, critical analysis of meaning, and foundational reading skill development.

### **Purpose of Reading Intervention**

Ultimately, the purpose of reading intervention is to meet student needs and help them learn and grow, as literate, positive contributing members of society. Constructively, as teachers improved their modeling of literacy instruction, students cultivated a literary culture mindset (Hancock, 2012; Tovani, 2004). Building relationships and a literary connectedness can be tantamount to the power of multi-literate customs and approaches to nurturing content knowledge, as well as reading and writing skills (Akey, 2007). When success is not achieved, pull-out reading intervention is the next logical step to bridging gaps (Boulay et al., 2015) and providing targeted reading instruction (Denton et al., 2006). Empowered learners (Nelson & Manset-Williamson, 2006) strengthened literacy skills (Faggella-Luby et al., 2007) in struggling

readers. Determination of need begins with assessment, considered engagement of student and strategies that promoted deep understanding of read text and a perspective shift of learning (Paterson & Elliott, 2006).

Building an influential and impactful instructional program begins with an assessment of skills and skill deficits and determining a remediation path to mastery of content (Flynn et al., 2012; Hwang, Lawrence, Mo, & Snow, 2015; Kibler, 2009). Constructing new knowledge necessitates experiencing literacy in a multitude of rich and meaningful ways. Experiential learning is best when prior knowledge is paired with new experiences in areas of high interest (Clark & Kamhi, 2014). Attaching new schema to successful reading and writing practices (Akey, 2007; Kaminski et al., 2014; Kibler, 2009) culminates in the power of transactional and transactional learning, where a third space existed (Jiménez et al., 2009).

Schema and Metacognition is promoted when students engage in developing literary strategy development (Ash, 2005) through explicit and implicit learning experiences transversely throughout the school day and immersed in content areas, in isolation (Akey, 2007; Ash, 2002), and in alternate educational and social settings (Allen-DeBoer, Malmgren, & Glass, 2006; O'Brien, Langhinrichsen-Rohling, & Shelley-Tremblay, 2007). The goal for elementary/primary school students is to master the pre-requisite decoding skills necessary for reading fluency. The goal for intermediate school students is promoted independence in thinking, learning, progressing; a perspective shift in responsibility. A journey towards independence includes a look into learning theory; a determination of how learning is achieved and the actions necessary to become successful readers.



## **Conceptual Framework**

The conceptual framework for this dissertation arose from my personal experience in the field of developing literacy competencies in intermediate school students, observations of effective and non-effective reading intervention strategies- in and out of the classroom, and research into increased motivation of student, rigor of content, and proven learning environments for fostered reading skills development in struggling readers. I am concerned with developing effective scaffolded skills in primary students and the state of readers in secondary students. Literacy competencies, reading and writing at or above grade level, seemingly faltered post-primary schools- when direct reading support, instruction and intervention ends. The previously acceptable practice of reading instruction and intervention through third grade only promoted gaps within struggling students. Students identified with a specific learning disability, such as dyslexia or Reading Comprehension or Written Expression, received accommodations and some direct support.

Within the context of this research, my position changed from English Teacher and Reading Interventionist to Reading and Dyslexia Specialist. I positioned myself to be a spokesperson for change in programs as well as instrumental in the direction intermediate to middle school interventions should be taken. I worked with esteemed colleagues on campus and off, attended professional development that supported my focus, extended my education through academic language therapist certification training at Rawson Sanders Institute, as I began to formulate my research theory and meshing theory with practice.

Personally and professionally, I also looked at my role as a Reading Specialist, a Master Reading Teacher, with a servant leadership heart and considered servant leadership theory as an enlightened path to creating empowered student leaders who are in charge of their own learning

with the guidance of a servant leader. Northouse (2013) suggested servant leadership transforms leadership to empower the leader to serve and the participant to lead while embedding a service orientation to the team. Patterson (2003) emphasized putting followers' needs first and Reinke (2004) focused on social responsibility. Servant Leadership is the sum of our whole. The following qualities define the core principles of servant leadership, as identified by Liden, Wayne, Zhao, and Henderson (2008) and discussed by many theorists, including Van Dierendonck and Nuijten (2011): courage, empowerment, authenticity, and humility.

Courage related to preemptive behavior and inferred generating new ways of learning (Van Dierendonck & Nuijten, 2011). Courage defined my decision to accept a new position as Master Reading Specialist in a new district with intense and definable reading needs, focusing attention on developing successful reading intervention programs. Borgmann (2006) detailed the importance of generosity—a combination of friendship, grace, justice and stewardship—and resourcefulness—a combination of wisdom, courage, economy, and design (p. 12). Courage explained letting go of control and allowing students to lead. Courage defined Socratic seminars where students engaged in critical thought and dialogue; analysis and cooperative stimulations, Project-Based-Learning (PBL) and Literature Circles led by students. It also defined pull-out, intensive instruction based on student need and not on norms of teaching.

Empowerment fostered self-efficacy and gave students the power to forge new schema (Van Dierendonck & Nuijten, 2011). Administration, teachers, and students empowered teachers to be pro-active and embed that behavioral trait into classrooms. Discovery learning, one of our campus goals, empowered students to take charge and ownership of their learning. The hard part is letting go of the control to facilitate and guide learning when direct teaching is completed. Servant leadership is the foundation of student-led learning, think-pair sharing, and

cooperative learning where the teacher lets the learner lead the way and notices when re-teaching is necessary. Student-led learning does not mean complete self-directed learning without guidance and formatively assessing mastery of learning. Student-led learning is different in primary and intermediate schools.

Authenticity, “being true to oneself” (Van Dierendonck & Nuijten, 2011, p. 252), is where the character of the leader shone. Authentic teaching is real, powerful, and selfless. Authenticity mandated that leaders looked at selves first for the selfless purpose of being honest. Authenticity evoked a real and natural response to the connections made to text self, and ultimately the world in which we live. Servage (2008) suggested this relevant communicative dialogue promoted “authenticity and sustainability...generated challenges to teachers’ identity integrity” (p. 71) consequently connecting teachers to students in a culturally responsive way.

Humility taught servant leaders to understand limitations, collaborate with others to transform limitations to strengths (Van Dierendonck & Nuijten, 2011). Healthy confidence required humility (Fullan, 2011). Students needed leaders to be confident in their vision, direction, and directives, but to remain balanced. Fullan (2011) stated effective change leaders exude confidence but appeared humble. It is a challenge to stay accountable to state indoctrinated standards and authentic in the delivery of instruction. Humility is accepting the inequities of instruction and feeling empowered to change. My passion for student success is my motivation to change myself as an interventionist and programs for students. The student and student’s need become the framework for change.

### **Theoretical Framework**

The theoretical frameworks that established the foundation in Pull-Out, Targeted Reading Intervention are Socio-Constructivism and Pragmatic Learning Theories that used Vygotsky and

Bruner to explore constructing learning through scaffolding interacting with Critical Theory of Freire, and Bottom-up/Part to Whole Theory of Louisa Moats which postulated mixing direct, targeted instruction in multisensory ways while allowing students to critically analyze words in context. Computer-based intervention demonstrated significant gains in phonemic awareness measures (Pindiprolu & Forbush, 2009) and deepened comprehension (Council, Cartledge, Green, Barber, & Gardner, 2016).

Select direct teach through repeated skill acquisition mixed with experiential learning activities allowed students to interact with each other and with text to make their own meaning, combine literacies, and expand their inquiry and developmental experiences. Conversely, the theoretical framework that establishes the foundation in Integrated Reading Intervention within content and embedded in contextual instruction are the Behaviorism and Transactional theories of Skinner, Rosenblatt, and conceptually of Bakhtin and Gee - Funds of Knowledge self-created out of shared and multiple experiences. Connell (2008) connected Rosenblatt and Dewey to the pragmatic transactional theory of constructing meaning through contextual repeated readings by ensuring a connectedness between the reader and the text. Alvermann et al. (2013) explored literacy's emerging practices incorporating theory into practical applications, connecting Rosenblatt, Bakhtin, and Gee to sociocultural theory and the importance of motivation and literacy advancement. Kibler (2009) studied the necessity of communicatively competent English learners "must acquire the structures of language in the context learned" (p. 18) through classroom instruction and academic discourse. Students created their own meta-cognitive space where reading strategies are used in context, as needed, and varied across contextual need.

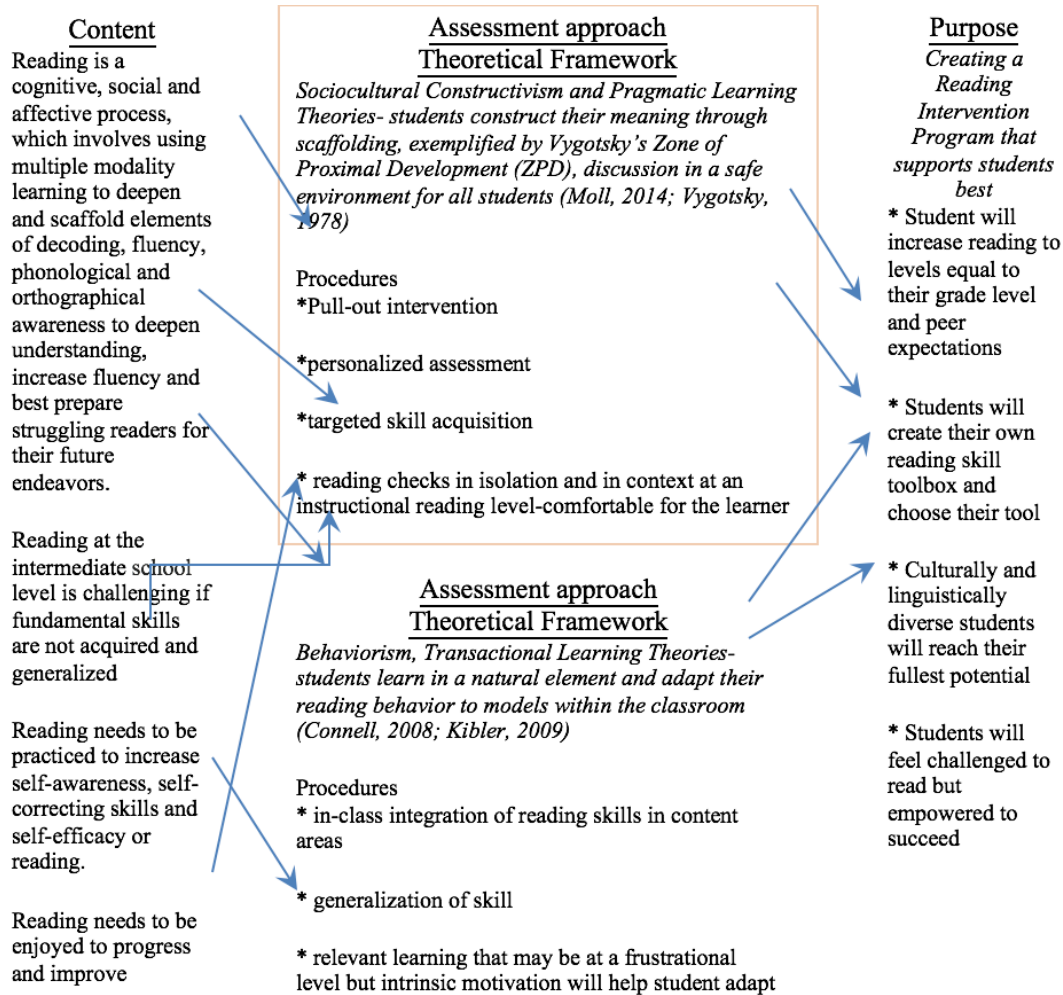


Figure 3. Reading intervention programs in intermediate school.

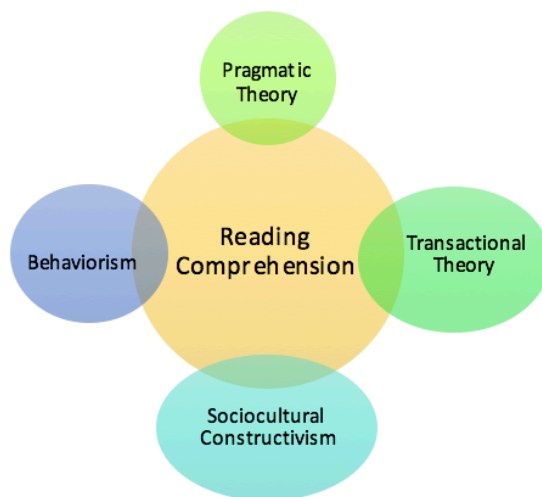


Figure 4. Reading comprehension.

## **Review of Research Literature and Methodological Literature**

**Reading performance.** Reading performance at the primary school level has seen a static to a decreased level of skill acquisition for English language learners, economically disadvantaged students, and many of the sub-pop groups. Struggling students participating in intensified reading instruction, layered instruction, and small group instruction have the best chance of success (Reed, Marchand-Martella, Martella, & Kolts, 2007). Darling-Hammond (2010) and Coutland and Leslie (2010) discovered literacy development disparity between educators who have received authentic professional development based on real needs of their students and intermediate teachers who attend national conferences that are generalized in developing instructional systems. A Professional Learning Community (PLC) is borne from the current need for relevant and meaningful professional development opportunities. Servais, Derrington, and Sanders (2009) discovered PLC to be the “most effective framework for student achievement and overall school success” (p. 11). Collaboration between novice and veteran teachers, using the PLC framework is a predictor of success (Jones, 2014).

Reading performance at the intermediate school level has seen a decrease in skill acquisition for Limited English Proficient (LEP) students, students in poverty, and students with special needs. Declines in student performance effects high school, college and career preparedness and quality of life for struggling students. Students are impacted by everyday events, from taking and sharing notes with peers, writing shopping lists, letters, or texts to friends. King et al. (2012) reported gains have not been demonstrated in intermediate school students in some time and as many as half of intermediate school students can only read basic texts. Short-term effects of reading issues included passing classes and self-esteem with peers, all related to the inability to hide reading deficits in intermediate school learning environments.

Long-term effects of reading issues included applying for a job, succeeding and advancing in a job, and continued self-efficacy concerns. Struggling readers improved in their compensatory skills and avoidance behavior as the years progressed, but actual reading improvement declined without targeted practice. Maynard, Solis, Miller, and Brendel (2017) found significant effects on cognitive performance, resilience, and stress measures for students receiving on-going targeted reading intervention but no significant effects on emotional problems. The reauthorization of the Individuals with Disabilities Education Act of 2004 allowed Response to Intervention (RTI) to identify students as having a specific learning disability. The IDEA Act of 2004 empowered practitioners to use a student's non-progress as data to support intervention and testing for students beyond primary school. Peregoy and Boyle (2000) suggested, in addition to "funds of knowledge and rich reading experiences in primary and secondary print reading and analysis" (p. 242), identifying similarities in the writing systems promoted positive transfer in decoding. Nationwide, students at the secondary level received a decreased amount of direct support for fluency and comprehension (Paterson & Elliott, 2006) and traditionally no support for decoding, spelling, and handwriting (Ritchey & Goeke, 2006). Identifying struggling readers at the intermediate school level and providing targeted and personalized intervention depended on the learning environment. Learning environment included "decreased opportunities to develop reading and critical thinking skills" (Paterson & Elliott, 2006, p. 387), strategies taught and used in context, and time spent acquiring skills versus generalizing skills within content areas. Ko and Hughes (2015) specifically addressed a variety of contexts that demonstrated mastery of reading skills interactively, intuitively, and practiced throughout a variety of constructs and contexts.

Improving reading begins in the classroom. Transactional Learning Theories suggest students learn in a natural element and adapt their reading behavior to models within the classroom in programs that embedded strategies and generalized skills through relevant content. Embedded literacy practice is a Tier I effective reading intervention (Ash, 2002). The least restrictive environment, where students are learning in clustered groups of ability learners and using skills within content, is part of good instructional practices, delivered by the classroom teacher and provided to all students. The effectiveness of improving classroom literacy-embedded instruction needs to be explored further. Joshi et al. (2002) suggested a multisensory learning approach contributed to the success of struggling readers. Parker (2012) supported transactional learning within the classroom and Macy and Bricker (2006) promoted need-based intervention in a naturalistic context.

Parker (2012) determined that targeted intervention in isolation was not successful in students with low initial reading skills and that embedded instruction, within the context of the content texts would be more appropriate. Suggested was that the variety of growth patterns matched the various initial skills and needs of students. It was determined that student needs must be determined prior to intervention programs to effectively match intervention with need. Successfulness may be contingent on the individualization and personalization of the reading intervention program.

**Types of intervention.** In the current study, types of reading intervention were explored, connecting theory, conceptual framework, and best practice to most appropriate intervention types. The conceptual foundation of reading intervention was suggested to have integrated specific skills, like spelling, into contextual literacy for decades (Ladky, 2005). As the pendulum swings, reading intervention shifts. From early basal readers inclusively in the classroom to pull-



out intervention in isolation, early intervention has been a part of literacy development in primary schools for many years, but only actively part of intermediate schools for the last decade or so. Historically, remediation was the norm for students determined to have a specific learning disability but not provided for students on the cusp of reading below grade level and comprehending only basic information. Cutts (1963) reported intervention in the fifties included remediation of spelling and phonics, oral reading and comprehension, in isolation, and transferred to the general classrooms in the sixties. Intervention was deemed important at the intermediate level through fifth grade, as the fifth grade was customarily part of the intermediate level. Educational practices suggested to improve reading skills included increasing library time, homogeneous grouping, reading blocks, and differentiation in reading instruction. Individualization and intervention beyond sixth grade were researched in the sixties but teacher comfort was considered and overwhelmingly not implemented.

Chilla, Waff, and Cook (2007) declared intervention reform, including small school, small group structure in the eighties morphing into standards-driven reform and test-based accountability measures in the nineties that led to the ultimate reform, the No Child Left Behind Act of 2001 (NCLB) and has been the model for instruction and remediation until recently. Every Student Succeeds Act (ESSA), implemented in 2015, creates a new vision where students set their own goals, teachers are not evaluated through student outcomes, and districts create evidence-based intervention plans for struggling students, to name a few changes and adaptations. Reading intervention has certainly evolved into a more productive, student-based program, but specific intervention types still remain untested, for the most part (Herman et al., 2017).

Review of literature noted three recently proven types of interventions. Two pull-out programs focusing on either specific deficits in reading and spelling aligned with the part-to-whole methodology or focusing on overall reading skill improvement aligned with whole-to-part methodology and one embedded intervention within the content area classrooms, aligned with the whole-to-part methodology. Descriptions of Pull-out and Computer-based Intervention Programs are provided in separate sections to follow. Sociocultural Constructivism and Pragmatic Learning Theories suggested students constructed their meaning through scaffolding, and discussion in a safe environment, a part to whole or bottom-up literacy approach where isolated skill instruction is the first intervention and literacy components are taught systematically until overall literacy skills are learned. Tier I intervention is in class, supported by the teacher. Tier II intervention is continued support by the teacher in a classroom with added instructional focus, homogeneously grouped by skill or grade level. Tier III intervention is Tier I + Tier II intervention, plus pull-out small group intervention with a reading specialist, increasing in frequency and duration.

***Pull-out program - Part to whole.*** Pull-out programs, using a part-to-whole approach use multisensory, teacher-driven activities or highly engaging, student-driven programs to develop phonemic awareness from the smallest unit of sound, phoneme, to words, sentences, paragraphs, and a story. This approach is used to dissect letters and sounds and build upon skills towards reading the whole language—words and sentences. Most skills are developed in the primary school (Rose & Zirkel, 2007; Woodward & Talbert-Johnson, 2009) but some students have not mastered this understanding and need extended support in intermediate school (Joshi et al., 2002; Pindiprolu & Forbush, 2009).

Multisensory, teacher-driven types of intervention deliver instruction in a systematic, fast-paced format where the teacher teaches and models, students repeat and practice in a variety of multisensory activities. Ritchey and Goeke (2006) evaluated the effectiveness of multisensory approaches to skill-based intervention, specifically the Orton-Gillingham (OG) systematic and phonics-based strategies to teach and interact with reading, spelling, handwriting, and comprehension instruction. Intense and targeted instruction includes: direct, targeted instruction in phonology, phonological awareness, morphology, and orthography within visual, auditory, and tactile learning experiences. Students participated in systematic and sequential activities until skills were mastered and overlearned, in other words, automatic where reading skills were automatically used correctly to make meaning or read words correctly. Skills and approaches were modeled, practiced, and used in a plethora of literacy platforms, within the construct of pull-out sessions in a small group intervention design. Limitations to the research findings included fidelity in the implementation of strategies across a variety of settings and the use of quasi-experimental designs for group studies instead of individual students.

Lim and Oei (2015) analyzed long-term skill gains and reinforced research findings that systematic and implementation with fidelity is key. Derivations of Orton-Gillingham systematic instruction may produce results, as long as it remained multi-sensory and consistent. Joshi et al. (2002) determined that implementing all components of the Orton-Gillingham approach yielded results in all aspects, phonological awareness, decoding, and reading comprehension while students focusing solely on reading comprehension strategies yielding significant gains in just explicit and implicit reading comprehension skills. Single-subject research design using pre-intervention assessment /post-intervention assessment on individual students successfully

attributed growth in reading skills during a short intervention window. Limitations of Lim and Oei's study included long-term effects of unknown interventions.

Rose and Zirkel (2007) analyzed the methodology of the Orton-Gillingham program and the effectiveness and validity of strategies in targeted intervention. Caution was given that although strategies were proven successful (Ritchey & Goeke, 2006), the fidelity of implementation and correlation between increased comprehension and intervention type was not established, and only the pretest and posttest scores were used to determine the success of the Orton-Gillingham methodology. Limitations of part-to-whole methodology are the generalization of skills not equally addressed by all teachers (Lim & Oei, 2015) and consequently, compromised fidelity (Rose & Zirkel, 2007). Another perspective of whole language acquisition and development is the whole-to-part language approach which mitigates some of these concerns.

***Pull-out program Whole-to-part.*** Pull-out programs, using a whole-to-part modality, begin instruction with components embedded in the story (Hemphill et al., 2015). Deep meaning, vocabulary study, and even some phonics attention are given through embedded content; teaching words within a story, within a sentence and breaking down words into smaller parts, like phonemes, and then read the words again in context. Strategies included in whole-to-part methodology include assessing reading in context with grade level text, using multiple strategies within reading grade-level text to determine specific need and plan to improve reading and comprehending skill (Ash, 2002, 2005; Hubbard, 2011; Reed et al., 2007). Extending a whole-to-part approach to reading fluency includes a repeated reading of a text, once corrections have been made (Lee, 2015; Parker, Holland, & Jones, 2013).

Hemphill et al. (2015) researched the second type of pull-out reading intervention, focusing on whole-to-part literacy instruction, which balances isolated skill development within whole text application, specifically reading comprehension strategies. Reed et al. (2007) reported significant gains in comprehension when students correctly identified as struggling readers received the relevant and meaningful intervention. Hubbard (2011) demonstrated significance for the Scholastic Reading Inventory (SRI) scoring method but determined the subsequent Read 180 program's effectiveness inconclusive. Ash (2002, 2005) proposed including five strategies: daily oral reading, word study, guided reading organized by flexible abilities, extended reading with texts of choice and explicit instruction of comprehension strategies, such as reciprocal teaching, making connections, and questioning. Ash (2002) did not disprove the validity of pull-out interventions by reading specialists but proposed success can be attained and scaffolded as part of daily instruction as a pragmatic framework where teachers and researchers work together and create programs designed for individualized and generalized literacy proficiency within content areas. Generalized literacy proficiency is the ultimate goal-acquired reading skills applied with automaticity in all content areas. This multi-component, multi-tiered instructional model was not empirically applied to special education and English language learners, so research limitations include generalizing results for all targeted populations.

Lee (2015) proved that familiar texts paired with direct instruction and rotely applied strategies improved comprehension. Similarity in passages has a history of proven success in comprehension studies. Parker et al. (2013) and Lee (2015) demonstrated that familiarity with questioning strategies support language development. Contrarily, Clark and Kamhi (2014) found no correlation between prior knowledge and comprehension score, using the QRI-4 and 5 and

testing instruments but suggested low-ability readers outperform high-ability when the content of passages is known. Scores remained consistent across narrative and expository passages.

Burns and Mosack (2005) determined increased acquisition rates occurred when standardized Curriculum-Based Assessment for Instructional Design (CBA-ID) following intervention implementation. Familiarity with test-taking strategies and answering consequent questions transfers within content and support comprehension in all areas, as well as suggests that constructivism and transactional learning theories simultaneously produce success. Limitations to whole-to-part methodology are other compounding factors interfering in deep understanding (Burns & Mosack, 2005), un-mastered targeted phonics skills (Lee, 2015) and, sometimes but not always, incorrect prior knowledge (Clark & Kamhi, 2014).

***Computer-based reading intervention.*** Computer-based intervention is a visually-stimulating and highly engaging method of delivering targeting practice through interactive platforms which vary from video and questions to game-based instruction. Council et al. (2016) connected high interested activities varying from phonics to whole passage comprehension practice and assessment. Repeated readings of a text and multiple opportunities to analyze and practice vocabulary in isolation and in context of the passage results in higher reading comprehension scores. Results of this study demonstrated high engagement increased social behavior and commitment to reading and consequently increased fluency and comprehension scores significantly. Pindiprolu and Forbush (2009) investigated the correlation between computer-based intervention and increased oral reading fluency, showing statistically significant gains in both oral reading fluency and letter naming fluency.

Contrarily, Reed (2013) discovered no significant gains in reading skills in analyzing the effectiveness of a computer-based intervention on comprehension and overall reading skills.

Worrell (2011) demonstrated that computer-based intervention programs did not affect comprehension significantly and gains in comprehension were inconsistent in both narrative and expository passages. Suggestions for future study include the skills of explicit information retrieval versus implicit comprehension on computer platforms and teaching computer skills to affect outcomes.

Woodward and Talbert-Johnson (2009) suggested success depends on the collaboration efforts between teacher and reading specialist, and the maturity of the students. Different students have different targeted needs and although clustering by ability is a growing trend, it is problematic to address the multi-faceted needs of struggling students without small-group reteach opportunities. Students reported that peer-mentoring and socialization opportunities improved self-efficacy and generalization of skills when they do not have the burden of keeping up with peers as they foster reading for comfort (Woodward & Talbert-Johnson, 2009). More data is needed to determine completeness of programmatic success.

Schumaker et al. (2006) illuminated the idea that student-led learning increased motivation to adopt reading strategies within the content. Pairing skill practice in independent and differentiated learning environments with integrated and generalized learning environments is challenging yet attainable in collaborative classrooms. Dedication and focusing instruction on skill deficits and providing rich and varied multisensory opportunities engages the learner and helps to scaffold the strategies.

Macy and Bricker (2006) identified skill deficits with a CBA and personalized intervention based on individualized needs of the student. Instructional strategies were effectively embedded in a naturalistic environment and results showed improvement in skill-based intervention compared to non-identified deficit intervention. Limitations to embedded

intervention within the classroom include lack of collaboration by teachers and reading specialist and suggestions to promote success include multisensory approaches to learning, differentiated learning environments, engaging activities, and scaffolded strategies throughout the school day where skills are learned, practiced, and refined.

### **Impact on Future Programs**

Common themes began to emerge while searching for relevant literature regarding successful reading intervention practices. All programs considered normed testing measures to determine the applicability of intervention to improve reading for struggling readers. Most programs focused on improving comprehension and eventual independence in learning, using multi-faceted instructional strategies to deepen the meaning of the content. The two themes that emerged during this literature search were regarding types of reading intervention programs at the intermediate school level. One theme was providing direct, targeted, systematic instruction in a pull-out, and intensive program. A contrasting theme was embedded reading skill development within core classrooms to provide the generalization of skill and the transfer of learning from pull-out to in-class interventions.

**Pull-Out intervention.** Social constructivism and contextual learning have important roles in pull-out intervention, prioritizing immediate feedback and increased opportunities to identify and reteach concepts, as needed, on an individual basis. Students learn in homogeneous groups (Goering & Baker, 2010) without the stigma of reading differently from peers and teachers can try a variety of strategies to increase engagement and evoke memory stimulation (Biggs & Watkins, 2008). Similarities in research encouraged dialogue to increase reading skills in small group learning environments while cultivating self-evaluation capabilities (Kibler, 2009; Tovani, 2004) and a desire to peer conference, where validation occurred through writing with



peer support (Cooks, 2002; Sanacore & Palumbo, 2010). Vygotsky influenced social constructivism where learning moved from “individual to the group - the era of socio-cultural and contextual influences on learning and instruction” (Alvermann et al., 2013, p. 1075). When interaction and dialogue occurred between peers, in the context of reading and writing, cultural meaning happened (Moll, 2014; Vygotsky, 1978).

Cooks (2002) discovered that tutoring learning environments improved literacy when paired with socio-emotional feedback. The improvement was attributed to not only skills acquired during small group learning environments but in the naturalistic immediacy of positive and negative feedback designed to identify weak areas of acquisition and provide re-teach, targeted opportunities to correct and acquire new skills. Improved literacy skills transferred learning to students, provided a transition to generalization-foci of learning in content areas, and increased self-efficacy in learning for students through rich, Vygotsky-inspired conversational opportunities. The teacher, now facilitator was able to utilize Vygotsky’s Zone of Proximal Development to promote learning as students “experience and socially negotiate meaning in the authentic context of a complex learning environment” (Hosier, 2009, p. 3).

Within small group learning environments, Sanacore and Palumbo (2010) argued for independent reading in content areas; balancing independent reading in a variety of textual experiences. Peer influence and modeling are pivotal to accepted new roles and new identities as readers and writers. Sanacore and Palumbo (2010) did not address the acquisition of skills or the necessitation of remediation of erroneous skill acquisition but purports generalization of skills acquired a key component in retaining and applying skills. Suggestions to improve literacy within content include contextual experiences, kinesthetic activities that build and activate vocabulary and metacognition. Promoting behavioral and cognitive habits translated into an

efficient literacy foundation serving a multitude of students and their needs, layering learning experiences and learning preferences.

Strategies discussed and successfully implemented in isolated, peer-conferenced, pull-out intervention groups were as follows: Phonological development, specific comprehension strategies taught with extensive vocabulary focus, and comprehension toolbox varying depending on need (Brozo, 2010; Hwang et al., 2015; Jacobs, 2008). Oral reading strategies within multiple literacies strengthened in content areas and in isolation improves self-efficacy in all literacy learning environments (Goering & Baker, 2010). Social-economical and components to self-efficacy must be addressed to ensure fidelity of learning programs (Holt & Smith, 2005; Smith & Hardman, 2000) and a variety of instructional strategies and environments must be tried to generalize skills once taught in isolation (Lovett et al., 2008).

Goering and Baker (2010) provided empirically grounded, reading content strategies affecting both reading fluency and comprehension further suggesting peer influence negatively supports reading growth when used in whole class learning environments. Intermediate school students were found to improve at greater rates when skills developed in isolation and in homogeneous groupings. Self-efficacy and a passion for reading were not supported when intervention was provided in-class and within content only. Direct support, such as pull-out homogeneous-skill small groups, was evaluated to be the successful model. Students were not ridiculed by peers but accepted for inequalities in reading and supported each other cooperatively and collaboratively.

Lovett et al. (2008) expanded upon the relationship between phonological and strategy-based instruction as separately developed skills, in context and in isolation. Success was only contrived by the generalization of decoding non-sensical and sensible interpretations of words in

remediation of content. Suggestions for scaffolded learning of skills were recommended as isolated skill development did not prove to be successful in pull-out intervention nor in contextual classrooms.

Biggs and Watkins (2008) introduced music into reading intervention groups with the hypothesis that singing technology programs, which exaggerated the language in reading increased reading scores in intermediate school students. The study found that isolated skills were mastered quicker than the control group and allowed for differentiated reading experiences, impacting motivation and engagement, while promoting successful reading outcomes. Additionally, Rother (2000) determined that musical aptitude and achievement are not related. Summarily, one does not have to have a high musical aptitude for musical intervention to influence outcomes. Limitations to pull-out intervention included non-naturalistic learning environments, interesting trials of alternate learning not widely accepted but innovative, and with focus on skill acquisition, scaffolded learning not successful.

**Integrating strategies within content texts.** Embedded intervention occurs when literacy enriched lessons are taught within other subjects, such as math, science, and social studies. Research suggested metacognition occurs through integrated reading and writing experiences that scaffolded and generalized skills within all content area texts (Foster, 2008; Hancock, 2012; Ladda & Jacobs, 2015; Wuebbels, 2014;) while other articles supported independent, individualized small group learning environments where targeted strategies were taught and assessed, based on individual need (Nanda et al., 2014; Schumaker et al., 2006; Wilson et al., 2013). Categorically, it was discovered that success in increasing comprehension is determined by the combination of explicit teaching and implicit opportunities for practice

simultaneously resulting in improved reading and writing duration while creating self-efficacy in students (Akey, 2007; Allen-DeBoer et al., 2006).

Strategies discussed and successfully implemented within content suggested are as follows: Reciprocal Teaching, Reciprocal Teaching Plus, Writing Workshop, Journal Writing, and Peer Conferencing, also included in Writing Workshop (Ash, 2005; Boulay et al., 2015). Ash (2005) suggested a pragmatic framework that incorporated rich literacy reinforcing activities used within content areas provided a solid foundation in reading. Keys to success included building skills in critical literacy and providing flexible groups, self-selected extended reading and writing with the inclusion of explicit instruction in comprehension strategies. Essentially, combining pull-out and contextual support helped build a solid foundation in literacy.

Students engaging in transversing reading strategies throughout content areas benefitted from interactive dialogue promoting higher order/critical thinking skills, relationship building with peers and teachers, and ultimately improved comprehension. Suggestions to enrich literacy content by introducing *Graphica* as a meaningful content also was empirically based (Jacobs, 2008). Aspects such as modeling reading behavior and knowing the learner increased independence in learning, facilitating success in personalized learning, and success in multi-tiered instruction within the content area classrooms (Louanne, 2003; Lovett, Steinbach, & Frijters, 2000). Development of metacognition is a positive side effect of embedded intervention. As students navigated through layered strategy experiences, deep understanding occurred.

**Cultural interference and responsiveness.** Taking risks in learning are deemed academically responsive to needs of students. Incorporating cultural norms and expectations are deemed culturally responsive to the uniqueness of students. Engaging students in empathetic and

transformative thinking enables literacy instruction to become meaningful to the individual student. Wuebbels (2014) determined the effectiveness of reading and writing across the curriculum, provided scaffolding to deepen understanding, and raised awareness of literacy struggles in intermediate school students. Ladda and Jacobs (2015) suggested a multisensory approach for math fluency provided multi-layered literacy learning. Schumaker et al. (2006) addressed concerns for at-risk adolescents' performance gap in literacy acquisition. Gay (2010) introduced culturally responsive pedagogy as equal accessibility for all students where students engaged in critical thinking strategies that included "analytical, reflective, and transformative thinking" when interacting with issues and with texts (p. 39).

Culturally responsive teaching embraced differences with a celebratory modality. Students identified as at-risk included English learners, low socio-economic students, and students with special needs. Strategies were introduced, mastered at fluency above grade level, and generalized throughout content courses once skills acquired during systematic, targeted, small group instruction was proficient. Nanda et al. (2014) provided reliable and valid research findings to further support systematic phonological skills development in small-group, pull-out instruction prior to generalized support in the classroom and within the content. Wilson et al. (2013) suggested that Tier 3, targeted small group, pull-out or assigned small group instruction replacing an elective course or study hall needs to be more than just increased time reading. Quality of instruction is as vital to decreasing performance gaps, as is quantity of support. Hwang et al. (2015) identified that former English language learners, now re-designated as fluent English proficient, while benefitted from targeted pull-out interventions for language acquisition, varied in the success of generalization of English proficiency. Suggestions included continuing

pull-out interventions to determine the longevity of effectiveness and ability to transfer knowledge across contexts.

Jacobs (2008), contrarily, discovered that a continuum of historical effects depended on the contiguous and continuous relationship of skill and process instruction in reading skills. Important aspects of literacy metacognition depended on modeling support, communication of expectations and strategies and transference of control of learning in pre-adolescent and adolescent learners. Childs (2013) demonstrated the connection between learning environments, language proficiency (L1 or L2) to successful outcomes on reading achievement tests. Interesting to note, reading interest did not factor into success or mastery of reading skills. Students who loved to read scored in the same range as those who did not like to read.

Holt and Smith (2005) enlightened the effects of socioeconomic and cultural factors that interplay with literacy development. Exposure to literacy in a variety of contexts was not sufficient to decrease literacy performance gaps but increased third space development. Students felt empowered by their environment but the significance of self-efficacy in appropriate social environments did not outweigh achievement gaps in literacy.

Smith and Hardman (2000) evaluated socioeconomic and cultural nuances embedded in multi-literacy contexts and found possible predictors of success related to training of teachers. Teachers balked at receiving additional training, which may have minimized implementation fidelity. It is important to have teacher buy-in, so strategies modeled are accepted by both teachers and students. Suggestions included the inclusion of teacher feedback and stressed importance of instructional Literacy strategies so as not to impact outcome without incurring bias effects. Additional consideration for English Language Learners' literacy needs impacted intervention programs. Consideration of all participants contributing factors needed to be

addressed so that programs addressed all needs, not just literacy needs. Factors to consider include socioeconomic status, family literacy abilities, and cultural norm discrepancies, that all culminated in forming a partnership between the school and home.

Connections between language, experience, and situated action created meaningful interaction (Gee, 2001). Calkins (2000) eloquently suggested that an organizing literacy vision merged separate components into something vital, meaningful, and inspiring. When organization occurred, the “reader becomes writer, critic becomes participant” (Graves, 1980, p. 201). When interaction and dialogue occurs between peers, in the context of reading and writing, cultural meaning happens (Moll, 2014; Vygotsky, 1978). Cultural meaning also happened through cultural and community development. Making connections between family and school created a continuous loop of support for students. Understanding differing cultures and values and working collectively to create a better community is an important concept for students to develop.

**Professional development and teacher support.** Developing successful programs includes developing teachers. Highly effective teachers need to grow personally and professionally and practice new strategies applicable to student need to create a foundation for learning. Response to Intervention (RTI) responds to student and teacher needs. Increasing teaching toolkits with research-based strategies empowers the teacher and strengthens in-class support. Professional development becomes the tool to individualized learning for the teacher. Snow, Burns, and Griffin (1998) suggested, “there is an important correlation between the professional development of teaching staff and response of a student to intervention” (p. 273). Research further shows that employing highly qualified teachers who thoughtfully organize classrooms creates successfully motivated readers and promotes self-efficacy. Saunders and Ash

(2013) noted, “In the figured world of schools, there is an expectation that teachers continue to grow as professionals and serve their schools beyond the workday” (p. 494).

Bandura defined self-efficacy in his Social Cognitive Theory as belief in personal abilities. “Self-efficacy can be developed through modeling and social persuasion (Freudenberg, Cameron, & Brimble, 2010, p. 3). Vygotsky proposed academic or scientific concepts and personal/everyday concepts work together to build a foundation for learning (Au, 1998). Gagliardi (2011) demonstrated instructional improvement depends on teacher implementation and is critical to student achievement and Rosengarten (2010) determined that matching instruction need to instructional program is effective only in the presence of an RTI monitoring system.

Brozo (2010) further suggested that reading intervention type did not assume success as much as the structure and operational definition of the Response to Intervention (RTI) model of support. Support begins with the content teacher but the tiered process, progressing from Tier 1 intervention in-class support to Tier 3 pull-out, direct and targeted intervention may be flawed. Suggestions for improvement lay in the timed process of additional support, as needed, and the dependence on the structure and not the differentiated instruction cultivating an interference and hindrance to learning when Tier 1 intervention or in-class support is not continued when Tier 3 support is introduced. If teachers stop in-class, individualized support, then Intervention is disjointed instead of scaffolded. Saunders (2012) described scaffolding as “openings of a series of pathways or passages that lead students to places of understanding” (p. 3), cautioning the static use of the term zone of proximal development and scaffolding. Saunders suggested teachers “must layer in multiple ways for students to come to that knowledge, and that teacher must maintain a willingness to let students grapple with difficult concepts repeatedly and



collaboratively until they truly internalize their learning” (p. 3). Brozo (2010) determined that the RTI model looks through a disability lens that disables a reader by cultivating a culture of failure instead of cultivating a culture of success by maintaining classroom learning integrity and embedding reading skill development in-class and in the context of the coursework learned.

Boulay et al. (2015) provided a plethora of intervention research that explored intervention for improving achievement in struggling reading and writings. Determining the format of effective interventions, studies were dissected to enumerate causes for reading difficulties. Comprehension gaps and inefficient reading habits constituted the primary causes for gaps in literacy competence. Suggestions to close the gaps included targeted reading intervention in a pull-out and in-class support to generalize acquired skills and reinforce social-emotional applicability of improved comprehension and essentially an established metacognition; absorption of all skills resulting in deep understanding. Similarities of research determine that intervention is vital to prepare intermediate school students for their future. Determining the most effective reading intervention program was the focus of this study. The discontinuities in the research were inconsistent support from administrators that impacted professional development opportunities, which impacted fidelity of implementation. Not all campuses were given the time to prepare, the learned, effective comprehension strategies to implement, and the support for supplementing content area instruction with reading and writing practice. Vernon-Feagans et al. (2015) demonstrated the effectiveness of webcam coaching for specific skill development in cases where face-to-face coaching was not feasible. In situations where support was not available but a re-teach of instructional strategies was needed, webcam or distance coaching proved useful. Pull-out intervention had the most support as it was the primary focus of the Reading Specialist and Dyslexia Teacher’s job description when designated.

Professional Development opportunities were provided off campus at the expense of a personal day for the teacher. It is unclear if this unsupportive trend will continue regarding the provision of reading intervention professional development for teachers and interventionists. Current research shows a change in national administrator response to intervention need (Brozo, 2010; Lim & Oei, 2015; Shaw & Hurst, 2012) yet disparity remains as to which intervention is most effective.

Dissimilarities in the articles include teaching in isolation that hindered collaborative, team-oriented, cultural transformation in schools with special needs students (Hancock, 2012; Rogevich & Perin, 2008). Hancock (2012) presented evidence that refuted the positive effects of Reciprocal Teaching Plus Strategy in classroom applications. Rogevich and Perin (2008) proved that self-regulation of strategies throughout the day in all classes improve generalization in more complex text. Students with comorbid factors, such as Attention Disorders demonstrated mastery of skills when practiced in context compared to isolation. Effective instruction required students to use critical thinking skills to deepen and broaden understanding (Marzano et al., 2001) no matter what the learning environment (Allen-DeBoer et al., 2006). Teachers have an innate variety of skills that offer both advantages and disadvantages to the implementation of reading and writing across the curriculum (Tovani, 2004). In the absence of appropriate training and preparation, teachers pose a threat to the fidelity of Transference of Learning ability in students (Ivey & Fisher, 2006) and the self-efficacy of teachers in making a difference (Wuebbels, 2014).

**Transformative educators and community metacognition.** Transformative learning begins with critical thinking and a growth mindset. Changing instruction from the way it has always been done to innovative and individualized takes a growth perspective, a newly designed

habit of mind. Yeager et al. (2016) defined the need for using design thinking to improve intervention and demonstrated that an iterative, user-centered design improved a learning mindset and consequently deepened understanding. Critical thinking is a cocktail that includes tangy critical reflection and rich transformative learning to create distinct adult learning opportunities. Analyzing habits of mind, synthesizing new beginnings, foreshadowing different endings, and “acting on insightful products of transformed meaning making situations” (Mezirow, 1997, p. 6) allowed for critical thinking to bring about change. Brookfield’s (2009) statement the “best teaching is critically reflective” (p. 2), supported collaborative learning, making meaning of assumptions, and facilitating change to instructional formats and implementation of strategies. Hochanadel and Finamore (2015) suggested success is achieved when a growth mindset is fostered by educators and when the persistence and desire for personal achievement are applied to literacy development. Changing the way teachers teach and students learn created learning solutions and hope for success.

Change involving an analytical format of reflection deepened understanding of teaching effectiveness or ineffectiveness. Balancing assumptions and preconceived notions with new information facilitated, motivated, and transformed ideology, and promoted change. Darling-Hammond (2010) proposed higher-order thinking and performance skills development as prudent to prepare students for international competitiveness. Much like the impact community connections make on teachers and the consequential instructional shift that occurs, instruction extended beyond the school day. Importance needed to be given to the whole child; the child who has different discourses, different spaces and different cultural, social, and political identities must be embraced to affect students. Educators have the power to change not only educational parameters but change the focus of students’ lives. Shifting power to the students,

allowing the students to lead the journeys of learning, helped create a new world in which they live. Establishing critical literacy ideals which progress over time and teachers changing instructional styles through collaboration defined instrumental and communicative learning as situational and complex.

### **Review of Methodological Issues**

Research methodologies champion for the most effective outcome in a study; one that minimizes risks and maximizes benefits. Feasibility of study, appropriateness of design and applicability of methods employed are all components that will be discussed in this section. Many research designs were used and successful interpretations of data collected in past studies. Ethical use of participants and limitations based on the choice of design that may have influenced the outcome of a study were also addressed.

#### **Quantitative design.**

*Strengths.* Quantitative research effectively designs assessment to prove tiered interventions, pull-out and in-class support are beneficial instruments of learning. Hemphill et al. (2015) used quantitative analysis to determine the effectiveness of multi-component intervention programs for Tier II intervention in struggling readers in heterogeneous groups. Successful outcomes suggested heterogeneous grouping affected intervention programs and coupling strategies scaffolding effects. A quantitative design is also favorable to promote change in programs based on successful correlational outcomes of research.

Denton et al. (2006) used quantitative measures to analyze the effectiveness of Tiered interventions. Using pre- and post-test data, Denton et al. determined that scaffolded intervention by a teacher in classroom and interventionist in a pull-out small group (Tier II) was statistically significant compared to only classroom intervention by the teacher (Tier I). This

research design helped support the complexity of intervention implementation and the benefits of scaffolded instruction. A relationship between increased reading skill and intensity of instruction was explored and confirmed.

Quantitative research methods were instrumental in determining additional contributing factors affecting literacy development. Trezak and Mayer (2015) favored the QRI-5 as a formative tool to assess reading levels but not to inform instruction. Interrater Reliability was measured by multiple raters with 94% to 98% agreement compartmentally. Holt and Smith (2005) used quantitative analysis to determine socioeconomic and cultural factors affecting literacy development of struggling learners. Although delineating educational attainment and achievement gaps, cluster-analysis of reading practices across environments, school and home, did not effectively analyze reading intervention practices at school. It did, however; delineate the variety of home environments impacting the effectiveness of literacy and the need to consider home and third space experiential environments. Bakhtin suggests meaning only grounds itself in the interplay with other cultural interactions (Alvermann et al., 2013). Literacy is a complex practice of meshing all Discourses and discourses, Big D and little d defined by Bakhtin stratified literacy experiences that together created an interwoven literacy thread that connected primary, secondary, and tertiary literacy worlds together (Kibler, 2009). Hwang et al. (2015) determined through quantitative, random-treatment methodology the specific environment for learning that benefits English language learners; language variation strategies both in English pull-out intervention and in-class intervention environments. Quantitative data provided positive correlation between language variation strategies and small group effects of the intervention.

Hancock (2012) chose a quasi-treatment quantitative design to determine if reciprocal teaching in addition to a collection of strategies used together within the context of classroom

instruction resulted in gains in reading comprehension. Results indicated multiliteracy strategies improved reading comprehension, but gains were not statistically significant. All participants were ethically protected, and mixed method treatment design promoted positive social change by “guiding the efforts of future researchers and educators to assess other, related aspects” (Hancock, 2012, p. 3).

***Weaknesses.*** Quantitative research designs have limitations that may impact fidelity of studies or, in the absence of all contributing factors, may prove invalid. Lim and Oei (2015) applied a quantitative design, which allowed for analysis for effect sizes to determine a direct correlation between systematic intervention and reading gains. Paterson and Elliott (2006) employed an experimental design, which directly correlated intervention to reading growth but did not contextualize social-emotional aspects of readers’ self-efficacy. Both studies demonstrated the feasibility of the current study, effectively interpreting causal results of reading intervention but did not consider cultural norms nor socioeconomic factors as influential to outcomes. Sometimes, it is not background information that impacts a study but the implementation of instruction.

McKeown et al. (2009) quantitatively designed a longitudinal study to evaluate a variety of comprehension strategies in pull-out intervention programs and the transference of skills across reading content and levels. Students were given pre- and post-tests to determine skill deficits the first year and similar tests the following year with the added assessment and observation of gradual release of responsibility to students. Limitations of this study were attrition rates of participants and inferred noncohesiveness of instruction by different intervention teachers. Teachers were inconsistently trained and feelings about intervention were not considered which might have impacted implementation fidelity. Sometimes teacher

empowerment motivates multiple-strategy use within one intervention but that may produce ceiling effects or confuse the accreditation of the most effective strategy.

Lovett et al. (2000) determined through quantitative measures that double-deficit reading difficulties co-mingle and are determined to impact reading to a greater degree. One intervention strategy implemented in a pull-out intervention program was determined to be statistically significant in increasing language acquisition. This success was the foundation for a larger study in which Lovett et al. (2008) used quantitative measures to determine statistically significant intervention strategies across a homogenous, large sampling of students with learning disabilities. Comparative analysis of three separately taught strategies and a linear trend analysis also determined strategy connectedness. This study conducted pre- and post-tests separately but did not effectively circumvent a ceiling effect of multiple strategies used within one study. Suggestion for future studies included single-strategy intervention per homogeneously-leveled groups to determine the effectiveness of each strategy in isolation.

**Qualitative design.** Qualitative designs also have strengths and weaknesses within the construct of the study. Ko and Hughes (2015) used qualitative methods to observe, interview and track changes that special education students experienced in different learning environments. Perceptions of effective and enriching reading intervention practices, specifically inclusion-embedded whole language literacy instruction versus isolated skill, bottom to top, self-contained reading instruction were analyzed to determine self-efficacy of students. Strengths in using qualitative methods are in determining self-efficacy of students, using observations that support flexible learning environments of inclusion classrooms while maintaining appropriate treatment design fidelity.

Qualitative methods can sometimes provide beneficial information on perceptions of interventions while not providing enough data to determine the effectiveness of strategies. Kibler (2009) chose a qualitative method to analyze ethnographic data to further determine English learners' sociolinguistic connections to literature in their second language (L2); English. Anecdotal notes, interviews, and audio-recording of communicative events focused on student's effectiveness in navigating their world with adopted literacy traditions. Qualitative data allowed for flexible data gathering in situational uses of English. Woodward and Talbert-Johnson (2009) used a qualitative design to determine student's socioemotional response to different reading intervention models. Surveys were used to determine self-efficacy and effects of preconceived expectations for the different learning experiences. Akey (2007) also used a qualitative design to determine student literacy perceptions and self-perceptions following reading intervention strategies. Surveys were used to analyze the effectiveness of interventions delivered within the context of classrooms. Limitation similarities in the aforementioned studies include determining the statistical significance of specific strategies while maintaining a hermeneutical approach to critical literacy.

#### **Mixed-methods design.**

***Strengths.*** Mixed-Methods research can be beneficial in combining benefits of both quantitative and qualitative research designs. Goering and Baker (2010) demonstrated both effective strategies and self-efficacy in struggling students with a mixed-methods research design, which effectively pulled components of statistically significant intervention strategies with socio-emotional development learners. Hwee and Houghton (2011) also demonstrated statistically significant, effective pull-out intervention of isolated strategies and self-efficacy of



reading strategies as a result while providing anecdotal information prudent to the analysis to intervention design and self-efficacy of participants.

**Weaknesses.** A mixed-method design is confusing if not implemented correctly or efficiently. The benefits of student and teacher perceptions weigh into the overall success of the student; the student needs to feel good about abilities improved and reading skills learned. Successful comparisons are not always defined in mixed-method design and the lost opportunity was observed in a few studies. Kim et al. (2010) used a mixed-methods study to determine causal effects of one type of reading intervention program, Read 180, on struggling pre-adolescent readers. The nature of the study did not allow for a comparative design for strategy or intervention component effectiveness since it could not determine statistical significance nor was self-efficacy determined in the design. Klubnik and Ardoin (2010) used a mixed-methods, single-subject design and comparative analysis that determined the effectiveness of two different intervention programs (pull-out and in-class) with one intervention design, repeated readings, to improve oral fluency. A single subject design allowed for analysis of one learner across varying intervention settings but did not take in to account instrument fidelity. Generalization of skills may have impacted in-class intervention and impacted fidelity of intervention. Frijters, Lovett, Sevcik, and Morris (2013) proceeded to evaluate intervention strategies with older, adolescent struggling readers in a fixed criterion mixed-method strategy. The authors reported that reading intervention in pull-out programs effectively demonstrated the success of two strategies taught in isolation if small groups did not exceed eight participants.

**Meta-Analysis.** One strength of a meta-analysis is in the breadth of interventions addressed while the weakness of a meta-analysis is in the consistent delivery of instruction. Ritchey and Goeke (2006) conducted a meta-analysis; quasi-experimental and experimental

focused on Orton-Gillingham instructional methodology and whether effectiveness compared to alternate interventions benefitted struggling pre-adolescent and adolescent readers. The thoroughness of the experimental design in all twelve studies determined no significant differences across studies (experiential fidelity) and quantitative measures allowed for correlation between intervention type and demonstrated reading growth in all twelve case studies. The most significant of these strategies included word attack and non-word reading, phonological awareness practices with a mean effect of .82. Weaknesses in experiential rigor make findings inconclusive and imply fidelity of design was suspect. Suggestions for future research are noted and would be a good basis to pursue further. Improvements made to instructional implementation may cause a different outcome.

Edmonds et al. (2009) published a meta-analysis of intervention types that effectively denoted successful (within .89 effect size) intervention strategies. The stringency of the qualifying conditions for the meta-analysis eliminated ineffective reading strategies which strengthened the meta-analysis' findings. Contrarily, Edmonds et al.'s (2009) meta-analysis of a variety of intervention strategies did not eliminate nor scrutinize in-class intervention support so consequent effect sizes did not yield nor disaggregate effective strategies. It did, however, provide suggestive implications for future studies; the need for additional research into integrating intervention strategies within content areas coupled with and compared to pullout intervention support.

The synthesis of these studies was instrumental in informing the design plan for the current study. Evaluating the various methodologies used, it is suggestive that a quantitative design is feasible to determine the effectiveness of reading intervention programs, pull-out or embedded and the content of the proposed intervention. Predictive outcomes will also support

the development of specific reading intervention types in coming years. Continuation of this research could follow a targeted cohort as they navigate from intermediate to junior high school reading intervention experiences, using quantitative design to specifically note the correlation between intervention type and continuation of reading intervention support.

### **Synthesis of Research Findings**

Continuities in research showed two emerging learning theories, Sociocultural Constructivism or Pragmatic Learning Theory and Behaviorism or Transactional Learning Theory, which constitute varying intervention themes. Both theories consist of focusing on individual learning style and need of a student but in different ways. Sociocultural Constructivism theory and Pragmatic Learning theory consider how students construct their own learning through hands-on, targeted approaches. Synthesis of research findings uncovered intervention similarities and dissimilarities, cultural connectedness, and sociolinguistic variations.

**Intervention types.** Reading instruction delivered in homogeneous, or leveled, groups necessitated pull-out support at the intermediate school level. Students reading one to two grade levels below their peers do not feel comfortable reading aloud in front of on-level reading peers. Research supported direct, targeted support for some students whose deficits impacted their ability to keep up with peers and whose self-efficacy and self-esteem improved alongside reading skills. Boulay et al. (2015) discovered statistically significant positive effects on intervention delivered in a homogeneous, leveled, pull-out reading intervention program where struggling readers receiving targeting skill intervention increased reading fluency. Denton et al. (2006) discovered that systematic instruction in phonological awareness skills and decoding demonstrated success for students with significant reading discrepancies. Direct instruction in

phonological awareness skills, with intensive, targeted reading intervention, improved reading skills; significant growth in fluency was directly correlated to the strategy of repeated reading of texts.

Nelson and Manset-Williamson (2006) demonstrated explicit instruction impacted students more significantly than generalized intervention and resulted in positive gains in their corrective strategy usage for reading difficulties which signifies increased self-awareness skills promoting self-efficacy in reading. Faggella-Luby et al. (2007) reported increased comprehension skill development when the targeted instruction was embedded into literacy. Statistically significant differences were found specific to “embedded story structure routine... and unit reading comprehension” (p. 131) in developing readers and reading self-efficacy. Pull-out reading supports some students who allow teachers to address reading deficits in a setting with like-skilled peers. Trust is easily established; reading skill deficits are considered the norm in reading intervention groups.

**Cultural connectedness.** Behaviorism and transactional theories consider the immersion of strategy development in a naturalistic element and adaptive to content. Continuities in research support a naturalistic approach to learning where students adapt reading skills to generalized learning environments, within content areas. Akey (2007) discovered sociocultural mediation motivates students to persevere literacy practices within a context that relies on the “course of intellectual development in social interaction” (Vygotsky, 1978, p. 24). Children need to converse and participate in an activity to develop socially and intellectually.

Brozo (2010) discovered disparate aspects of pull-out intervention, suggesting the absence of establishing a connectedness between curricula and student interests directly correlates to the erosion of classroom engagement. Further suggestions included success is not

universal and that both interventions, scaffolded interventions embedded in daily instruction and pull-out intervention, are key. Contrarily, research demonstrates comprehension gains only when students receive targeted, multiple reading competencies (Edmonds et al., 2009), which may not be possible in the constructs of intermediate school content classrooms.

Mallinson, Charity Hudley, Strickling, and Figa (2011) promoted literacy as a “collaborative partnership .... that integrates cultural and linguistic knowledge in classroom contexts” (p. 450) through dialogue and interaction resulting in reduced barriers to learning. Ladda and Jacobs (2015) promoted a facilitation of learning when the integration of literacy practices interrelates content knowledge, inquiry, and curiosity with realia in meaningful, world-impacting experiences. Parker (2012) effectively demonstrated merging critical literacy with critical skill building in after-school book clubs where the literacy content was diverse and insightful and provided visualization into cultural differences and into deepening comprehension of the text itself. A cultural connectedness begins and develops with social interaction, integrated cultural and linguistic shared experiences.

**SocioLinguistic Variations.** Immersion of students, socio-culturally and linguistically, is supported by Vygotsky’s (1978) scaffolding theory, Moll’s (2014) transfer of learning, and Gee’s (2001) situational learning theory. Fostering a connectedness with student’s culture, home and school literacy and learning environments create a critically-rich, diversified experience. Lapp and Fisher (2010) promoted a gradual release of instruction that develops a skill set of critical analysis of text according to situational merit. Once targeted skills are developed, a generalization of skills is necessary for integral participation in a global world to “see themselves in a larger world beyond the wall of the classroom... connected to larger social issues” (Clarke & Whitney, 2009, p. 534).

Allen-DeBoer et al. (2006) determined that intensive instruction based on individual need was successful to impact reading skills, but the setting of the research was contrived and, although the improvement was noted in the behavior of reading, the study was remiss in determining successful outcome within content in generalized settings. It could be argued that success was detracted by positive interaction between teacher and student. Hemphill et al. (2015) discovered struggling readers improved their reading skills with direct instruction but acknowledged the limitation of research did not determine increased engagement in “opportunities to talk about text with teachers and peers” (p. 4).

Peregoy and Boyle (2000) suggested good readers “move through the text, decoding and construction meaning” (p. 239) as long as the textual interpretation is built upon and engaged in background knowledge and social context. Paterson and Elliott (2006) suggested peer tutoring to bring reading skill development and community together. Reading efficacy is best promoted by reading in a shared community and social contextual environment where shared struggles promote deeper connectedness between peers and provide an emotionally safe learning environment. Clarke and Whitney (2009) proved critical literacy is effective as a literacy tool to deconstruct and reconstruct meaning, giving students a tool to merge prior knowledge with new pathways of reflecting.

### **Critique of Previous Research**

Sociocultural theory prescribes interactions with cultural influences on literacy, including literacy customs and abilities, and reveals problems associated with cultural disconnectedness. Behaviorism and Transactional theories consider the immersion of intervention strategies with critical literacy while uprooting intervention disparities. Discontinuities of previous research

noted disparity of intervention, cultural disconnectedness, as well as sociolinguistic similarities as themes uncovered in the literature review.

**Intervention disparities.** Connell (2008) presented concerns regarding how readers detract meaning from their texts and questioned educator's ability to motivate students to engage in critical reflection and make sense of texts by applying situational experiences to literacy in the classroom. Rosenblatt's (2005) transactional perspective motivates an interactive response from the reader yet may ignore the effect of sociocultural, or situational constructs to deepen meaning. Reader-response theorists agree that meaning happens within the context of readers but do not agree on the manner of deconstruction of text meaning nor in the possibility that whole-to-part perspectives are not effective. Rosenblatt does foster continuity of literacy and social contexts but lacks engagement by students in their personal zone of proximal development.

**Cultural disconnectedness.** Ritchey and Goeke (2006) focused on targeted skill, explicit instruction without the benefit of multi-cultural influences. Kaminski et al. (2014) demonstrated successful implementation of literacy skills at the early childhood level with children considered at risk, but implementation was inconsistent across classrooms. Self-efficacy of learning with peers was shadowed by non-diverse, homogeneous cultural immersion. Ash (2005) provided research-based strategies to embed critical thinking into consistent routines, merging significant content with reading skill development. Cultural disconnectedness is diminished by reading efficacy through shared experiences and developed skills first addressed in small group situations.

**SocioLinguistic similarities.** Gainer (2016) strongly suggested students should not be separated by academic abilities but rather "ensure diversity of thought and experience in all classrooms" (p. 372). Critical literacy is participatory and collaborative in nature and separating

students to teach is argued to be domesticating. Categorizing literacy in this way may mischaracterize intervention benefits when the need exists. Suggestions would include focusing on student individual needs and addressing needs in whatever learning environment is best for the students. Literacy customs and norms at the intermediate school level may interfere with accurate assessment and diagnoses of deficit skills. Similarities in focus on student success, an adaptation of critical literacy, and compassion towards cultural differences negate the dissimilarities of sociocultural disconnectedness.

### **Summary**

Based on the review of the literature, a distinctive conceptual and theoretical framework is born. These frameworks help to define intervention, comparing behaviorism and transactional learning theories to Sociocultural Constructivism and Pragmatic Learning Theories in understanding literacy behavior and intervention applicability. There is sufficient cause to believe that further research and analysis of the impact of interventions on literacy skills would affect socially significant findings. I can, therefore, claim that the literature review has provided considerable support and a firm foundation to pursue continued research to discover the answers to the following multi-part research questions: Is direct, pull-out intervention, part-to-whole effective in intermediate school students from the beginning of the year to the end of the year, as measured by the QRI-5 assessment? Is direct, systematic, computer-based based intervention effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the end of the year, as measured by the QRI-5 assessment? Is direct, integrated-content reading intervention, whole-to-part, effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the end of the year, as measured by the QRI-5 assessment?





## **Chapter 3: Methodology**

### **Introduction**

The focus of this study was to evaluate the effectiveness of pull-out, computer-based, and integrated-content reading interventions in improving implicit and explicit reading comprehension in struggling intermediate school students. A review of the extant literature, presented in Chapter 2, supported the conclusion that some type of targeted intervention steeped in critical literacy-deconstruction and reconstructed meaning is key to increasing reading skills (Clarke & Whitney, 2009; Gee, 2001). Lapp and Fisher (2010) suggested that literacy experiences are enhanced by social perspectives and Gainer (2016) demonstrated that situational experiences connect meaning to reading. The effectiveness of pull-out programs (Lim & Oei, 2015; Reed, 2013; Ritchey & Goeke, 2006) and computer-based interventions (Council et al., 2016; Pindiprolu & Forbush, 2009; Reed, 2013), in particular, have been shown to be effective in separate studies. However, missing in the literature is any direct comparison of those intervention strategies.

### **Purpose of the Proposed Study**

The purpose of this study was to evaluate the relative effectiveness of three reading interventions in increasing comprehension in struggling readers at the intermediate school level. Three reading intervention types were examined in this study of third through fifth-grade students at an elementary school in the Austin, Texas area—pull-out, computer-based, and integrated-content. The aim of the research was to gather empirical evidence to drive instructional decision making in the selection of reading intervention programs in order to improve the reading comprehension skills of struggling pre-adolescent and adolescent readers.

Struggling readers experience increasing difficulties in academic achievement as they continue in school because reading skills they possess lag further and further behind the reading skills needed as they are integrated into an increasingly fast-paced, rigorous academic environment. A variety of programs have been implemented to help these struggling readers. These include in-class core content plus interventions which lend relevance to reading instruction. As suggested by Peregoy and Boyle (2000), “building learning activities upon familiar concepts...helps facilitate literacy and content learning but also helps students feel more comfortable and confident at school” (p. 244). Other strategies feature intense reading skills instruction. These interventions can either occur within a class or in the context of pull-out programs. Yeager et al. (2016) have emphasized that successful reading interventions change students’ mindsets from seeing school as a struggle against impossible barriers to seeing oneself as capable of overcoming the hurdles that are encountered in school. Successful interventions build trusting relationships between teachers and students and help students to make connections between text, self, and others. Vernon-Feagans et al. (2015) determined that professional development was instrumental in providing teachers with appropriate training in improving reading skills for struggling readers.

In the remainder of this chapter, the study’s research questions will be presented, along with respective null and alternative hypotheses. The study’s independent and dependent variables will be defined, both conceptually and operationally. The choice of a quantitative research methodology will be explained and defended, as will the choice of the quasi-experimental pretest-posttest comparison of nonequivalent groups. The general and target populations for the study will be delineated, and the sampling methodology will be described. The instrument used to collect measures of the dependent variables will be identified and

information about measurement reliability and validity will be presented. Data collection procedures will be described, followed by methods used in analyzing the collected data. A discussion of factors influencing the study's internal and external validity will follow. Study limitations and delimitations will be noted. Expected findings will be listed. Finally, the chapter closes with a review of ethical considerations.

### **Research Questions and Hypotheses**

The purpose of this study was to evaluate the effectiveness of three reading inventions—pull-out, computer-based, and integrated-content—in enhancing implicit and explicit reading comprehension among struggling third through fifth-grade readers. In accomplishing this purpose, three research questions were addressed. Those research questions are presented below along with associated null and alternative hypotheses.

RQ<sub>1</sub>. Is direct, pull-out reading intervention effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year as measured by the QRI-5 assessment?

H<sub>1,0</sub>. Direct, pull-out (part to whole) reading intervention is not effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.

H<sub>1,A</sub>. Direct, pull-out (part to whole) reading intervention is effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.

RQ<sub>2</sub>. Is direct, computer-based reading intervention effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment?

- H<sub>2,0</sub>. Direct, systematic, computer-based reading intervention is not effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.
- H<sub>2,A</sub>. Direct, computer-based reading intervention is effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.
- RQ<sub>3</sub>. Is direct, integrated-content (part-to-whole) reading intervention effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment?
- H<sub>3,0</sub>. Direct, integrated-content (part-to-whole) reading intervention is not effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.
- H<sub>3,A</sub>. Direct, integrated-content (part-to-whole) reading intervention is effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.
- RQ<sub>4</sub>: What differences exist among three types of reading interventions, pullout, computer-based, and integrated-content in their effectiveness on implicit and explicit student growth in reading comprehension?

H<sub>4,0</sub>: There is no difference among three types of reading interventions, pullout, computer-based, and integrated-content in their effectiveness on implicit and explicit student growth in reading comprehension

H<sub>4,A</sub>: There is a difference among three types of reading interventions, pullout, computer-based, and integrated-content in their effectiveness on implicit and explicit student growth in reading comprehension.

### **Research Design**

A quantitative quasi-experimental methodology was chosen over a qualitative or mixed-methodology approach in this research. Several considerations led to the decision not to utilize a qualitative or mixed methodology. First, in the school that participated in this study, as well as many similar schools, reading success and failure are defined by students' scores on the QRI-5. An independent reader scores 98% or higher and requires no intervention, an instructional reader scores 70%-97% and would benefit from reading instruction and monitoring, and the frustration level is defined by a score falling below 70%. This is the targeted intervention level where reading intervention is crucial (Leslie & Caldwell, 2011).

With schools placing such emphasis on QRI-5 scores to define students' reading skill levels, it only makes sense that the effectiveness of reading interventions should be evaluated using scores on that same instrument. While qualitative research most often produces data in the form of words and images from interviews and observations, quantitative research is called for when the data are numbers (Johnson & Christensen, 2008). Second, the purpose of this research was to evaluate and compare the effectiveness of three reading interventions in improving students' reading comprehension over a period of a few months. Those evaluations necessitated comparing levels of pre-test reading comprehension, before the reading intervention, with

reading comprehension at post-test, following exposure to the reading intervention. An effective intervention was indicated by one that was associated with a strong improvement in reading comprehension scores from pretest to posttest. This being the case, some objective means of defining a “strong” improvement was needed. Only the statistical analysis of numerical data can provide this objective assessment of effect strength (Johnson & Christensen, 2008). A “strong” increase was defined in this study as a statistically significant increase along with other statistical measures of effect strength. A quantitative methodology is called for when numerical data are to be evaluated using statistical data analyses in answering a study’s research questions (Creswell, 2014; Johnson & Christensen, 2008; Lim & Oei, 2015; McKeown et al., 2009). Third, in program evaluation studies such as this one, where the research findings can result in important policy and curriculum changes, it is important that the conclusions that are drawn are objective, reliable, and replicable. In qualitative research, the analysis of data is often quite subjective and in some qualitative studies, such as interviews and participant observation, the researcher even becomes part of the method by which data are collected (Yilmaz, 2013).

The introduction of the researcher into the data collection or analysis process could increase the chance of bias in both data collection and data interpretation. The statistical analysis of numerical data gathered through quantitative research is ideal in establishing that sample findings are objective, reliable, and replicable because the basic meaning of a statistically significant finding is that it is a reliable and replicable finding (Warner, 2013). The observation that a statistically significant improvement occurred between pretest scores and posttest scores in a sample of students means that improvement would be expected to occur repeatedly in other samples drawn from the same population. Fifth, the ability of tests of statistical significance to establish that sample findings are reliable and replicable requires that the samples that are studied

be of relatively large size. While large sample sizes can be handled easily in quantitative studies, qualitative studies are typically limited to eight to 15 participants (Hill, Thompson, & Williams, 1997). It is intuitively obvious that the larger one's sample becomes, the more justifiable it becomes to generalize sample findings to the larger population (Gravetter & Forzano, 2016).

This study collected data from students who were assigned to three different reading interventions by differences in their reading skill levels. Because the students were not assigned randomly to treatments, the study was not a true experiment, but rather, a quasi-experimental research design. Known differences between the groups mean that this was a nonequivalent groups research design. Students were tested at the beginning of the year, then exposed to their assigned reading interventions, and then tested again at the middle of the year, making the study a pretest-posttest research design. With these defining characteristics, the research design used in this study can be considered a quasi-experimental pretest-posttest comparison of nonequivalent groups (Campbell & Stanley, 2011; Creswell, 2014). The purpose of this study, as reflected in the research questions, was to evaluate the effectiveness of each of the three reading interventions. That was accomplished by comparing pretest and posttest scores within each intervention group. Although a pretest to posttest gain cannot be unambiguously attributed to the intervention, as will be discussed later under study limitations and delimitations, a pretest-posttest gain is consistent with intervention efficacy. The research design also enabled comparing the relative effectiveness of each of the interventions by comparing the sizes of pretest to posttest gains shown by each intervention group. Differences in those gains cannot be unambiguously attributed to differential intervention efficacy, but different pre-test to post-test gains observed from one group to the next are at least consistent with differential intervention efficacy.



## **Target Population, Sampling Method and Related Procedures**

The general population for this study consists of all struggling intermediate school readers in the United States. The target population from which the study sample was drawn consists of struggling readers in one elementary school located in Central Texas. The sample consisted of 78 struggling readers drawn from third through fifth-grade classes. These 78 students were assigned in equal numbers ( $n = 26$ ) to pull-out, computer-based, and integrated-content reading intervention groups. Classes from which participants were taken included students with special needs, students performing in the mid to lower quartile of reading ability levels as assessed by the state standardized assessment (STAAR), and included a variety of cultures, language variations, and socioeconomic factors. All students with a curriculum-based assessment (CBA) score of 53% or lower were automatically selected to receive reading intervention support. Intervention was not withheld from any student who qualified to receive it simply to create a no-treatment control group. Since the students who were examined in this study were included simply because of their availability, the sample can be considered a convenience sample of naturally formed groups (Creswell, 2014). With 26 students representing each of the three reading intervention conditions examined in this study, statistical power was adequate to produce statistically significant findings for tests of the effects of interest. Results of statistical power analyses are provided in Chapter 4. Twelve teachers, whose instructional styles matched the intervention types that were evaluated in this study, were chosen to participate in this study. Those teachers all received prior professional development training in reading skill development and held certifications in English language arts and reading. Additional support staff rotated through the classes as needed and requested by the teachers.

## **Instrumentation**

The Qualitative Reading Inventory-5 (QRI-5; Appendices C and D) was used to measure the dependent variables of implicit and explicit reading comprehension. This instrument is given to those defined by the CBA to be struggling readers. Biggs and Watkins (2008) reported that the QRI-5 had an internal consistency reliability coefficient of .98 and the instrument's validity was supported in a comparison of scores on the QRI-5 to scores on other standardized reading tests.

## **Data Collection**

IRB approval (Appendix E) was obtained prior to intervention implementation or data collection to ensure that research participants were at minimal risk. Written site authorization was obtained from the site principals and officials representing the school district (Appendix F). Parents and guardians of all students in the participating school provide blanket informed consent as part of the annual registration process for their children to participate in all studies conducted for educational purposes, to evaluate programs, develop instructional programs based on needs of students, and improve teaching in their child's educational setting. Additional consent forms for participation in this study were also collected from parents and guardians (see Appendix G).

To identify struggling readers who were eligible to receive reading intervention, the Developmental Reading Assessment (DRA2) was administered to all students enrolled at the participating school. This instrument is a curriculum-based assessment (CBA) that is widely used to determine students' Lexile levels of reading proficiency (White & Clement, 2001) and was used in that manner to assess reading proficiency levels of students at the participating school. Finore (2013) reported that the DRA2 shows good interrater reliability and the validity

of the DRA2 was demonstrated by showing that increases in DRA2 scores were correlated with levels of progress through reading intervention programs. Other researchers have shown that the DRA2 is a reliable instrument that demonstrates good criterion-related validity in assessing reading levels and instructional needs (Burns & Mosack, 2005; Macy & Bricker, 2006; Parker, 2012).

The pull-out reading intervention included students who scored at or below grade level for reading, as determined by the DRA2 reading assessment and students' Lexile levels. The pull-out intervention is considered a Tier 2-3 type of reading intervention where students need support on reading comprehension involving larger passages at lower reading levels. Pull-out intervention occurs in a small group setting with a frequency up to five days a week and duration up to forty-five minutes per session. The pull-out instruction used a part-to-whole approach, with multisensory, teacher-driven activities to develop phonemic awareness (the smallest unit of language sound), to words, sentences, paragraphs, and culminating in reading a story. The intervention started by the sixth week of school and finished 12 weeks later.

The computer-based reading intervention included students who demonstrated phonological weaknesses, as determined through both the initial assessments and previously identified skill gaps. This intervention is considered a Tier 2-3 type intervention where students are also pulled out of class to a computer lab environment where they participate in a computer enriched reading program. This intervention is designed to provide reading skill support through a bottom-to-top literacy reading intervention. The intervention provides highly engaging learning experiences for skill development, working from the grapheme and morpheme levels to word chunks to sentences all the way to passage reading. The intervention started by the sixth week of school and finished 12 weeks later.

The integrated-content intervention included students who are proficient in reading words in parts (decoding, chunking, part-to-whole) and need the practice of reading in larger passages to determine the meaning of words in context and need focused practice on determining the meaning of whole passages. This intervention is considered a Tier 1 intervention where all the support is provided by the classroom teacher in a small guided-reading setting. In this reading intervention, the teacher provides reading strategies within the context of teaching the varying content of the classroom curriculum. Teachers were chosen to deliver this intervention who had received previous professional development training on integrating literacy learning, reading, and writing within the context of regular classroom instruction. The intervention was started by the sixth week of school and finished 12 weeks later.

All raw data that were collected were stored in a locked filing cabinet in a locked room. Data needed for the present study were compiled by hand into Excel spreadsheets which were subsequently imported to IBM SPSS for analysis. Although the raw data and some Excel files included student names, no information that would identify individual students was retained in the SPSS data files. The raw data, reading scores, and some Excel files are official school records and will be retained indefinitely. All Excel and SPSS data files used in this study will be stored on a password protected USB flash for three years following completion of the study. At that time, the data will be deleted.

### **Operationalization of Variables**

**Struggling readers.** In this study, struggling readers were operationally defined as students who have not mastered literacy skills in the areas of decoding, fluency, and/or comprehension (Boulay et al., 2015; Nanda et al., 2014; Paterson & Elliott, 2006). Struggling readers constitute a bubble population, i.e., students not receiving special education, but not able

to succeed without interventions and/or accommodations. These students quite often get lost in a fast-paced curriculum and higher-than-achievable learning expectations because they have not mastered literacy skills in the areas of decoding, fluency, and comprehension by intermediate school (Boulay et al., 2015; Nanda et al., 2014; Paterson & Elliott, 2006). Bubble students are those who are barely passing assignments at a minimal standard, and often fail multiple assignments and must retest for a score of 70 to pass. These students would not pass classes without this general education accommodation and allowance or additional literacy support. Parents quite often do not want their children to receive intervention support or to participate in a defined response to intervention (RTI) system (Appendix A) if that intervention takes the student away from classes and electives. The struggle to propose and defend needed interventions to all stakeholders is challenging. RTI responds to the needs of struggling students of all ages (Paterson & Elliott, 2006; Rosengarten, 2010).

RTI provides three levels, or tiers, of intervention, and this study focused on struggling readers receiving Tier 1 and Tier 2 instruction (Appendix B). Tier I instruction is available to all students and uses empirically based approaches that are differentiated to meet the needs of individual students. If, after Tier 1 instruction is delivered and the student is still struggling, the student receives Tier 2 instruction, which includes Tier I plus additional support. Tier 2 support occurs first in the classroom in a small group that is provided additional opportunities within the school day. If the student still struggles, the student moves to Tier 3 intervention. Interventions at Tier 3 include increased duration and intensity of instruction three to five days per week and may include further testing to identify learning disabilities (Kibler, 2009; Lim & Oei, 2015; Woodward & Talbert-Johnson, 2009). No Tier 3 students were included in this study.

Tier 1 interventions in this study used integrated comprehension strategies, operationally

defined as specific comprehension strategies using classroom content and occurring both in the classroom and in pull-out models of instruction (Faggella-Luby et al., 2007; Ko & Hughes, 2015; McKeown et al., 2009). These strategies included a reciprocal teaching plus strategy where five reading strategies are used to improve comprehension—questioning, clarifying, predicting, summarizing, and evaluating (Ash, 2002, 2005). Tier 2 pull-out interventions used whole-to-part instruction, operationally defined as reading support beginning with reading whole passages, then paragraphs, sentences, to sounds as needed and only if needed. Students learn to decode and read in passages and build fluency through the context within which the words appear (Louanne, 2003).

**Independent variables.** Three reading interventions were evaluated in this study. Consequently, Intervention Type was the study’s key independent variable, with three levels—pull-out, computer-based, and integrated-content interventions. Reading intervention is operationally defined as “daily sessions with reading specialists through separated intervention or within the regular classroom” (Woodward & Talbert-Johnson, 2009, p. 190). Pull-out intervention is operationally defined as students pulled out into small groups to focus on developing specific skills. Pull-out intervention includes either part-to-whole or whole-to-part intervention. Pull-out groups are either homogeneous by skill deficits or by grade level and consequently can be heterogeneous by either grade level or by skill deficits (Wilson et al., 2013; Woodward & Talbert-Johnson, 2009). Computer-based based intervention (Reed, 2013) involves part-to-whole instruction and is operationally defined as using a systematic, highly engaging approach to reading beginning with sounds or concepts in isolation and working up to skills instruction in the context of a reading passage (Council et al., 2016; Pindiprolu & Forbush, 2009). Skills are usually acquired in isolation and generalized in whole passages (Kibler, 2009).

The integrated-content intervention involves whole-to-part instruction and is operationally defined as providing reading support beginning with reading whole passages, then transitioning to paragraphs, sentences, and finally to sounds. Students learn to decode and read in passages and build fluency through the context within which the words are found (Louanne, 2003). Integrated-content intervention occurs in a naturalistic environment (Gee, 2001) promoting situational literacy development with embedded peer-coaching experiences. Reading development within a variety of contexts scaffolds skills learned in Language Arts and promotes generalized reading skill practice and development.

Since a pretest-posttest research design was used in this study, time served as a second independent variable, with two levels—pre-test and post-test. The pre-test assessment of students' reading comprehension occurred at the beginning of the school year. The post-test assessment of reading comprehension took place in the middle of the school year.

**Dependent variables.** Two dependent variables were used in this study—implicit reading comprehension and explicit reading comprehension. These two types of comprehension were operationally defined as scores on the implicit and explicit reading comprehension sections of the Quantitative Reading Inventory (QRI-5) which was administered in a pre-test at the beginning of the school year and in a posttest at the middle of the school year. The QRI-5 consists of a selection of prose passages, fiction and nonfiction, and a set of accompanying multiple-choice questions, similar in format to the standardized STAAR assessment.

### **Data Analysis Procedures**

Data on two dependent variables, implicit and explicit reading comprehension, were collected at pretest and posttest from three groups of students assigned to receive pull-out, computer-based, or integrated-content reading interventions. Following preliminary data

cleaning to assure that the collected data were accurate and following tests to determine whether the appropriate statistical assumptions were met, the data were analyzed using a 3(Intervention Type) x 2(Time) mixed-subjects factorial analysis of variance (ANOVA). The between-subjects factor (i.e., independent variable) was Intervention Type, with three levels—pull-out, computer-based, and integrated-content. The within-subjects factor (i.e., independent variable) was Time, with two levels—pretest and posttest. As is described in Chapter 4, the statistical assumptions upon which the ANOVA is based, i.e., data normality, homogeneity of variances, and homogeneity of covariances, were found to be violated in this study. Although the ANOVA is quite robust with respect to those violations, especially given the study's relatively large and equal sample sizes in each intervention group (Kirk, 2012; Tabachnick & Fidell, 2013), it was determined that the possible impact of those violations would be mitigated by using a stringent level of significance ( $p < .01$ ) in evaluating all effects (Meyers, Gamst, & Guarino, 2013). Upon finding significant effects, the ANOVA was followed by Games-Howell post hoc comparisons to perform pairwise comparisons of cell means in searching out the sources of those significant effects (Ramsey, Barrera, Hachimine-Sempreborn, & Liu, 2011). These pairwise comparisons directly addressed the study's research questions by assessing the statistical significance of reading comprehension gains from pretest to posttest for: (RQ1) students in the pull-out intervention, (RQ2) students in the computer-based intervention, and (RQ3) students in the integrated-content intervention. The ANOVA test of the Intervention Type x Time interaction effect provided an omnibus test of differences in the effectiveness of the three interventions. That significant interaction effect was followed by additional Games-Howell post hoc comparisons that were used to further explore the nature of the interaction effect.



A one-way multivariate analysis of variance (MANOVA) was conducted to determine the effect of three types of reading interventions (pull-out, computer-based, and integrated-content) on the two dependent variables, implicit and explicit student growth in reading comprehension (RQ4). Barton, Yeatts, Henson, & Martin, (2016) identified which dependent variables contributed to group differences and which groups were different from each other. Miller, Darch, Flores, Shippen, & Hinton, V. (2011) revealed significant differences between instructional groups. These results indicate systematic and explicit reading comprehension instruction can be delivered successfully to students with high-incidence disabilities in general education settings.

### **Limitations and Delimitations**

Research limitations are sources of weakness within a study that are beyond the researcher's control (Ellis & Levy, 2009). Limitations to this study resulted from several sources, including the research design, instrumentation, and sampling methodology as described below.

1. The study used convenience sampling of students who were available at the research site. As Demerouti and Rispens (2014) noted, the use of convenience sampling, despite its disadvantages, is relatively common in field studies where true random sampling is not feasible. However, the use of convenience sampling limits the external validity of the study. Specifically, results of this study should be generalized only to the hypothetical population of students that are similar to those of this study.
2. The analysis of data from nonequivalent groups also limits the conclusions that can be drawn from this study. Specifically, the lack of an experimenter-manipulated independent variable (Intervention Type) means that between-group differences in

reading comprehension at posttest cannot be linked causally to the types of reading intervention received by those groups. Rather, the relationship is correlational, i.e., changes in reading comprehension from pretest to posttest are related to but may or may not have been caused by differences in reading interventions. The choice of a nonequivalent group research design was not really a choice in this study but was an unavoidable necessity. It would not have been feasible to randomly assign students to reading interventions without regard to their characteristics, including reading skill levels and resulting needs.

3. Also resulting from the use of nonequivalent groups, different rates of pretest-to-posttest improvement among the three intervention groups may not have resulted from the different interventions but might instead be linked to unknown differences between those groups in demographic, cognitive, personality, or other variables. Consequently, while the differential pretest to posttest improvements are related to intervention types, those improvements cannot be causally attributed to the different reading interventions.
4. The three reading interventions not only supplied different groups of students with different types of reading instruction, the three intervention types were also provided by different teachers. This was unavoidable, as teachers had to be assigned to administer those interventions with which they were most proficient. This means, though, that reading interventions were potentially confounded by teacher characteristics. Any differential effectiveness of the three reading intervention may be partially or wholly attributable to differences in the teachers who provided the interventions.

5. The availability of qualified teachers limited this study to examining only three types of reading interventions. Other interventions could not be included in the study since there were no teachers to provide those interventions.

Research delimitations are features of a study that were controlled by the researcher, but, limit the scope of the study nonetheless (Ellis & Levy, 2009). Delimitations in this study resulted from decisions made by the researcher pertaining to the choice of a quantitative research methodology, the setting in which the research took place, and the choice of dependent variables.

1. The decision to use a quantitative methodology rather than a qualitative method prevented the collection of any rich data on students' reading experience. Interviews with students and others who are familiar with those students might have provided those rich data at both pretest and posttest. Qualitative data collection at pre- and post-test would have had the additional advantage of offering students a low-anxiety assessment alternative, at least in comparison to the use the quantitative standardized QRI-5 test that was used. The qualitative approach was rejected, however, for several reasons. First, it was not logistically possible to pull children out of the instructional setting to conduct lengthy interviews and observations for this study. Second, qualitative studies are typically limited to relatively small samples. It is axiomatic in statistics that the smaller the samples, the poorer the likelihood that the samples will approximate the characteristics of the populations of interest. A qualitative study would thus be of questionable value for the purposes of generalizing the study's findings beyond the sample at hand. Finally, a quantitative alternative was deemed to be sufficient to gather the data needed to address the study's research questions in a manner that was logistically feasible and would provide the sample sizes needed to

make it more likely that sample findings could be generalized beyond the samples at hand.

2. Data were drawn from only one school in Central Texas. This decision was based on the availability of data but resulted in a sample that may not be typical of the larger population of struggling readers. The analysis of data from only one elementary school leaves unanswered questions as to whether the results obtained with this sample apply to a more culturally and demographically diverse population.
3. The researcher decided to limit the evaluation of the reading interventions to their effect on reading comprehension. Decoding and fluency were not a focus of the study. This decision was based on the realization that no single study can answer all the questions that call for answers. Future research can address the question of whether other reading skills can be enhanced through targeted interventions.
4. In any quantitative research study, the validity of the study's findings is limited by the validity of the dependent variables that were used. In this study, the QRI-5 was chosen to measure reading outcomes in the areas of implicit and explicit comprehension. While the psychometric qualities of the QRI-5 are well documented, no single measure of reading comprehension can adequately capture all the facets of that complex mental activity.

### **Internal and External Validity**

Internal validity refers to the degree to which a treatment effect can be unambiguously attributed to the treatment being evaluated (Gravetter & Forzano, 2016). Internal validity is a relevant concern in studies that seek to determine if, or to what degree, a treatment (the independent variable) influences or affects some outcome (the dependent variable). The present

study sought to determine if each of three reading interventions (the Intervention Type independent variable) influenced students' implicit and explicit reading comprehension (the dependent variables). Consequently, challenges to the study's internal validity are important to consider. External validity refers to the degree to which the findings from a study can reasonably be generalized to other people, settings, and times (Gravetter & Forzano, 2016). In the present study, the goal was not limited to evaluating the effectiveness of reading interventions among just the 78 student participants, at one school in Central Texas, in the year 2017, but rather, to use the data obtained from those students in that place and at that time to draw broader conclusions about the effectiveness of the reading interventions. Consequently, threats to the study's external validity are also important to consider.

**Internal validity.** Several challenges to the study's internal validity were identified that create some ambiguity in determining what brought about reading comprehension changes in the students who participated in the study.

**Selection bias.** Because the groups that are compared in the quasi-experimental pretest-posttest comparison of non-equivalent groups are not randomly assigned to groups and cannot be considered equivalent; the treatments received by different groups are confounded with the different characteristics of those groups. This is referred to as selection bias. Consequently, if some groups gained more from pretest to posttest than other groups, it cannot be known that those differences are due to a differential effectiveness of the interventions received or if the groups have other characteristics that are responsible for their greater (or lesser) changes from pretest to posttest. In this study, since different interventions were provided by different teachers, interventions are also confounded with teachers. In other words, if different groups showed differential gains from pretest to posttest, it might be that the teachers who managed

some groups were more effective than the teachers who managed other groups. The likelihood of this second type of confounding in the present study was somewhat reduced by the fact that several teachers were involved in providing each intervention, not just one teacher per intervention group.

**Maturation.** Even without any intervention, people change over time. In the present study, improvements in reading comprehension from pretest to posttest might be attributable to natural maturational changes in the participants. Thus, what appears to be an efficacious intervention might simply reflect those maturational changes. However, students in all three interventions would be expected to experience the same maturational changes, and so differences in the pretest to posttest gains seen from one group to the next cannot be due to maturation.

**History.** While maturation refers to naturally occurring changes within the participants in a pretest-posttest design that can account for pretest to posttest changes, the threat to the internal consistency of history refers to events taking place in the participants' environment while the treatment is being administered. All the students in this study, for example, received regular classroom instruction while they were also receiving the reading intervention. Considerations should include whether pretest to posttest changes may be attributed to regular classroom instruction or the reading intervention or both. Although the history threat to internal validity makes it difficult to interpret changes from pretest to posttest within any single group, it can be assumed that the children in all three interventions probably experienced about the same environment throughout the course of the study, so differential pretest to posttest gains of the groups cannot be due to history.

**Testing.** The testing threat to internal validity refers to the possibility that the improvement seen from pretest to posttest was caused by the pretest, not by the treatment that

intervened between the pretest and posttest. The effect of testing is also referred to as the practice effect (Miller, Lovler, & McIntire, 2013). As an example of the practice effect, full-scale WAIS-IV scores improve about 7 points (almost half a standard deviation) from one testing to a second testing three months later (Estevis, Basso, & Combs, 2012). This is because the pretest served an instructional role and helped test takers to perform better on the second testing. In the present study, improvements in reading comprehension from pretest to posttest might be attributable to this same type of testing or practice effect. However, since the practice gained at pretest would be expected to affect equally all three intervention groups, differences in pretest to posttest gains between different groups cannot be due to testing.

In summary, pretest to posttest improvements in reading comprehension seen in this study cannot be unambiguously attributed to the reading interventions that students received, but those pretest-posttest improvements are consistent with what would be observed if the interventions were effective. The evaluation of the differential effectiveness of the reading interventions is also ambiguous. Different amounts of pretest to posttest improvement demonstrated by different intervention groups could be due to different student characteristics or different teacher characteristics of the intervention groups. However, a differential effectiveness of the interventions would also appear as different amounts of pre-test to post-test improvement from one group to the next.

**External validity.** The fact that this study was conducted as a field study using a quasi-experimental pretest-posttest comparison of nonequivalent groups, and not as a true experiment with participants randomly assigned to groups, resulted in several challenges to the study's internal validity as discussed previously. However, field studies like this one, which are conducted in a real-world environment, have the advantage over many experimental studies of

enhanced external validity. The artificiality of controlled experiments conducted under highly standardized conditions means that the results obtained in those studies can only be confidently generalized to similarly artificial settings. Highly artificial laboratory research is sometimes of questionable applicability to real-world problems.

The statistical significance of key findings also facilitated the external validity of this study. Findings that are statistically significant are, by definition, very likely to be seen in the population from which the sample came. That means that what was observed in the sample can be confidently generalized to the larger population represented by the population. This generalizability of findings is the essence of external validity. The considerations then become the population the sample represents and the population to which the study's findings be generalized. When a probabilistic sampling method like random sampling is utilized to draw a reasonably large sample from a population, the sample can safely be considered to represent that population and statistically significant sample findings can be safely generalized to the population from which the random sample was drawn (Gravetter & Forzano, 2016). In the present study, however, random sampling was no more an option than random assignment of students to conditions. The samples that were studied were determined by the students who were available to be studied at the time and in the place that the study was conducted. As a result, the population to which the study's findings can be generalized must be defined after the fact as that hypothetical population of struggling readers who are like the struggling readers who participated in the study.



## **Expected Findings**

The reading interventions that were evaluated in this program were all expected to result in gains from pretest to posttest, but the gains were not expected to all be the same. Expected results for each of the study's research questions are summarized below.

**RQ<sub>1</sub>. Is direct, pull-out reading intervention effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year as measured by the QRI-5 assessment?**

Anticipated results included a positive effect of direct, pull-out intervention on reading comprehension. Boulay et al. (2015) demonstrated a significant positive impact of the pull-out intervention and reading comprehension in their assessment of targeted reading instruction (Denton et al., 2006; Faggella-Luby et al., 2007).

This positive effect of a direct pull-out intervention was also predicted by socio-constructivism theory. Vygotsky (1978) proved that students benefit from scaffolding learning opportunities, Nelson and Manset-Williamson (2006) showed connections between targeted reading instruction and learner empowerment, and Tovani (2004) discovered that direct intervention cultivated a literary culture mindset through modeling and scaffolded instruction, just as Vygotsky and Bruner (Moll, 2014; Vygotsky, 1978).

**RQ<sub>2</sub>. Is direct, computer-based reading intervention effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year as measured by the QRI-5 assessment?**

Anticipated results included a positive effect of direct, computer-based reading interventions on comprehension. The bottom-up/part-to-whole theory of reading intervention of

Louisa Moats was supported by previous research which showed that this approach facilitated deep understanding (O'Brien et al., 2007).

The connections between direct, systematic computer-based based intervention and pragmatic learning theory also support the prediction that the computer-based reading intervention examined in this study would be effective in enhancing reading comprehension. Previous research showed that reading interventions that combine multi-sensory experience with direct, systematic, supportive instruction increases comprehension through targeted skill acquisitions (Ash, 2002).

**RQ<sub>3</sub>. Is integrated-content reading intervention effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year as measured by the QRI-5 assessment?**

Predicting the results of integrated-content reading instruction was difficult because competing theoretical perspectives predicted different effects. On the one hand, it was expected that integrated-content reading intervention might interfere with improved reading comprehension at the intermediate school levels due to apprehension at being identified as a struggling reader in front of peers (Jacobs, 2008). On the other hand, the fact that intermediate school students perform better with their peers, gaps are not as wide in the primary school, and skills can be acquired more easily in a large group setting where centers are created to practice skills learned suggested a positive impact of integrated-content reading intervention on reading comprehension (Foorman, Herrera, Dombek, Schatschneider, & Petscher, 2017). Lapp and Fisher (2010) showed that students are motivated by literacy experiences and social interactions within content areas when learning occurs through immersion and experiencing literacy through a multitude of strategies (Akey, 2007; Kaminski et al., 2014). However, despite students'

positive reception to this intervention approach, students were not shown to show substantial improvement in their reading.

**RQ4. What differences exist among three types of reading interventions, pullout, computer-based, and integrated-content in their effectiveness on implicit and explicit student growth in reading comprehension?**

A positive impact of integrated-content reading intervention and reading comprehension was predicted by behaviorism and transactional learning theories. Connell (2008) demonstrated that transactional learning between learner and contextual reading within the classroom environment enhances comprehension. Kibler (2009) promoted contextual learning with English language learners and demonstrated the need for immersion learning for some early language strugglers. Kraemer (2009) demonstrated differences between narrative and expository texts and explicit student growth in comprehension.

**Ethical Issues in the Study**

Ethical concerns associated with this study were relatively minor, as the reading interventions evaluated were consistent with best educational practices. The students who qualified for reading intervention were initially pooled from students who failed the previous years' STAAR (State of Texas Assessments of Academic Readiness) standardized test. The STAAR measures a minimal requirement for reading readiness and additional assessments are conducted by campuses to define areas of reading need. Students identified as candidates for reading interventions are tracked through multiple assessments and remain in reading intervention until both STAAR test scores and other indicators of improvement in reading comprehension skills are noted. In this study, participating students were determined through

careful assessment to need reading intervention and the interventions that they received were chosen to provide the best possible fit to their individual needs as struggling readers.

Test anxiety and fatigue associated with lengthy testing at pretest and posttest were of some concern. However, all students at this level are evaluated through standardized testing at several points in the school year. Reading passages were pre-determined through DRA2 assessments with QRI-5 pretest and posttest appropriately aligned to reading level. No additional testing burden was born by students who participated in this study simply by their participation.

Another ethical dilemma was the potential conflict of interest that would be created by including the researcher's own students as participants in the study. Miles, Cromer, and Narayan (2015) expressed concerns that participants in such a situation would feel a sense of coercion or fear retribution if they declined to participate. Those authors mitigated the appearance of coercion in their own research by limiting research duration and making assessments fun and engaging. In the present study, the potential for conflict of interest was eliminated simply by not using the researcher's own students in the research. Students of the researcher who were identified as needing reading interventions were given those interventions, but not by the researcher, nor were their data included in subsequent data analyses.

Finally, it was important to maintain the confidentiality and anonymity of student records. That was accomplished through careful management of the research data, specifically by removing all identifying information from the electronic data files (Excel and SPSS) that were analyzed to address the study's research questions. Student names were replaced with code numbers, a procedure which is recommended widely to maintain confidentiality and anonymity (Hubbard, 2011). Gagliardi (2011) also noted that "coding of each participant's responses was

made in order to ensure confidentiality” (p. 86). All raw data that were collected were stored in a locked filing cabinet in a locked room. Data needed for the present study were compiled by hand into Excel spreadsheets which were subsequently imported to IBM SPSS for analysis. Although the raw data and some Excel files included identifying information, no information that would identify individual students was retained in the SPSS data files; names were replaced with code numbers. The raw data and some Excel files are official school records and will be retained indefinitely, such as demographic information, DRA2 reading levels, and post-test outcomes. All SPSS data files used in this study will be stored on a password protected USB flash drive in a locked filing cabinet for three years following completion of the study. At that time, the data will be deleted.

The final means by which ethical considerations were managed was through obtaining informed consent from parents and guardians of the participating students. Granting informed consent is part of the process by which parents register their children for classes and acknowledge that they have received and understand the handbook. That handbook informs parents that instructional assessment will be ongoing and includes standardized testing throughout the year. Additional informed consent for students to participate in this study was obtained separately. Students who did not want to participate in the study or who had parents or guardians who did not give informed consent still received the appropriate reading instruction but data from these nonparticipants were not collected for analysis by the researcher.

## **Summary**

The purpose of this study was to evaluate and compare the effectiveness of three reading intervention types in increasing comprehension for struggling readers in intermediate school—pull-out, computer-based, and integrated-content interventions. Sociocultural Constructivism

and Pragmatic Learning theories (Moll, 2014; Vygotsky, 1978) proposed that reading interventions like these can motivate students to construct meaning through scaffolded action, using multiple modalities of thinking and promote a deeper connection to learning. The extant literature has shown that the types of reading intervention examined in this study can be effective in improving reading comprehension in struggling readers, but there have been no published head-to-head comparisons of the three interventions that were examined in this study. The goal of this study was to provide that comparison of interventions. It is hoped that the findings of this study will provide the empirical evidence that is needed by administrators and teachers in making sound decisions regarding effective reading interventions.

The effectiveness of the three interventions was assessed using a quantitative methodology and a quasi-experimental pretest-posttest comparison of nonequivalent groups. Two dependent variables were collected in this study, measuring implicit and explicit comprehension. The QRI-5 instrument was used for that purpose. Data collected from students in the three intervention groups at pretest and posttest were then analyzed using a mixed-subjects 3 (Intervention Type) x 2 (Time) factorial ANOVA. The between-subjects factor was the primary independent variable Intervention Type, with three levels corresponding to the three types of reading interventions. The within-subjects factor was Time with two levels—pretest and posttest. In addition to the ANOVA, tests of simple effects and Games-Howell post hoc pairwise comparisons were chosen to identify the sources of significant ANOVA effects. A one-way multivariate analysis of variance (MANOVA) was conducted to determine the effect of three types of reading interventions (pull-out, computer-based, and integrated-content) on the two dependent variables, implicit and explicit student growth in reading comprehension.

The methodological and research design choices made in this study resulted in some limitations to the study's internal validity and were discussed in this chapter. Those limitations mean that the effectiveness of the interventions and their differential effectiveness cannot be unambiguously attributed to the interventions; pretest to posttest gains seen within each intervention group might be due instead to other factors. The study's external validity was also discussed in this chapter. Several characteristics of the design and methodology require that generalizations of the study's findings be made with caution.

Ethical issues created by the study were given careful attention, with the goal always being to ensure that all students received the reading interventions that were best for them, that those interventions were taught by the most qualified teachers, and that student information was kept confidential. Efforts made to address ethical concerns were also discussed in this chapter.

Chapter 4 presents the results and findings of the study, organized around the study's three research questions. In Chapter 5 those results are interpreted and explained in light of previous research and relevant theory, implications of the findings are considered, and directions for future research are suggested.

## Chapter 4: Data Analysis and Results

### Introduction

The purpose of this research was to examine and compare the effects of three reading interventions in a sample of struggling elementary school readers in third through fifth grades; in one elementary school in Central Texas. The three interventions and criteria by which students were assigned to those interventions were described fully in preceding chapters. Because students were not assigned randomly to interventions, the research design used in the study was a quasi-experimental this was a quasi-experimental, non-equivalent pretest-posttest comparison of nonequivalent groups in which each group served as a control to the others (Gravetter & Forzano, 2016).

The steps I took to heighten validity and reliability of the results with respect to the research questions were to include multiple sources of results to consistently support correlational data of increasing reading comprehension. School-wide Developmental Reading Assessment (DRA2) was delivered to determine initial reading level, to determine reading intervention groups. I used this data to support and further validate the findings determined by the Qualitative Reading Inventory-5th Edition (QRI-5). All students showed similar increases of at least a 45% gain in implicit comprehension between pretests and posttests stagnation in explicit reading comprehension, as evidenced by 49% to 71% gains in explicit comprehension between pretests and posttests, within QRI-5 findings. Students who increased explicit and implicit comprehension also increased their reading levels. DRA2 recorded an average of a two-year gain in reading levels.

The purpose of this study was to determine which intervention type is statistically significant in increasing comprehension at the intermediate level, grades 3-5 and to determine



differences among three intervention types and effectiveness on explicit and implicit student growth in reading comprehension. Ultimately, curricula and meaningful reading programs will be based on the outcome of this study, for this specific campus. The longer ineffective and inappropriate reading strategies are embedded in schema, the harder it is to overcome reading deficits and become proficient readers. The following research questions and the associated hypotheses were designed to discover effective reading practices:

RQ<sub>1</sub>: Is direct, pull out (part-to-whole) reading intervention effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment?

H<sub>1,0</sub>: Direct, pull-out (part-to-whole) reading intervention is not effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.

H<sub>1,A</sub>: Direct, pull-out (part-to-whole) reading intervention is effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.

RQ<sub>2</sub>: Is direct, systematic, computer-based reading intervention effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment?

H<sub>2,0</sub>: Direct, systematic, computer-based reading intervention is not effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.

H<sub>2,A</sub>: Direct, systematic, computer-based reading intervention is effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.

RQ<sub>3</sub>: Is direct, integrated-content (whole-to-part) reading intervention effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment?

H<sub>3,0</sub>: Direct, integrated-content (whole-to-part) reading intervention is not effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.

H<sub>3,A</sub>: Direct, integrated-content (whole-to-part) reading intervention is effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year as measured by the QRI-5 assessment.

RQ<sub>4</sub>: What differences exist among three types of reading interventions, pullout, computer-based, and integrated-content in their effectiveness on implicit and explicit student growth in reading comprehension?

H<sub>4,0</sub>: There is no difference among three types of reading interventions, pullout, computer-based, and integrated-content in their effectiveness on implicit and explicit student growth in reading comprehension

H<sub>4,A</sub>: There is a difference among three types of reading interventions, pullout, computer-based, and integrated-content in their effectiveness on implicit and explicit student growth in reading comprehension.

The remainder of this chapter provides a review of the sample, demographics, tables, and charts related to findings, detailed factorial analyses of explicit and implicit comprehension increases, and the summary of the results. This chapter also discusses the validity and reliability of the analysis and potential effects on the data. The presentation of Data and Results includes multiple analytical methods to ensure assumptions for ANOVA were met and that quasi-experimental was the best method of analysis. Figures and table shown and discussed in this chapter are also located in the appendices.

### **Description of the Sample**

Data that guided the eligible population sample was derived from Texas Education Agency (2016a) determination of at-risk students on my campus, students who have not passed state standardized assessments in reading and who are recommended for further reading intervention. Additionally, the campus was determined to be “Improvement Required” by Texas Education Agency (2016b) standards and could possibly face receivership if scores do not improve in the 2017-2018 school year. If the campus does not improve standardized test scores and remains academically unacceptable for another year, the state of Texas will take control of the school, fire the school board, administration, and staff, and rehire all positions or, possibly, close the school. Three hundred and fifty students were recruited, and 78 consent forms were returned. Multiple permission forms were sent home and study began when I received the minimum quantity of participants necessary for the sample size of 78. Participants were correlated with parent permission forms received and those names entered into a spreadsheet.

Beginning reading levels were entered and QRI-5 pretests were administered to participating students. Results of the QRI-5 pretests were also entered on the spreadsheet, specifically implicit and explicit comprehension scores. Sample size was determined using the statistical power analysis, G\* Power (Faul, Erdfelder, Buchner, & Lang, 2009), ANOVA repeated measures, between factors as the statistical type, effect size  $f = .40$  with error probability of .05 and Power of .95 (see Appendix H). The sample population for this study was determined to be 78-students, 26 students per intervention type, which correlates to more than ten percent of the population.

Intervention began by the sixth week of school and was conducted four days a week, 45 minutes per day, and lasted the entire semester, approximately 10 weeks total. A QRI-5 posttest was administered to determine comprehension growth. Table 1 shows that across three grade levels, the ethnicity distribution included 7 African American (9%), 56 Hispanic (72%), 15 White (19%). Additional populations include 50 Economically Disadvantaged (64%), 10 English Language Learners (13%), and 52 At-Risk for Dropping Out (66.0%). Gender distributions are not a reportable category and therefore, not public record. The sample size was a good representation of the school site; symbolic of the demographics of the school in terms of gender, ethnicity, and special populations.

Table 1

*Demographics of Study Sample for 2016-2017 School Year*

	Frequency	Percent
<b>Students</b>		
Grade 3	40	51%
Grade 4	26	33%
Grade 5	12	16%
<b>Ethnic Distribution</b>		
African American	7	9%
Hispanic	56	72%
White	15	19%
<b>Additional Sub Populations</b>		

Economically Disadvantaged	50	64%
English Language Learners (ELL)	10	13%
At-Risk for Drop Out	52	67%

## Summary of the Results

**Validity.** The validity of data was addressed during the research. Threats to external validity and a generalization of findings included prior knowledge of passages previously read affecting comprehension outcomes, attrition of participants, and pretest effects (Chilton & Ehri, 2015). Prior knowledge of passages read and assessed becomes a threat when the previous content was explored, and additional details were previously learned that are not included in the QRI-5 passage. Prior knowledge may come from another version of the text, a media representation of the text, or a fictitious version of the texts so details recalled are in fact attributed to a previously read or experienced version. These were potentially minimized by using QRI-5 passages of high interest and on level texts. Prior knowledge is expected to enhance or scaffold comprehension not interfere with the assessment of comprehension ability (Leslie & Caldwell, 2011). Threats to internal validity, treatment effect attributed to the treatment being evaluated (Gravetter & Forzano, 2016), included conducting reading intervention at different times throughout the day and by multiple sources. The steps taken to reduce and eliminate the threat were restructuring the reading intervention, SOAR time, to the same time every day, 8:15 in the morning, and for the same duration, 45 minutes. Another threat to internal validity was a carryover of reading strategies taught during SOAR reading intervention to classroom instruction. Exceptional instruction includes using and reinforcing strategies to deepen understanding (Ash, 2002, 2005). For the purpose of this study, to determine which reading intervention type was statistically significant in improving reading comprehension, the

instructional strategies had to remain pure. Eliminating the reading intervention curriculum from classroom instruction minimized the effects of carryover, reducing, and eliminating this threat.

Direct, pull-out intervention was provided during the campus-wide SOAR time and each participant received reading and comprehension support through small group part to whole reading support. Direct, systematic, computer-based intervention was also delivered through SOAR time and each participant received reading and comprehension support through small group part to whole reading support. Direct, integrated classroom reading intervention was delivered through whole to part reading and comprehension support in a guided reading format.

**Reliability.** DRA2, found to be both a valid and a reliable instrument for determining reading levels, was used to inform reading intervention type placement. Finore (2013) found greater interrater reliability using DRA2 than with other reading level assessments. QRI-5 was determined to be a reliable assessment by a consistent interrater reliability of 94-98% (Trezak & Mayer, 2015). Reliability of the research study was determined by stringent factorial analysis with a smaller sample size and intervention types provided across multiple grade levels.

**Delimitations.** The delimitation changes included a change in the location to the third type of intervention. Computer-aided intervention, which complements reading comprehension through software designed to teach skills, was moved to SOAR time to regulate consistent intervention time, aligned to all intervention types provided during SOAR time, and conducted first thing in the morning. This change provided consistency and fidelity of instrumentation implementation while providing no distractions in the learning environment. No outliers were noted during compilation of assessment scores; all scores were within an expected range and no extremely low and extremely high scores were noted. Rother (2000) suggested reliability coefficients typically range from .00 and .95, and the higher the coefficient, the more stable the

test. Gill and Hodgkinson (2007) determined optimal reliability (internal consistency and temporal stability) of an inventory assessment with  $p < .05$ . The next section details the research methods, the applicability of data collected to research foci, and changes in research mitigated by changes in the sample population.

Data were analyzed using two 3 x 2 mixed-subjects factorial ANOVAs, one ANOVA for each of the study's dependent variables—implicit and explicit reading comprehension. Those measures of reading comprehension were provided by the QRI-5 standardized reading achievement test. The between-subjects independent variable was Intervention Type, with three levels: (a) pull-out, (b) computer-based, and (c) integrated-content. Twenty-six students were assigned to each of these interventions for a total sample size of 78 participants. The within-subjects independent variable was Time, with two levels: (a) pretest reading comprehension scores gathered at the beginning of the academic year, and (b) posttest reading comprehension scores gathered at the middle of the academic year.

### **Research Questions**

Four research questions were addressed in this study:

- RQ<sub>1</sub>: Is direct, pull-out (part-to-whole) reading intervention effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year as measured by the QRI-5 assessment?
- RQ<sub>2</sub>: Is direct, systematic, computer-based reading intervention effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year as measured by the QRI-5 assessment?

RQ<sub>3</sub>: Is integrated-content (whole-to-part) reading intervention effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year as measured by the QRI-5 assessment?

RQ<sub>4</sub>: What differences exist among three types of reading interventions, pullout, computer-based, and integrated-content in their effectiveness on implicit and explicit student growth in reading comprehension?

Each of these four research questions was considered from two perspectives—the intervention’s effectiveness in enhancing both implicit comprehension and explicit comprehension. In addition to these four research questions, the analyses performed in this study enabled evaluating the differential effectiveness of the three reading interventions in improving reading comprehension from pretest to posttest. All data manipulations and statistical analyses for this study were performed using IBM SPSS (Version 24.0), G\*Power software (Version 3.1.9.2; Faul et al., 2009), and a hand calculator.

Data was compiled using an Excel spreadsheet and imported to SPSS. Data analysis began with the construction of frequency distributions for all reading test scores to screen for missing data or out-of-range scores. There was no missing data and reading scores all ranged appropriately from 0 to 100. Reading scores were calculated on a percent scale. 0% would mean not completed or 0 correct and a 100 would mean all answers were correct and therefore; a 100 QRI score would mean a 100% comprehension of passages read.

### **Detailed Analysis**

One analysis used to compile the data was ANOVA. The mixed-subjects factorial ANOVAs used to address the first three study research questions are based on several statistical assumptions. Violations of these assumptions can distort or invalidate the results of the analysis



(Kirk, 2012). These statistical assumptions were evaluated and described in the following section.

**Outliers.** The mixed-subjects factorial ANOVA assumes that all cells are free of outliers. Thus, each cell of the 3 x 2 factorial design was checked for outliers. Outliers exert a disproportionate effect on the outcomes of many statistical analyses. Screening for outliers was accomplished by standardizing the scores within each cell and searching for scores exceeding  $\pm 3.3$  ( $p < .001$  in a normal distribution). No outliers were identified (see Appendix I).

**Normality.** The second assumption upon which the mixed-subjects factorial ANOVA is based is that the dependent variable is normally distributed in each cell of the factorial design. This assumption was evaluated in this study both visually, by inspecting frequency histograms of implicit and explicit reading comprehension scores in each cell, and statistically, using the Shapiro-Wilk test of normality (Tabachnick & Fidell, 2013) and measures of distribution skewness and kurtosis. Shapiro-Wilk tests were evaluated using a stringent significance level ( $p \leq .001$ ) as recommended by Meyers et al. (2013) to mitigate against that statistic's sensitivity to even trivial departures from normality. Measures of skewness and kurtosis were screened for values exceeding  $\pm 1.0$  as recommended by George and Mallery (2003) to identify non-normal distributions (see Appendix J).

Table 2 provides measures of distribution skewness and kurtosis and the results of Shapiro-Wilk tests of distribution normality for implicit reading comprehension scores. Table 3 provides that same information for explicit reading comprehension scores. Looking at cell data for implicit reading comprehension scores (Table 2), score distributions in three out of six cells were identified as non-normal by significant values of the Shapiro-Wilk statistic and/or kurtosis values exceeding  $\pm 1.0$ . Looking at cell data for explicit reading comprehension scores (Table 3),

score distributions in four out of six cells were identified as non-normal by significant values of the Shapiro-Wilk statistic and/or skewness or kurtosis values exceeding  $\pm 1.0$ .

Table 2

*Skewness and Kurtosis Statistics and Results of Shapiro-Wilk Tests of Distribution Normality for Implicit Reading Comprehension Test Scores for Students in Pull-Out, Computer-Based, and Integrated-Content Interventions (rows) at Pretest and Posttest (columns).*

Reading Intervention	Pretest			Posttest		
	Skewness	Kurtosis	Shapiro-Wilk	Skewness	Kurtosis	Shapiro-Wilk
Pull-Out	0.37	0.84	0.846	-0.30	-0.88	0.793*
Computer-Based	0.68	0.61	0.869	0.16	-1.21	0.898
Integrated-Content	0.51	0.09	0.852	0.00	-2.17	0.639*

*Note.* \*  $p < .001$ ,  $n = 26$  in all cells. All Shapiro-Wilk statistics were evaluated with  $df = 26$ .

Table 3

*Skewness and Kurtosis Statistics and Results of Shapiro-Wilk Tests of Distribution Normality for Explicit Reading Comprehension Test Scores for Students in Pull-Out, Computer-Based, and Integrated-Content Interventions (rows) at Pretest and Posttest (columns)*

Reading Intervention	Pretest			Posttest		
	Skewness	Kurtosis	Shapiro-Wilk	Skewness	Kurtosis	Shapiro-Wilk
Pull-Out	0.41	-0.58	0.838	-0.64	-0.1	0.783*
Computer-Based	-0.27	-1.27	0.825*	-0.21	-1.14	0.871
Integrated-Content	0.48	-0.85	0.834	-1.11	-0.85	0.557*

*Note.* \*  $p < .001$ ,  $n = 26$  in all cells. All Shapiro-Wilk statistics were evaluated with  $df = 26$ .

This would suggest that the normality assumption was violated for both ANOVAs. On the other hand, Tabachnick and Fidell (2013) noted that the assumption of normality in significant difference tests like the mixed-subjects factorial ANOVA applies to the sampling distribution of the means, not to the actual sample distributions. We examine those sample distributions because if the sample distributions are normal, it is very likely that the sampling distribution of the means will be normal as well. Tabachnick and Fidell (2013) stated

it is the sampling distribution of the means of variables that are to be normally distributed. The Central Limit Theorem reassures us that, with sufficiently large sample

sizes, sampling distributions of means are normally distributed regardless of the distributions of variables. For example, if there are at least 20 degrees of freedom for the error in a univariate ANOVA, the  $F$  test is said to be robust to violations of normality of variables (provided there are no outliers). (pp. 78-79)

The smallest error term degrees of freedom in the ANOVAs used in this study was 75. Consequently, although score distributions in some cells of the ANOVAs were non-normal, sample sizes were sufficiently large in this study that the Central Limit Theorem should satisfy the assumption that the sampling distribution of the means is normally distributed.

**Homogeneity of variances.** The remaining statistical assumptions of the ANOVA were evaluated using a preliminary run of the mixed-subjects factorial ANOVAs to enable using the diagnostic tools available in the output of those analyses. The first of these remaining statistical assumptions is that the groups in the analysis should show approximately equal variances on the dependent variable. This assumption was tested using Levene’s test of homogeneity of variance. Table 4 summarizes the results of the homogeneity of variance tests for the implicit and explicit reading comprehension dependent variables. As shown, the homogeneity of variance assumption was met for both dependent variables at pretest, but not at posttest. As Kirk (2012) has noted, however, ANOVA procedures are quite robust with respect to violations of the homogeneity of variance assumption as long as sample sizes are equal, as they were in this study.

Table 4

*Levene’s Tests of Homogeneity of Between-Group Variance at Pretest and Posttest for Implicit and Explicit Reading Comprehension Dependent Variables*

Dependent Variable	Pretest				Posttest			
	$F$	$df1$	$df2$	$p$	$F$	$df1$	$df2$	$p$
Implicit Reading Comprehension	0.02	2	75	0.977	13.85	2	75	<.001
Explicit Reading Comprehension	2.23	2	75	0.114	13.09	2	75	<.001

Table 5

*Correlations Between Pretest and Posttest Reading Comprehension Scores for Each Reading Intervention Group*

Group	Implicit	Explicit
Pull-Out Intervention	.40*	.41*
Computer-Based Intervention	.73**	.83**
Integrated-Content Intervention	0.26	-0.16

Note. \*  $p < .05$ , two-tailed. \*\* $p < .001$ , two-tailed.  $N = 26$  for all correlations.

**Homogeneity of covariances.** The final assumption upon which the mixed-subjects factorial ANOVA is based is that scores on the within-subjects factor show similar covariances across all groups that form the between-subjects factor. In the context of this study, the homogeneity of covariance assumption would mean that the correlations between pretest and posttest reading comprehension scores are about equal in all three-intervention groups. Those correlations are shown in Table 5. Box's M test of equality of covariances was statistically significant for the implicit reading comprehension dependent variable, Box's  $M = 21.49$ ,  $F(6, 140.192.31) = 3.44$ ,  $p = .002$ . Box's test was also statistically significant for the explicit reading comprehension dependent variable, Box's  $M = 31.85$ ,  $F(6, 140192.31) = 5.10$ ,  $p < .001$ . While these significant Box's M tests may indicate that the homogeneity of covariance assumption was violated, Box's M is also very sensitive to non-normal data distributions (Meyers et al., 2013) and, as noted previously, the data in this study were non-normal in several cells of the factorial design.

**Summary of the tests of assumptions.** To summarize, the results of the tests of statistical assumptions of the mixed-subjects factorial ANOVAs include: (a) no cells in either ANOVA included outliers, (b) several cells in both ANOVAs indicated possible violations of the normality assumption, but the samples were of sufficient size that the Central Limit Theorem somewhat mitigates this possible violation, (c) the homogeneity of variance assumption was

violated at posttest on both dependent variables. The ANOVA is fairly robust to violations of this assumption when sample sizes are equal, as they were here, and (d) Box's M tests indicated that the homogeneity of covariance assumption was violated for both dependent variables, but that test is extremely sensitive to non-normal data distributions as well. Considering all of this, and given that there is no robust, nonparametric alternative to the mixed-subjects factorial ANOVA within IBM SPSS, the ANOVAs were performed as planned, but all  $F$  tests were evaluated for significance using a more stringent level of significance ( $p < .01$ ) than the standard  $p < .05$  (Dattalo, 2008).

### **Post Hoc Power Analysis**

A priori power analysis was performed during the planning stages of this study to determine the sample size that would be needed to achieve the reasonable statistical power to detect as significant an effect of a size that would be noteworthy. Once the data was collected, more information was available, such as different explicit and implicit results and reading score increases as determined by QRI-5 and DRA2 assessments. As the actual sample size was known ( $N = 78$ ), it became clear that all effects needed to be assessed for significance using a stringent level of significance ( $p < .01$ ) to mitigate possible violations of some of the statistical assumptions of the ANOVAs, and correlations between pretest and posttest scores were known. The correlation between pretest and posttest measures of implicit comprehension was  $r(76) = .39, p < .001$ ; the correlation between pretest explicit and posttest measures of explicit comprehension was  $r(76) = .37, p < .001$ . It was with this additional information available, that the performance of a post hoc power analysis was used to determine how much statistical power was available to support the study's ANOVAs. G\*Power software was used for this purpose. G\*Power requires performing three separate power analyses to fully cover a mixed-subjects

factorial ANOVA: (a) one for the between-subjects main effect (Intervention Type), (b) one for the within-subjects main effect (Time), and (c) one for the interaction effect (Intervention Type x Time).

Parameters input to the repeated measures between factors ANOVA post hoc power analysis were as follows: effect size was moderate (Cohen's  $f = .25$ ,  $\alpha = .01$ ,  $N = 78$ ), there were three groups, there were two measurements, and the correlation among measures was set as  $r = .38$  (the average of the pretest-posttest correlations for implicit and explicit comprehension). Results of the analysis are displayed in Figure 5 which shows statistical power ( $1 - \beta$ ) as a function of effect size (Cohen's  $f$ ) for a sample of  $N = 78$ . For the between-subjects main effect of Intervention Type, statistical power ( $1 - \beta$ ) is 4% for a small effect (Cohen's  $f = .1$ ), 39% for a medium effect (Cohen's  $f = .25$ ), and 89% for a large effect (Cohen's  $f = .40$ ) (see Appendix K).

Parameters input to the repeated measures within factors ANOVA post hoc power analysis were as follow: a medium effect size (Cohen's  $f = .25$ ),  $\alpha = .01$ ,  $N = 78$ , three groups, two measurements, correlation among measures  $r = .38$ , and the nonsphericity correction factor was left at the default value of  $\epsilon = 1$  because the ANOVA does not assume sphericity unless there are three or more repeated measures. Results of the analysis are displayed in Figure 6 which shows statistical power ( $1 - \beta$ ) as a function of effect size (Cohen's  $f$ ) for a sample of  $N = 78$ . For the within-subjects main effect of Time, statistical power was 15% for a small effect (Cohen's  $f = .1$ ), 90% for a medium effect (Cohen's  $f = .25$ ), and 99% for a large effect (Cohen's  $f = .40$ ; see Appendix K).

Parameters input to the repeated measures within-between interactions ANOVA post hoc power analysis were identical to those for the repeated measures within factors ANOVA analysis. Results of the power analysis are displayed in Figure 5 which shows statistical power

$(1 - \beta)$  as a function of effect size (Cohen's  $f$ ) for a sample of  $N = 78$ . For the Intervention Type x Time interaction effect, power was 10% for a small effect (Cohen's  $f = .1$ ), 83% for a medium effect (Cohen's  $f = .25$ ), and 99% for a large effect (Cohen's  $f = .40$ ; see Appendix K).

A one-way multivariate analysis of variance (MANOVA) was conducted to determine the effect of three types of reading interventions (pull-out, computer-based, and integrated-content) on the two dependent variables, implicit and explicit student growth in reading comprehension. Significant differences were found among the three reading interventions on the dependent measures, Wilks's  $\Lambda = .52$ ,  $F(4, 148) = 14.37$ ,  $p < .001$ . The multivariate  $\eta^2$  based on Wilks's  $\Lambda$  was a strong effect size, .28, which indicates that 28% of multivariate variance of the dependent variables (growth in implicit and explicit student growth in reading comprehension) is associated with the type of intervention. The means and standard deviations for student growth in reading comprehension as a function of the type of reading intervention are presented in Table 6.

Table 6

*Mean Scores and Standard Deviations for Implicit and Explicit Student Growth in Reading Comprehension*

Intervention	Implicit		Explicit	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Pull-Out	38.46	21.86	36.15	22.60
Computer-Based	10.96	21.73	2.31	15.95
Integrated - Content	51.35	21.43	44.04	27.13

The ANOVA on dependent variables were conducted as follow-up tests to the MANOVA. Using the Bonferroni method, each ANOVA was tested at the .025 level. The ANOVA on both the implicit  $F(2, 75) = 23.56$ ,  $p < .001$ ,  $\eta^2 = .39$  and the explicit  $F(2, 75) = 25.54$ ,  $p < .001$ ,  $\eta^2 = .41$  student growth in reading comprehension were statistically significant.

Posthoc analyses to the univariate ANOVA of both the implicit and the explicit student growth in reading comprehension consisted of conducting pairwise comparisons to find which

intervention affected reading comprehension growth most strongly. Each pairwise was tested at the .025 divided by 3 or .008 level. For both the implicit and explicit student growth in reading comprehension, the Computer-based intervention was significantly inferior to the Pull-Out intervention and the Integrated-Content intervention. The Integrated-Content intervention and the Pull-Out intervention were not significantly different from each other. See Figure 13.

### **Analyses of Implicit Reading Comprehension**

Descriptive statistics for the QRI-5 measure of implicit reading comprehension as a function of Intervention Type and Time are provided in Table 7. Table 8 provides a summary table for the 3 (Intervention Type) x 2 (Time) mixed-subjects factorial ANOVA using implicit reading comprehension as the dependent variable. The Intervention Type x Time interaction effect was strong ( $\eta^2 = .152$ ) and statistically significant ( $p < .001$ ). This statistically significant interaction indicates that the three interventions were differentially effective in changing implicit reading comprehension scores. The difference in the effectiveness of the three types of reading interventions is captured in Figure 11. That figure shows that the content integrated intervention achieved the highest gains, followed by the pull-out intervention, and finally by the computer-based intervention. Inspection of Table 5 enables quantifying the reading gains seen in each of the three interventions. Students receiving the integrated content intervention showed a pretest to posttest gain of 51.35 points (95% CI [42.69, 60.00]), students receiving the pull-out intervention gained 38.46 points (95% CI [29.64, 47.29]), and students in the computer-based intervention showed a gain of 10.96 points (CI [2.19, 19.74]). Put simply, the integrated content intervention was 4.7 times as effective as computer-based intervention, 1.3 times as effective as pull-out intervention, and the pull-out intervention was 3.5 times as effective as the computer-based intervention. Since an interaction effect precludes any unconditional interpretation of main



effects, the interaction effect will be the focus here. Figures 11 provides a plot of the cell means (see Appendix L).

Table 7

*Descriptive Statistics for Implicit Reading Comprehension as a Function of Intervention Type and Time.*

Intervention Type	Time		Row Means
	Pretest	Posttest	
Pull-Out	31.92 (18.71)	70.38 (21.12)	51.15
Computer-Based	40 (23.75)	50.96 (31.91)	45.48
Integrated-Content	36.15 (20.90)	87.5 (12.75)	61.83
Column Means	36.03	69.62	

*Note.* Values in parentheses are standard deviations. Sample size in all cells was 26 with total  $N = 78$ .

Table 8

*Summary Table for 3(Intervention Type) x 2(Time) Mixed-Subjects Factorial ANOVA Using Implicit Reading Comprehension as the Dependent Variable*

Source	SS	df	MS	F	p	h2
Between-Subjects						
Intervention Type	7163.78	2	3581.89	4.73	0.012	0.112
Error	56820.19	75	757.6			
Within-Subjects						
Time	44002.56	1	44002.56	187.42	<.001	0.605
Intervention Type x Time	11063.78	2	5531.89	23.56	<.001	0.152
Error	17608.65	75	234.78			

**Simple main effects of intervention.** To assist in identifying the source and meaning of the interaction effect, tests of simple main effects were performed. One of these evaluated differences between intervention groups at pretest; the other evaluated differences between intervention groups at posttest. None of the three intervention groups differed significantly on implicit reading comprehension at pretest,  $F(2, 75) = 0.94, p = .394$ . However, the three groups did differ significantly at posttest,  $F(2, 75) = 16.03, p < .001, \eta^2 = .299$ . This is because the

three intervention groups showed different amounts of improvement from pretest to posttest. Games-Howell post hoc comparisons summarized in Table 8 showed significant differences between all three groups at posttest. Games-Howell comparisons were selected for use in this study because that procedure has been shown to be robust to violations of the normality and homogeneity of variance assumptions (Ramsey et al., 2011). The fact that the intervention groups did not differ significantly at pretest but did differ significantly at posttest was the source of the significant interaction effect and indicates that some interventions were more effective than others in producing gains in implicit reading comprehension from pretest to posttest. The efficacy of each of those reading interventions will be evaluated next as the study's three primary research questions are addressed.

Table 9

*Games-Howell Post Hoc Comparisons of Posttest Implicit Reading Comprehension Among the Three Reading Intervention Groups*

Comparison	Group		Group 2		<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Pull-Out vs. Computer-Based	70.38	21.12	50.96	31.91	0.011
Pull-Out vs. Integrated-Content	70.38	21.12	87.5	12.75	0.029
Computer-Based vs. Integrated Content	50.96	31.91	87.5	12.75	<.001

### **Detailed Analysis**

In this section, the research questions and corresponding hypotheses are discussed in relation to statistical analyses performed. This quantitative quasi-experimental study included three research questions and examined three related hypotheses. Factorial statistics were calculated for the independent variables, both between-groups (the three intervention types) and within-group (time) to examine the research questions and hypotheses. Discussion of which intervention type had the most significant gain was included.

#### **Analyses of implicit reading comprehension.**

***RQ1: Is direct, pull-out reading intervention effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year as measured by the QRI-5 assessment?*** RQ1 pertains to the efficacy of the pull-out reading intervention. This RQ was addressed using a Games-Howell post hoc comparison between the pretest implicit reading comprehension performance of pull-out students ( $M = 31.92$ ,  $SD = 18.71$ ) and their posttest performance ( $M = 70.38$ ,  $SD = 21.12$ ).

H<sub>1,0</sub>: Direct, pull-out (part to whole) reading intervention is not effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.

H<sub>1,A</sub>: Direct, pull-out (part to whole) reading intervention is effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.

***Hypothesis 1.*** The 38.46-point gain was significant ( $p < .001$ ), indicating that students in the pull-out intervention showed significant gains in implicit reading comprehension from pretest to posttest. The null hypothesis is rejected, and the alternate hypothesis is accepted. “Direct, pull-out (part to whole) reading intervention is effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.”

***RQ2. Is direct, computer-based reading intervention effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year as measured by the QRI-5 assessment?*** RQ2 pertains to the efficacy of the computer-based reading intervention. This RQ was addressed using a Games-Howell post

hoc comparison between the pretest implicit reading comprehension performance of computer-based students ( $M = 40.00$ ,  $SD = 23.75$ ) and their posttest performance ( $M = 50.96$ ,  $SD = 31.91$ ).

$H_{2,0}$ : Direct, systematic, computer-based reading intervention is not effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.

$H_{2,A}$ : Direct, systematic, computer-based reading intervention is effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.

**Hypothesis 2.** The 10.96-point gain was not significant ( $p = .012$ ), indicating that students in the computer-based intervention showed no significant gains in implicit reading comprehension from pretest to posttest. The null hypothesis is not rejected “Direct, systematic, computer-based reading intervention is not effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.”

**RQ3: *Is direct, integrated-content reading intervention effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year as measured by the QRI-5 assessment?*** RQ3 pertains to the efficacy of the integrated-content reading intervention. This RQ was addressed using a Games-Howell post hoc comparison between the pretest implicit reading comprehension performance of integrated-content students ( $M = 36.15$ ,  $SD = 20.90$ ) and their posttest performance ( $M = 87.50$ ,  $SD = 12.75$ ).

H<sub>3,0</sub>: Direct, integrated-content (whole-to-part) reading intervention is not effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.

H<sub>3,A</sub>: Direct, integrated-content (whole-to-part) reading intervention is effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.

**Hypothesis 3.** The 51.35-point gain was significant ( $p < .001$ ), indicating that students in the integrated-content intervention showed significant gains in implicit reading comprehension from pretest to posttest. The null hypothesis is rejected, and the alternate hypothesis is accepted. “Direct, integrated-content (whole-to-part) reading intervention is effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.”

**RQ4.** *What differences exist among three types of reading interventions, pullout, computer-based, and integrated-content in their effectiveness on implicit and explicit student growth in reading comprehension?* RQ4 pertains to the differences in growth between the three types of reading intervention. This RQ was addressed using a one-way multivariate analysis of variance (MANOVA) to determine the effect of three types of reading interventions on implicit student growth in reading comprehension and association with the type of intervention.

H<sub>4,0</sub>: There is no difference among three types of reading interventions, pullout, computer-based, and integrated-content in their effectiveness on implicit and explicit student growth in reading comprehension

H<sub>4,A</sub>: There is a difference among three types of reading interventions, pullout, computer-based, and integrated-content in their effectiveness on implicit and explicit student growth in reading comprehension.

**Hypothesis 4.** Significant differences were found among the three reading intervention types on the dependent measures, Wilks's  $\Lambda = .52$ ,  $F(4, 148) = 14.37$ ,  $p < .001$ . The multivariate  $\eta^2$  based on Wilks's  $\Lambda$  was a strong effect size, .28, which indicates that 28% of multivariate variance of the dependent variables (growth in implicit and explicit student growth in reading comprehension) is associated with the type of intervention. The null hypothesis is rejected, and the alternate hypothesis is accepted. "There is a difference among three types of reading interventions, pullout, computer-based, and integrated-content in their effectiveness on implicit and explicit student growth in reading comprehension."

**Summary.** All three reading intervention groups showed significant improvements from pretest to posttest. However, the fact that the three groups showed no significant between-group differences in implicit reading comprehension at pretest but differed strongly and significantly from each other at posttest indicated that the interventions were not equally effective. The intervention that produced the largest gain (51.35 points) in implicit reading comprehension was the integrated-content intervention. The second-largest gain (38.46 points) was achieved by the pull-out intervention. The most modest gain (10.96 points) was produced by the computer-based intervention. The relative efficacy rankings of the three reading interventions evaluated in this study can be considered statistically reliable.

Table 10

*Descriptive Statistics for Explicit Reading Comprehension as a Function of Intervention Type and Time*

Intervention Type	Time		Row Means
	Pretest	Posttest	
Pull-Out	41.15 (21.65)	77.31 (19.76)	59.23
Computer-Assisted	47.88 (26.12)	50.19 (27.98)	49.04
Content-Integration	49.23 (22.97)	93.27 (11.31)	71.25
Column Means	46.09	73.59	

*Note.* Values in parentheses are standard deviations. Sample size in all cells was 26 with total  $N = 78$ .

Table 11

*Summary Table for 3(Intervention Type) x 2(Time) Mixed-Subjects Factorial ANOVA Using Explicit Reading Comprehension as the Dependent Variable*

Source	SS	df	MS	F	p	$\eta^2$
Between-Subjects						
Intervention Type	12856.09	2	6428.05	8.65	<.001	0.187
Error	55727.4	75	743.03			
Within-Subjects						
Time	29493.75	1	29493.75	117.89	<.001	0.483
Intervention Type x Time	12779.81	2	6389.9	25.54	<.001	0.209
Error	18763.94	75	250.19			

**Analyses of explicit reading comprehension.** Descriptive statistics for the QRI-5 measure of explicit reading comprehension as a function of Intervention Type and Time are provided in Table 10. Figure 7 provides a plot of the cell means (See Appendix L). Table 11 provides a summary table for the 3 (Intervention Type) x 2(Time) mixed-subjects factorial ANOVA using explicit reading comprehension as the dependent variable. The Intervention Type x Time interaction effect was strong ( $\eta^2 = .209$ ) and statistically significant ( $p < .001$ ). This statistically significant interaction indicates that the four interventions were differentially effective in changing explicit reading comprehension scores. The difference in the effectiveness

of the three types of reading intervention is captured in Figure 12. That figure shows that the content integrated intervention achieved the greatest gains, followed by the pull-out intervention, and finally by the computer-based intervention. Inspection of Table 9 enables quantifying the reading gains seen in each of the three interventions. Students receiving the integrated content showed a pretest to posttest gain of 44.04 points (95% CI [33.08, 55.00]), students in the pull-out intervention gained 36.15 points (95% CI [27.07, 45.28]), and students in the computer-based intervention showed a gain of 2.31 points (95% CI [-4.14, 8.75]). In other words, the integrated content intervention was 19.1 times as effective as computer-based intervention, 1.2 times as effective as pull-out intervention, and the pull-out intervention was 15.6 times as effective as the computer-based intervention. Since an interaction effect precludes any unconditional interpretation of main effects, the interaction effect will be the focus here.

**Simple effects of intervention.** To assist in identifying the source and meaning of the interaction effect, tests of simple main effects were performed. One of these evaluated differences between intervention groups at pretest; the other evaluated differences between intervention groups at posttest. None of the three intervention groups differed significantly on explicit reading comprehension at pretest,  $F(2, 75) = 0.87, p = .423$ . However, the three groups did differ strongly and significantly at posttest,  $F(2, 75) = 28.43, p < .001, \eta^2 = .431$ . This is because the three intervention groups showed different amounts of improvement from pretest to posttest. Games-Howell post hoc comparisons summarized in Table 12 showed significant differences between all three groups at posttest. The fact that the intervention groups did not differ significantly at pretest but did differ significantly at posttest was the source of the significant interaction effect and indicates that some interventions were more effective than others in producing gains in explicit reading comprehension from pretest to posttest. The



efficacy of each of those reading interventions will be evaluated next as the study’s three primary research questions are addressed.

Table 12

*Games-Howell Post Hoc Comparisons of Posttest Explicit Reading Comprehension Among the Three Reading Intervention Groups*

Comparison	Group 1		Group 2		<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Pull-Out vs. Computer-Assisted	77.31	19.76	50.19	27.98	<.001
Pull-Out vs. Content-Integrated	77.31	19.76	93.27	11.31	0.022
Computer-Assisted vs. Content-Integrated	50.19	27.98	93.27	11.31	<.001

***RQ1: Is direct, pull-out reading intervention effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year as measured by the QRI-5 assessment?*** RQ1 pertains to the efficacy of the pull-out reading intervention. This RQ was addressed using a Games-Howell post hoc comparison between the pretest explicit reading comprehension performance of pull-out students ( $M = 41.15$ ,  $SD = 21.65$ ) and their posttest performance ( $M = 77.31$ ,  $SD = 19.76$ ).

H<sub>1,0</sub>: Direct, pull-out (part to whole) reading intervention is not effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.

H<sub>1,A</sub>: Direct, pull-out (part to whole) reading intervention is effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.

***Hypothesis 1.*** The 36.16-point gain was significant ( $p < .001$ ), indicating that students in the pull-out intervention showed significant gains in explicit reading comprehension from pretest to posttest. The null hypothesis is rejected, and the alternate hypothesis is accepted. “Direct, pull-out (part to whole) reading intervention is effective in significantly increasing

comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.”

***RQ<sub>2</sub>: Is direct, computer-based reading intervention effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year as measured by the QRI-5 assessment?*** RQ2 pertains to the efficacy of

the computer-based reading intervention. This RQ was addressed using a Games-Howell post hoc comparison between the pretest explicit reading comprehension performance of computer-based students ( $M = 47.88$ ,  $SD = 26.12$ ) and their posttest performance ( $M = 50.19$ ,  $SD = 27.98$ ).

$H_{2,0}$ : Direct, systematic, computer-based reading intervention is not effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.

$H_{2,A}$ : Direct, systematic, computer-based reading intervention is effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.

***Hypothesis 2.*** The 2.31-point gain was not statistically significant ( $p = .600$ ), indicating that students in the computer-based intervention showed no significant gains in explicit reading comprehension from pretest to posttest. The null hypothesis is not rejected. Direct, systematic, computer-based reading intervention is not effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.

***RQ<sub>3</sub>: Is direct, integrated-content reading intervention effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year as measured by the QRI-5 assessment?*** RQ3 pertains to the efficacy of

the integrated-content reading intervention. This RQ was addressed using a Games-Howell post hoc comparison between the pretest explicit reading comprehension performance of integrated-content students ( $M = 49.23$ ,  $SD = 22.97$ ) and their posttest performance ( $M = 93.27$ ,  $SD = 11.31$ ).

H<sub>3,0</sub>: Direct, integrated-content (whole-to-part) reading intervention is not effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.

H<sub>3,A</sub>: Direct, integrated-content (whole-to-part) reading intervention is effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.

**Hypothesis 3.** The 44.04-point gain was significant ( $p < .001$ ), indicating that students in the integrated-content intervention showed significant gains in explicit reading comprehension from pretest to posttest. The null hypothesis is rejected, and the alternate hypothesis is accepted. Direct, integrated-content (whole-to-part) reading intervention is effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment.

**RQ4. *What differences exist among three types of reading interventions, pullout, computer-based, and integrated-content in their effectiveness on implicit and explicit student growth in reading comprehension?*** RQ4 pertains to the differences in growth between the three types of reading intervention. This RQ was addressed using a one-way multivariate analysis of variance (MANOVA) to determine the effect of three types of reading interventions on implicit student growth in reading comprehension and association with the type of intervention.

H<sub>4,0</sub>: There is no difference among three types of reading interventions, pullout, computer-based, and integrated-content in their effectiveness on implicit and explicit student growth in reading comprehension

H<sub>4,A</sub>: There is a difference among three types of reading interventions, pullout, computer-based, and integrated-content in their effectiveness on implicit and explicit student growth in reading comprehension.

**Hypothesis 4.** Significant differences were found among the three reading intervention types on the dependent measures, Wilks's  $\Lambda = .52$ ,  $F(4, 148) = 14.37$ ,  $p < .001$ . The multivariate  $\eta^2$  based on Wilks's  $\Lambda$  was a strong effect size, .28, which indicates that 28% of multivariate variance of the dependent variables (growth in implicit and explicit student growth in reading comprehension) is associated with the type of intervention. The null hypothesis is rejected, and the alternate hypothesis is accepted. "There is a difference among three types of reading interventions, pullout, computer-based, and integrated-content in their effectiveness on implicit and explicit student growth in reading comprehension."

#### **Chapter 4 Summary**

In this chapter, I reviewed the reading intervention types this research study determined were statistically significant in increasing reading comprehension. Between the proposed research and the actual research, some changes to ensure fidelity, validity, and reliability were addressed. All Reading Intervention was conducted in the morning for the same duration. Students were not exposed to reading intervention strategies prior to the morning reading intervention, SOAR time. Teachers were aligned to the type of reading intervention best matching their pedagogy style and certification and students were homogeneously grouped according to predetermined reading level.

Factorial analyses were conducted to determine effects of reading intervention type to increases in reading comprehension, using ANOVA and to consequently determine which reading intervention type is most effective on increasing implicit and explicit student growth in reading comprehension, using MANOVA. Assumptions were analyzed and discussed prior to the onset of the statistical analysis. Multiple analyses were conducted to satisfy assumptions and determine the validity of ANOVA and consequently, the reliability of results. Tables are included in the body of the chapter and figures are in the appendices.

Students in pull-out and integrated-content reading interventions showed significant improvements in explicit reading comprehension from pretest to posttest, but there was no significant change in explicit reading comprehension among students in the computer-based intervention. The intervention that produced the largest gain (44.04 points) in explicit reading comprehension was the integrated-content intervention. The second-largest gain (36.15 points) was achieved by the pull-out intervention. Students in the computer-based reading intervention showed almost no improvement (2.31 points) from pretest to posttest.

Students in pull-out and integrated-content reading interventions showed significant improvements in implicit reading comprehension from pretest to posttest, but there was no significant change in implicit reading comprehension among students in the computer-based intervention. The intervention that produced the largest gain (51.35 points) in implicit reading comprehension was the integrated-content intervention. The second-largest gain (38.46 points) was achieved by the pull-out intervention. Students in the computer-based reading intervention showed minimal improvement (10.96 points) from pretest to posttest.

The relative efficacy rankings of the three reading interventions evaluated in this study can be considered statistically reliable. Consistently, pull-out and integrated reading intervention

types demonstrated strong growth for implicit and explicit comprehension. Computer-based intervention type had a moderate gain in implicit comprehension and minimal growth in explicit comprehension. Both aspects of comprehension, implicit and explicit, showed an increase. Although not statistically significant, growth in comprehension was a goal of this campus and noted in this study. The focus on student needs for comprehension growth (implicit or explicit) may be a significant contributing factor in assigning a successful intervention type to a student. Previous and current research shows that many factors need to be considered in determining which intervention type is the most effective. Differentiation of intervention type is as valid as determining the need for reading intervention.

In Chapter 5, the results will be discussed further with applicability to current and future research. Discussion of previous and current research to determine if research conducted since the onset of the study adds to the importance of the research study. Limitations of the study, implications of the results for practice, policy, and theory, followed by recommendations for further research, and conclusion of the study bring this study full circle.

## **Chapter 5: Discussion and Conclusion**

### **Introduction**

This study used a quasi-experimental pretest-posttest comparison of nonequivalent groups to evaluate the relative effectiveness of three reading interventions in samples of third through fifth graders at an elementary school in Central Texas. The purpose of this concluding chapter is to delineate the results of the study, to highlight the intervention that most effectively increased implicit and explicit reading comprehension, and to consider why the least effective intervention was least effective. Also included in this chapter is a discussion of the results in relation to the existing literature, as well as to reading intervention types, both current and those proposed for the future. The results of this study could potentially impact how reading intervention is implemented for struggling readers, especially in school districts where the majority of students read two or more grade levels below the norm. In the following paragraphs, I will summarize the study's methodology, review and evaluate the results of the research, connect the outcomes of the study to the reading intervention literature, and shed light on how this study might be impactful moving forward. Limitations of the study, implications for policy and practice, and recommendations for further research will precede the conclusions of this study.

### **Summary of the Results**

Reading comprehension is an essential skill that should be the over-arching focus for reading interventions (Reed et al., 2007; Ritchey, Palombo, Silverman, & Speece, 2017). Textual difficulty affects struggling readers early on, and if not addressed, can lead to various negative outcomes, such as scholastic retention of the student, poor self-confidence, and the desire of poor

readers to hide their reading deficits so as not to appear different than other students (Faggella-Luby et al., 2007).

For instance, students in third grade begin to notice different abilities in reading once the reading passages intensify in concept, theme, and length (Pannell, 2012). Oftentimes, compensatory skills will mask reading deficits, leading to the development of avoidance behaviors that keep students from receiving the help they need until they are hopelessly behind (King et al., 2012). Furthermore, teachers may focus on mitigating behavior instead of identifying the nature of the problem.

I explored three research questions in this study and those research questions guided the study's data analyses:

- RQ<sub>1</sub>. Is direct, pull-out (part-to-whole) reading intervention effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year as measured by the QRI-5 assessment?
- RQ<sub>2</sub>. Is direct, systematic, computer-based reading intervention effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment?
- RQ<sub>3</sub>. Is direct, integrated-content (part-to-whole) reading intervention effective in significantly increasing comprehension with intermediate school students from the beginning of the year to the middle of the year, as measured by the QRI-5 assessment?
- RQ<sub>4</sub>: What differences exist among three types of reading interventions, pullout, computer-based, and integrated-content in their effectiveness on implicit and explicit student growth in reading comprehension?



This study was also guided by the idea that unidentified reading difficulties can be remediated through reading intervention and those interventions are most effective when correctly paired to the student's needs (Fogarty et al., 2017). Sociocultural constructivism theory promotes learning through scaffolding multi-modality learning experiences (Moll, 2014; Vygotsky, 1978). Current research supporting transactional learning theory demonstrates that differentiation of instructional strategies garners positive results when intervention type matches student interest (Bulut, 2017; Peterson, 2016), student need (Foorman et al., 2017), is provided by trained and well-supported educational staff (Gersten, Newman-Gonchar, Haymond, & Dimino, 2017), and occurs in a naturalistic environment (Connell, 2008).

The results of the study demonstrated that all three reading interventions produced significant pretest to posttest gains in reading comprehension, with one exception: The explicit comprehension of students receiving computer-based instruction did not improve significantly from pretest to posttest. Regarding the relative effectiveness of the three interventions, the study found that the most effective intervention was integrated-content, whole-to-part. Other researchers have shown integrated reading intervention as well to be effective in improving comprehension when the embedded instruction is relevant and meaningful (Chilton & Ehri, 2015; Peterson, 2016). Embedded visual support is effective in improving comprehension in integrated types of intervention because it promotes situational interest in reading (Bulut, 2017; Peterson, 2016). Computer-based intervention was found to improve implicit comprehension but did not yield significant improvement in explicit comprehension (Fenty, Mulcahy, & Washburn, 2015). Further, in terms of relative efficacy, computer-based instruction was the least effective of the three interventions evaluated. The pull-out, small-group intervention, focusing on both integrated, whole-to-part and pull-out, part-to-whole reading skills, yielded statistically

significant improvement in reading comprehension and was second-most effective of the three interventions. This type of intervention has also been demonstrated to be effective by Foorman et al. (2017).

### **Review of Methodology**

The research design used in this quantitative study was a quasi-experimental pretest-posttest comparison of nonequivalent groups and utilized a sample of 78 struggling readers who were identified as reading at least one grade below expectation. The target population of 450 students, third through fifth grade, all provided permission to be part of a research study to evaluate reading intervention programs. All reading interventions were held during the beginning of the day, four days a week, for forty-five minutes a day. Multiple teachers were trained in specific reading interventions and were provided support for the study. Faculty members were assigned to teach or provide behavioral and/or other instructional support.

Students were identified to receive reading interventions based on the results of Developmental Reading Assessment 2 (DRA2) assessments taken by all students to determine their reading levels. Students with reading abilities one to two years below grade level were placed into one of three small reading intervention groups. Students with reading abilities on level or above participated in problem-based learning classes or pre-teach/re-teach classes and were not part of the target population. Students who were identified as needing reading intervention were assigned to either a pull-out, whole-to-part, systematic, computer-based, or integrated-content, part-to-whole intervention based on their specific reading deficits as detailed in Chapter 3.

Students who were assigned to a reading intervention were pretested on their intrinsic and extrinsic reading comprehension skills at the beginning of the school year using the QRI-5

instrument. Students were administered the Qualitative Reading Inventory-5 (QRI-5) at their reading level, as determined by the DRA2. These pretest scores provided a baseline, relative to which subsequent improvements could be evaluated. During the study, the researcher assessed the fidelity of the intervention types, ensuring that crossover effects did not occur, mitigated problems that occurred by attrition or late enrollment of students, and checked on teachers and supplies to promote fluidity of intervention. Post-test evaluation of implicit and explicit comprehension was conducted at the end of the semester and prior to winter break, again using the QRI-5. Changes from pretest to posttest were the focus of this study, along with differential changes observed from one intervention group to the next.

Data on reading comprehension gathered from the three intervention groups at pretest and posttest were evaluated using two mixed-subjects factorial ANOVAs and follow-up post hoc comparisons. The study's two dependent variables of reading comprehension—implicit and explicit comprehension—were measured using the QRI-5. These dependent variables were evaluated separately because reading interventions differ for students who cannot recall details and facts (explicit comprehension) as opposed to students who cannot draw inferences based on textual evidence (implicit comprehension). Separate ANOVAs were performed for each dependent variable because the ANOVA is suited to the analysis of a single dependent variable at a time. In each ANOVA, the between-subjects factor was Intervention Type (with three levels, consisting of pull-out, part-to-whole, systematic, computer-based, and integrated-content, whole-to-part interventions), and the within-groups factor was Time (with two levels, consisting of the pretest and posttest). Tests of the statistical assumptions of the ANOVAs showed that some of those assumptions were violated which might distort the reported exact significance levels. To mitigate this, the ANOVA main and interaction effects were evaluated for

significance using a stringent significance level ( $p < .01$ ) instead of the more standard significance level ( $p < .05$ ). For this same reason, Games-Howell post hoc comparisons were selected for use in this study, which are robust with respect to violations of many statistical assumptions.

A one-way multivariate analysis of variance (MANOVA) was conducted to determine the effect of three types of reading interventions (pull-out, computer-based, and integrated-content) on the two dependent variables, implicit and explicit student growth in reading comprehension. Significant differences were found among the three reading interventions on the dependent measures, Wilks's  $\Lambda = .52$ ,  $F(4, 148) = 14.37$ ,  $p < .001$ . The multivariate  $\eta^2$  based on Wilks's  $\Lambda$  was a strong effect size, .28, which indicates that 28% of multivariate variance of the dependent variables (growth in implicit and explicit student growth in reading comprehension) is associated with the type of intervention.

The ANOVA on dependent variables were conducted as follow-up tests to the MANOVA. Using the Bonferroni method, each ANOVA was tested at the .025 level. The ANOVA on both the implicit  $F(2, 75) = 23.56$ ,  $p < .001$ ,  $\eta^2 = .39$  and the explicit  $F(2, 75) = 25.54$ ,  $p < .001$ ,  $\eta^2 = .41$  student growth in reading comprehension were statistically significant.

Posthoc analyses to the univariate ANOVA of both the implicit and the explicit student growth in reading comprehension consisted of conducting pairwise comparisons to find which intervention affected reading comprehension growth most strongly. Each pairwise was tested at the .025 divided by 3 or .008 level. For both the implicit and explicit student growth in reading comprehension, the Computer-based intervention was significantly inferior to the Pull-Out intervention and the Integrated-Content intervention. The Integrated-Content intervention and the

Pull-Out intervention were not significantly different from each other. See Figure 13 (Appendix L).

### **Summary of Findings**

Data analyses were organized according to the study's research questions and results of those analyses are summarized here using the same organization. RQ1 asked if a direct-pull out intervention, focusing on a part-to-whole language approach would improve reading comprehension. In this study, students who received this type of intervention did improve significantly from pretest to posttest test on both implicit and explicit reading comprehension, thus supporting the alternative hypothesis associated with RQ1. RQ2 asked if a systematic, computer-based intervention would improve reading comprehension. In this study, students who received this type of intervention improved significantly from pretest to posttest on implicit reading comprehension, but not on explicit reading comprehension. Consequently, the alternative hypothesis associated with RQ2 was only partially supported. RQ3 asked if an integrated-content intervention, focusing on a whole-to-part language approach would improve reading comprehension. In this study, students who received this type of intervention improved significantly from pretest to posttest on both implicit and explicit reading comprehension, thus supporting the alternative hypothesis associated with RQ3. RQ4 asked if there was a difference between intervention to determine which reading intervention type produced the most growth in the areas of implicit and explicit intervention. All intervention types increased implicit comprehension growth, both integrated and pull out intervention type increased explicit comprehension growth, and integrated was the most effective in improving both explicit and implicit comprehension.

Finally, the significant Intervention Type x Time interactions effects observed in the ANOVAs and follow up post hoc Games-Howell comparisons of cell means enabled ranking the relative effectiveness of the three interventions, and the MANOVA determined effectiveness on implicit and explicit growth in reading comprehension. For both implicit and explicit comprehension, the greatest reading comprehension improvements were seen in the integrated-content intervention, the second most effective intervention was pull-out, and the least effective intervention was computer-based. Differences in the relative effectiveness of the three interventions were found to be statistically significant and therefore can be considered reliable and replicable beyond the samples that were examined in this study.

### **Discussion of the Results**

Results were consistent with the extant research literature as described in Chapter 1 and Chapter 2. Socio-constructivism and transactional theory both support the utility of embedding reading skill instruction in all content, enabling reading to be both meaningful and purposeful (EL-Deghaidy, Mansour, & Alshamrani, 2015; Kibler, 2009). Pullout and integrated reading interventions were both successful intervention types for a targeted skill and aligned learning style (Cooks, 2002; Peregoy & Boyle, 2000). The present research findings are consistent with those in the literature in indicating that small group interventions and integrating reading skills across content are effective in improving reading comprehension (Lovett et al., 2017; Reed et al., 2007). Both the pull-out and integrated-content interventions examined here focus students on the interpretation of paper-based texts and offer individual, guided learning.

The human effect on learning was seen clearly in this study by the fact that computer-based instruction was significantly less effective than interventions that included human interaction in enhancing reading comprehension. Differentiation of skills taught, as well as re-

teaching or reemphasizing a concept not mastered, is an important part of successful reading intervention programs (Clark & Kamhi, 2014; Reed, 2013; Pentimonti et al., 2017). Although the computer-based intervention was the least effective of the three that were examined, students receiving this intervention did improve significantly from pretest to posttest on implicit comprehension. The relatively poor overall performance of the computer-based intervention might stem from design limitations of the study. Students were assigned to reading interventions by their skill deficits, not their reading style preferences. Current research demonstrates the addition of a human element enhances results of computer-aided intervention in improving reading comprehension skills (Mosito, Warnick, & Esambe, 2017). Consequently, some students who were assigned to computer-based intervention might have preferred to read the paper-based text and might have benefited from the additional guided support that was available in the face-to-face interventions associated with the other interventions. Future researchers may want to examine reading style preference as an additional variable that might moderate the effectiveness of computer-based reading interventions (Schumaker et al., 2006; Ven, Leeuw, Weerdenburg, & Steenbeek-Planting, 2017).

### **Discussion of the Results in Relation to the Literature**

The results of this study reflect the need to improve the reading comprehension of struggling students by providing empirically-driven intervention programs that best meet differentiated needs (Jefferson, Grant, & Sander, 2017; Joshi et al., 2002; Louanne, 2003). Moll (2014) focused on differentiating by situational action immersing critical literacy with strategy while Assaf and Delaney (2013) suggested empowerment of both students and teachers is tantamount to reading improvement. The significance of improved reading skills manifests in preparing students for their future; fostering a culture of success that enables rather than disables

students in following their dreams (Couros, 2015; Joseph, Alber-Morgan, Cullen, & Rouse, 2016).

Another important aspect of this study is evaluating the benefit of a small group learning environment compared to integrated reading skill teaching in all content areas. Gersten et al. (2017) reported positive effects and a significant increase in reading comprehension with small-group intervention groups. Improvement in reading intervention practices was also seen in a study by Foorman et al. (2017), who compared both the pull-out, part-to-whole and integrated, whole-to-part reading practices in their study of a large sample. They reported that pull-out, part-to-whole intervention significantly improved target skills, like spelling and decoding, but integrated, whole-to-part skills showed significantly higher levels of improvement with integrated reading instruction. Reading performance increased in this study when guided-reading small groups were aligned with reading comprehension strategies in pull-out, part-to-whole intervention groups.

Consequently, the results of this study may be used to establish empirical reading intervention practices in schools across a broad range of campuses currently deemed academically unacceptable. Maynard et al. (2017) evaluated mindfulness reading intervention practices with attention given to socioeconomic and cultural factors that affect reading performance in low performing schools. Statistically significant findings on cognitive and socio-emotional growth for struggling students were reported in intervention types providing integrated reading intervention. Folsom et al. (2016) reported sensitivity to a community need for additional support as the primary cause of successfulness in an after-school reading intervention program that extended the learning environment by one hour each day. This served to provide students a safe and educationally rich extension of learning in small groups, focused



intervention, while providing parent a safe place for children to remain while they worked. A possible outcome of this study could lead to school-wide after-school reading intervention programs, based on student and community needs. A meeting point where situational learning connects to cultural awareness (Gee, 2001).

Bulut (2017) showed that an integrated, whole-to-part reading intervention, the SQ3R, improved reading comprehension in a whole group setting. Students who used visual supports and contextual evidence to analyze and predict reading passages improved decoding and both implicit and explicit comprehension. Qualitative and quantitative measures used in assessing the intervention strategies showed that an integrated, whole-to-part reading intervention was effective to a statistically significant degree. Peterson (2016) discovered that embedding comprehension instruction in texts with high situational interest resulted in significant improvements in reading. Integrated, whole-to-part intervention was significantly more effective than pull-out, part-to-whole, intervention. Chilton and Ehri (2015) analyzed the effectiveness of connecting words in passages to participant's interests. Their results concluded that this strategy significantly improved decoding. Results of these current studies promote integrated reading strategies combined with the human element of pull out reading intervention differentiated to student need and learning style, which informs the choice of intervention types in future reading programs.

### **Limitations**

There were some limitations to this study that will be addressed here. First, students were not randomly assigned to intervention groups but were assigned based on their individual reading difficulties. Consequently, the groups were nonequivalent at the beginning of the study. The part-to-whole, pull-out reading intervention, for instance, was probably further behind than

the other students at the beginning of the study and measurable growth for struggling readers is possibly slower for students with larger disparities in reading abilities and in learning styles (Begeny, 2006; Foorman et al., 2017; Paterson & Elliott, 2006). The full nature of the demographic, cognitive, personality and other individual difference characteristics amongst the groups is unknown, but these group differences are confounded with the different interventions the groups received. The differential improvements seen from one group to the next cannot be unambiguously attributed to intervention differences; the improvements might be a consequence of differences in group characteristics. Fuchs et al. (2015) discovered significant growth in homogeneous intervention groups with similar cultural and reading characteristics. This was largely unavoidable in the current study, as the alternative would be to assign students at random to treatments without regard to their characteristics or needs.

Second, but related to the first limitation, students were assigned to groups based on their reading deficits only. Other potentially relevant factors were not considered, such as student learning styles or reading style preferences (Goering & Baker, 2010; Sanacore & Palumbo, 2010). Some of the interventions were not friendly to some of these learning and reading style preferences. For instance, the computer-based intervention did not provide very much human interaction nor paper-based textual material that some students might have preferred. The computer-based reading intervention was removed from the classroom and placed in a computer lab to ensure that only students placed in this reading intervention group had access to this particular program and only in the time allotted. This ensured that intervention types would not cross-contaminate and lead to crossover effects but may have also kept the students in the computer-based intervention from benefiting from some of the characteristics of the other intervention types, such as the human element, interaction, dialogue, and immediate positive

feedback. This is more a possible explanation of why the computer-based group performed relatively poorly than a study limitation, though, since lack of human interaction, feedback, paper-based texts, and so forth, are all defining features of computer-based interventions.

Wheldall, Wheldall, Madelaine, Reynolds, and Arakelian (2017) recently discovered statistical significance in human interaction and feedback were defining factors in the discovered efficacy of small group reading intervention groups with struggling, at-risk readers. The purpose of the study was to evaluate each of the selected interventions *as they are*, not as the other intervention types are.

Third, just as intervention types were confounded with student characteristics, those interventions were also confounded with different teacher characteristics. This is because different teachers provided the three interventions. Phillips et al. (2016) discovered consistency of reading teachers improved outcomes. The differential effectiveness of some interventions cannot, therefore, be unambiguously attributed to the different interventions per se but might instead reflect a differential effectiveness of the teachers who provided the interventions (Kelly, 2013).

Fourth, this study was conducted in a single elementary school. Consequently, the external validity of the findings is questionable. The population to which the study's findings can legitimately be generalized is limited to that hypothetical population of students who are like the students in this study. It is not known if the findings of this study would apply to a more demographically diverse population, as Graves and McConnell (2014) discovered in their study of reading intervention groups with diverse populations. It was determined that intervention was statistically significant when groups were demographically diverse and the response to intervention was more specific to a demographic need. As a point of interest, I initially

ascertained the need for reading intervention programs at the secondary level and had designed this study around that premise. However, I moved districts and this study was ultimately redesigned for the elementary school level, at the beginning of the learning process when struggles in reading comprehension begin to emerge.

Fifth, the study examined the efficacy of only three types of reading interventions, leaving many alternatives that were not explored. This was an unavoidable consequence of the relatively small size of the school within which the study was conducted. Both time and staff constraints prohibited this study from including multiple reading intervention programs. Tannock et al. (2018) showed the efficacy of a multi-modal reading intervention for struggling readers. However, with only a few teachers trained to provide reading interventions to a relatively small population of students, it cannot be expected that there would be a teacher on staff who was trained to supply every known intervention.

Sixth, just as the variety of students and the variety of interventions were limited in this study, the variety of outcome measures was also limited. Reading includes many facets and abilities, and the use of only two measures of reading comprehension underrepresents that complexity. However, implicit and explicit reading comprehension are critical reading outcomes that must be positively impacted by any reading intervention, as discovered by Laurent-Prophete (2017). Thus, although more outcomes might have been measured, there is certainly a point of diminishing returns as dependent variables are accumulated in a research design, and the choice to use two basic measures was deemed to be sufficient in this study and was an expansion of the original intent, which was to use a single outcome measure.

Finally, the use of a pretest-posttest design in this study limited the outcome assessment to a single observation at one point in time. Vadasy et al. (2008) evaluated intervention in a

longitudinal study with success noted at strategic intervals, further validating intervention types. The durability over time of the reading comprehension gains displayed by the three intervention groups is unknown because logistics did not permit for follow-up assessments beyond the posttest assessment. Even had a longitudinal study been a viable option, however, the students would certainly have been exposed to additional reading training following the posttest and that additional training would have obscured the researcher's ability to assess the long-term efficacy of the interventions that were the focus of the study.

### **Implication of the Results for Practice, Policy, and Theory**

**Practice.** It is important to note changes to reading intervention types and how this study potentially impacts future programs. Reading intervention was reactive to the deficits in reading performance and occurred as a pull-out format, focusing on decreasing gaps in learning (Boulay et al., 2015) and targeting skills (Denton et al., 2006). Current research supports identifying student needs and creating learning environments conducive to learning in small group formats; still reactionary in nature (Griffin, 2016). Results of this study support integrating learning and targeted small group learning, proactively providing students what they need in the environment best suited for their learning style. Results demonstrated computer-aided instruction was the least significant in increasing reading comprehension but did not account for reading intervention grouping by learning style or choice format. Outcomes could have been different if this had been considered. This study supports differentiation in types of intervention and reading strategies embedded in content and hopes to promote both integrating reading skills and pull out intervention based on the need of the student. Another benefit to creating interventions prescriptively is that reading intervention becomes a continuum of learning, enjoyable by both

participants and teachers, and responsive to new learning cultures (Kim, Hemphill, Troyer, Thomson, Jones, LaRusso, & Donovan, 2017).

**Policy.** Response to intervention dictates rigorous instruction in Tier 1 within the classroom and available to all students. Tier 2 intervention increases time and duration of intervention and students failing to maintain growth with peers are recommended for pull-out intervention. Typically, students are not referred for the first six weeks of instruction (Pindiprolu & Forbush, 2009). Results of the current study promote increasing rigor within the classroom by adding intervention elements into whole group instruction, Tier 1, available to all students yet differentiated by actual needs of students. Al Otaiba, Connor, Folsom, Wanzek, Greulich, Schatschneider, & Wagner (2015) discovered dynamic or immediate intervention significantly increased scores as compared to student groups who waited twelve weeks within the process of Tier 2 referrals. This current study determined integrating skills across content significantly promoted increases in reading comprehension and therefore, supports a more rigorous and specific reading integration. Also applicable to the research of Al Otaiba et al. (2015) is initiating small group and targeting part-to whole interventions as soon as a need is determined, the sooner the better.

**Theory.** Sociocultural constructivism promotes learning through doing (Moll, 2014). Students learn through analyzing text and words within texts (Kibler, 2009). Historically, reading intervention focuses on decoding and fluency practice to improve reading (Lim & Oei, 2015). Struggling readers need to develop appropriate and effective toolboxes from which they can pull useful strategies to improve reading skills, including comprehension (Ash, 2002, 2005). Current research affirms the success of contextual influences in applying reading strategies and deepening comprehension (Chilton & Ehri, 2015; Peterson, 2016). The current research stems

from an interest in the connection between sociocultural constructivism and effective reading intervention types that promote increases in reading comprehension. This study was an effort to identify the most effective way to improve both explicit and implicit comprehension.

### **Recommendations for Further Research**

Reading intervention is a pivotal part of academic programs, but it is important to ensure that the most effective reading interventions are considered and administered. Limited resources demand that the choice of programs be based on demonstrated effectiveness and only empirical research will determine which programs are most effective. Efforts to replicate the present study would benefit by addressing some of the research design features that limited the strength of conclusions that could be drawn from the study. It was noted in an earlier section of this chapter that assigning students to interventions based on their reading deficits established nonequivalent groups and that this resulted in confounding intervention types with the characteristics of students receiving those interventions (Anderson, 2008; Schatz, 2017). Unless future researchers can justify randomly assigning students to interventions without regard to their reading deficits, the same confounding that occurred in this study will continue to be a weakness in future studies. In cases where there is no theoretical reason to believe that one intervention might be superior to another; however, it would be possible for researchers to evaluate the efficacy of multiple interventions within each of several homogeneous groups of students (Edmonds et al., 2009). In this study, interventions were also confounded with the teachers who provided those interventions. In studies conducted on a larger scale, the use of many teachers to provide each intervention should cause teacher differences from one intervention to the next to wash out. It was also noted previously that students were assigned to interventions without regard to their reading style or other preferences. It would be interesting to include student preference

variables, in addition to their deficits, in future comparisons of reading intervention effectiveness (Kearns & Fuchs, 2013).

Other study limitations focused on external validity, i.e., limits on the generalizability of the study's findings. For instance, this study was conducted on one campus, third through fifth grade, with a total population of 450 students. The sample size was relatively small, limiting the diversity of the participants, and thus, the ability to generalize findings to other student populations. Demographic subpopulations did not exist in sufficient numbers to support comparative analyses or the inclusion of demographic variables in the ANOVAs. Further research could extend the study to include a more diversified sample to see how demographic characteristics might be taken into consideration in the design and implementation of reading intervention programs. Research on struggling readers has previously focused on students below third grade, as it is assumed that if students cannot read by third grade, they will not be able to recover deficits in time to become successful readers (Finore, 2013; Sparks, 2011). Studies such as this one, which focused on students who are further along in school, are much needed in the future as reading comprehension difficulties are obviously often not resolved by the third grade. Future work might extend to include higher grades even than those examined here. Future research would also benefit by expanding to include multiple campuses and multiple locations to ensure that findings can be generalized broadly.

In addition to studying more diverse student populations, future researchers should study a broader assortment of reading interventions, including the assessment of intervention subtypes. For instance, it would be interesting to evaluate multiple computer-based instructional programs to determine if the limited efficacy of the computer-based intervention seen in this study was due to the specific program used or if the limitation is common across multiple computer-delivered



interventions. Kreskey and Truscott (2016) determined similar outcomes in computer-based reading intervention programs. A deficiency exists in comparative studies on computer-based interventions related to increased comprehension. Similarly, extensions of research to include pull-out intervention subtypes and integrated-content intervention subtypes would be welcomed additions to the literature. Expanding the research to include multiple reading intervention programs would be beneficial in determining which curricula to purchase, appropriate methods of intervention, and the duration of interventions necessary to increase comprehension in struggling readers.

Future research would also benefit from an expanded view of outcome assessment. This study used two measures of reading comprehension pulled from the QRI-5. While implicit and explicit reading comprehension are important outcomes, two measures drawn from one instrument may not fully cover the reading outcomes hoped to accomplish in the education of children. However, triangulation with other data sources could possibly strengthen conclusions drawn in future studies (Ryan, 2017). Richer outcome data would also be provided if future research were to include a qualitative component in the form of mixed-methods studies (Hancock, 2012). Qualitative research often enables drilling down to fully discover why the quantitative variables are behaving as they are. Student interviews and open-ended surveys might provide valuable insights into how interventions affect outcomes beyond those tapped by quantitative measures of reading ability, such as the reader's self-esteem, self-efficacy, and the pure joy of reading (Kibler, 2009). In addition to more outcome measures, more measurement events in longitudinal studies would provide opportunities to assess the durability of intervention effects over time. It would be beneficial when purchasing curricula, designing courses, and determining length of intervention for schools to know which intervention types are most

effective, both in the short and long terms, and why those interventions work as they do and what benefits they offer beyond the immediate goal of educating students to be able to read.

## **Conclusion**

Research into effective ways to promote growth in reading comprehension is limited, and more research is necessary to create valid and reliable reading intervention programs. This study was my contribution to that research. In one small elementary school in Central Texas, struggling readers were identified, teachers were recruited and trained to provide those students with three research-based reading intervention types, and data were collected to evaluate the relative efficacy of those interventions. The goal of the study was met. Research design limitations constrain the certainty with which conclusions from this study can be accepted at face value, but with that in mind, the results of the study are consistent with these two conclusions:

(a) The reading comprehension levels of students in all three reading intervention groups improved significantly over the course of the study, on at least one and typically on two measures of reading comprehension; and (b) The three reading interventions were shown to differ significantly in the degree to which they enhanced reading comprehension, with the integrated-content, whole-to-part intervention providing the greatest benefits, pull-out, part-to-whole intervention providing the second greatest benefits, and computer-based intervention offering the weakest benefits.

The elementary school that participated in this study was and still is facing potential closure if reading scores do not drastically improve. I hope that this research will contribute to improving those scores and preventing that closure. Effective reading intervention types were empirically identified and a research-based action plan to establish effective reading programs in that school can now be implemented. It was a joy to work with staff and students in finding

viable solutions to a stagnant problem. It is my hope that this exercise in empowering readers will not only affect standardized test scores going forward but that it will enrich the lives of the students and reinforce and invigorate the continuing efforts of the teachers.

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## Appendix A: Statement of Original Work

### Statement of Original Work

I attest that:

1. I have read, understood, and complied with all aspects of the Concordia University- Portland Academic Integrity Policy during the development and writing of this dissertation.
2. Where information and/or materials from outside sources has been used in the production of this dissertation, all information and/or materials from outside sources has been properly referenced and all permissions required for use of the information and/or materials have been obtained, in accordance with research standards outlined in the *Publication Manual of The American Psychological Association*

*Donna Elizabeth Weikert*

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Digital Signature

Donna Elizabeth Weikert

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Name (Typed)

March 28, 2018

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Date

## **Appendix B: Response-to-Intervention 3-Tier Model**

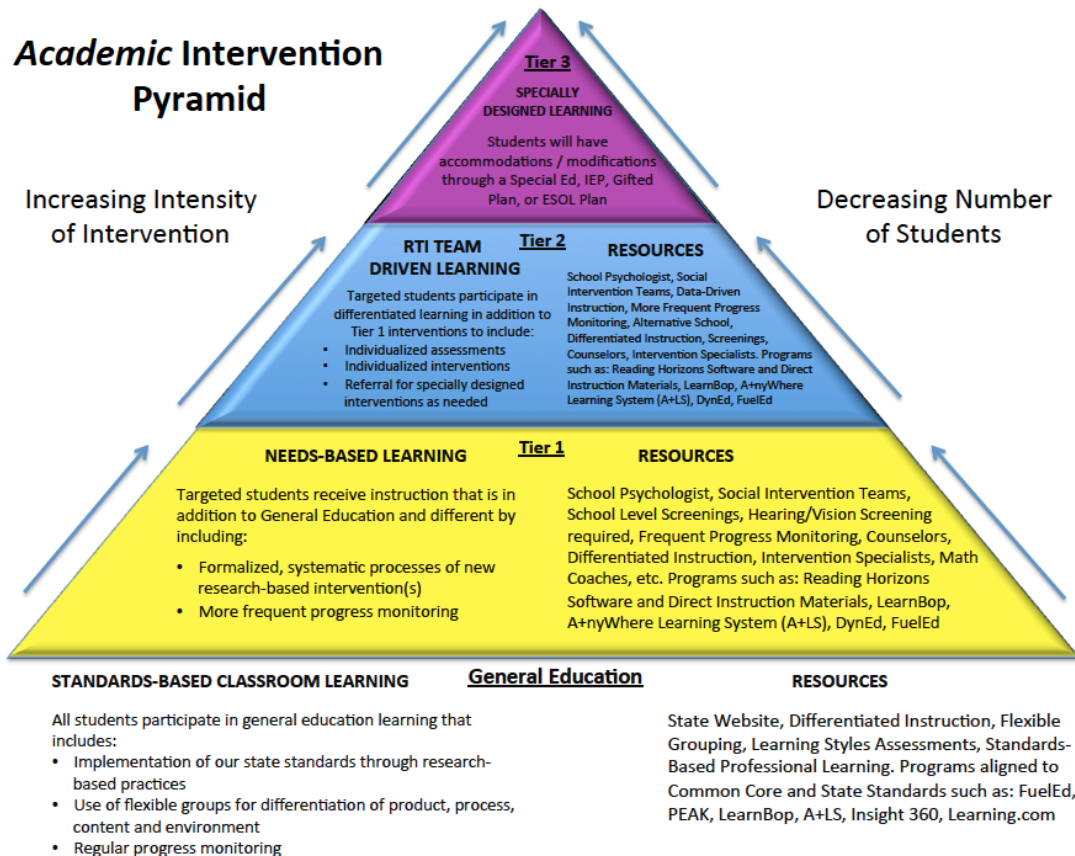
Source: National Association of State Directors of Special Education (2005).

A 3 Tier model begins at the foundational level for skills taught in the classroom. Core instruction is delivered to all students, is preventive and proactive simultaneously. Teachers are expected to differentiate teaching and learning experiences based on individual need.

Tier 2 is the next step in the intervention process. Tier 2 is where targeted group intervention occurs while continuing with Tier 1-core instruction differentiated to student need. Some students are still not successful in Tier 1 and are recommended for additional Tier 2 intervention. The last Tier is intensive, individual intervention, in addition to Tier 1 and 2 (in-class instruction and small group support). More assessments are recommended to determine if there are any confounding issues present, such as a learning disability. Full Individualized Evaluations (FIE) determine the breadth of learning capabilities for the student and offer an insight into important factors of learning, such as how information is processed, how information is stored and retrieved and any gaps in learning that can be addressed through specialized support. Tier 3 is notably much more intense instruction, usually 3-5 days of pull-out support, assessment-based and individualized to the needs of the student.

## Response to Intervention (RTI) Design

<http://www.backbonecommunications.com/wp-content/uploads/rti-academic-intervention-pyramid-tier-1-2-3-image.png>



## Appendix C: Leslie and Caldwell Qualitative Reading Inventory

Leslie, L., & Caldwell, J. S. (2011). *Qualitative Reading Inventory (5th ed.)*. Boston, MA: Pearson.

### Level: Two

#### “What Can I Get for My Toy?” (Student copy)

It was a Saturday morning. John looked at the toys in his room. They were all old and he wanted something new. John went to his mother. “All my toys are old.” He said. “I want something new to play with.” His mother looked at him, “John, we don’t have the money to buy you anything new. You’ll have to find a way to make something new.” John went back to his room and looked around at the toys. There were many toys that were fun. But he had played with them so much that they weren’t fun anymore. Then he had an idea. His friend Chris wanted a truck just like his red truck. And John wanted a car like the one Chris got for his birthday. Maybe they could trade. John ran down the street to Chris’s house. “Hey, Chris, would you trade your car for my truck?” “Sure,” said Chris. “I’ll trade. Later we can trade something else. That way we’ll always have something new to play with.”



**Level: Two**

**Narrative**

**Concept Questions**

What does “new toys” mean to you? (3-2-1-0)

What does “toys you've had a long time” mean to you? (3-2-1-0)

What are reasons for trading toys? (3-2-1-0)

**Score:** \_\_\_\_/9= \_\_\_\_%

\_\_\_\_ FAMILIAR. \_\_\_\_ UNFAMILIAR

**Prediction:**

**“What Can I Get for My Toy?” (Teacher copy)**

It was a Saturday morning. John looked at the toys in his room. They were all old and he wanted something new. John went to his mother. “All my toys are old.” He said. “I want something new to play with.” His mother looked at him, “John, we don’t have the money to buy you anything new. You’ll have to find a way to make something new.” John went back to his

room and looked around at the toys. There were many toys that were fun. But he had played with them so much that they weren't fun anymore. Then he had an idea. His friend Chris wanted a truck just like his red truck. And John wanted a car like the one Chris got for his birthday. Maybe they could trade. John ran down the street to Chris's house. "Hey, Chris, would you trade your car for my truck?" "Sure," said Chris. "I'll trade. Later we can trade something else. That way we'll always have something new to play with." (171 words).

Number of Total Miscues (Total Accuracy):

Number of Meaning-Change Miscues (Total Acceptability):

**Total Accuracy**

**Total Acceptability**

0-4 miscues \_\_\_\_\_ Independent \_\_\_\_\_ 0-1

miscues

5-18 miscues \_\_\_\_\_ Instructional \_\_\_\_\_ 5-9

miscues

19+ miscues \_\_\_\_\_ Frustration \_\_\_\_\_ 10+

miscues

Rate:  $171 \times 60 = 10,260 / \text{_____ seconds} = \text{_____ WPM}$

Correct WPM:  $(171 - \text{_____ errors}) \times 60 = \text{_____} / \text{_____ seconds} = \text{CWPM}$

**Retelling Scoring Sheet for "What Can I Get for My Toy?"**

**Setting/Background**

\_\_\_\_\_ John looked at his toys.

\_\_\_\_\_ They were old.

**Goal**

\_\_\_\_\_ John wanted something

\_\_\_\_\_ that was new.

### **Events**

\_\_\_\_\_ John went to his mother.

\_\_\_\_\_ "My toys are old,"

\_\_\_\_\_ he said.

\_\_\_\_\_ "I want something

\_\_\_\_\_ new

\_\_\_\_\_ to play with."

\_\_\_\_\_ His mother looked

\_\_\_\_\_ at John.

\_\_\_\_\_ "We don't have money

\_\_\_\_\_ to buy something

\_\_\_\_\_ new."

\_\_\_\_\_ John had played with his toys

\_\_\_\_\_ so much

\_\_\_\_\_ that they weren't fun

\_\_\_\_\_ anymore.

\_\_\_\_\_ His friend

\_\_\_\_\_ Chris wanted a truck

\_\_\_\_\_ just like his truck

\_\_\_\_\_ his red truck

\_\_\_\_\_ and John wanted a car

\_\_\_\_\_ like Chris's car.

\_\_\_\_\_ Maybe they could trade.

\_\_\_\_\_ John ran

\_\_\_\_\_ down the street

\_\_\_\_\_ to Chris's house.

\_\_\_\_\_ "Would you trade your car

\_\_\_\_\_ for my truck?"

\_\_\_\_\_ "Sure,"

\_\_\_\_\_ said Chris.

### **Resolution**

\_\_\_\_\_ "We can trade something else

\_\_\_\_\_ later.

\_\_\_\_\_ We'll always have something

\_\_\_\_\_ new

\_\_\_\_\_ to play with."

38 Ideas

Number of ideas recalled \_\_\_\_\_

Other ideas recalled, including inferences:

### **Questions for "What Can I Get for My Toy?"**

1. At the beginning of the story, what did John tell his mother he wanted?

*Explicit:* something new to play with

2. Why did John want a new toy to play with?

*Implicit:* because he had played with his old toys so much they weren't interesting to him anymore; he got bored with them. Note: "Broken" is not acceptable—the story discusses John's boredom and indicates that his toys were desired by another child.

3. What did John's mother say when he asked her to buy something new for him?

*Explicit:* they didn't have the money to buy anything new; he'd have to make something new

4. What did John do to get what he wanted?

*Explicit:* he went to his friend's house and asked him to trade toys with him

5. Why was trading a good idea?

*Implicit:* the boys would always have something new to play with; boys had new toys without spending money

6. At the end of the story, what did his friend suggest that they do?

*Explicit:* trade again later

7. In the future what must both boys have for trading to make them both happy?

*Implicit:* toys that the other boy wanted

8. Why do you think that the boys will trade again?

*Implicit:* they will get bored with the toys they traded; they will want a new toy again

**Level: Two**

Number Correct Explicit: \_\_\_\_\_

Number Correct Implicit: \_\_\_\_\_

**Total:** \_\_\_\_\_

\_\_\_\_\_ Independent: 8 correct

\_\_\_\_\_ Instructional: 6–7 correct

\_\_\_\_\_ Frustration: 0–5 correct

**Level: Three**

**The Trip to the Zoo (Student Copy)**

The day was bright and sunny. Carlos and Maria jumped out of bed and dressed in a hurry. They didn't want to be late for school today. It was a special day because their classes were going to the zoo. When they got to school, all of the children were waiting outside to get on the bus. When everyone was there, the second and third graders got on the bus and rode to the zoo. On the bus, the children talked about the zoo animals that they liked the best. Joe and Carlos wanted to see the lion, king of the beasts. Maria and Angela wanted to see the chimps. Maria thought they acted a lot like people.

When they got to the zoo, their teachers divided the children into four groups. One teacher, Mr. Lopez, told them if anyone got lost to go to the ice cream stand. Everyone would meet there at noon. Maria went with the group to the monkey house, where she spent a long time watching the chimps groom each other. She wrote down all the ways that the chimps acted like people. Her notes would help her write a good report of what she liked best at the zoo.

Carlos went with the group to the lion house. He watched the cats pace in front of the glass. Carlos was watching a lion so carefully that he didn't see his group leave. Finally, he noticed that it was very quiet in the lion house. He turned around and didn't see anyone. At first he was worried. Then he remembered what Mr. Lopez had said. He traced his way back to the entrance and found a map. He followed the map to the ice cream stand, just as everyone was meeting there for lunch. Joe smiled and said, "We thought that the lion had you for lunch!"

**Level: Three**

Narrative

Concept Questions:

What is a class trip? (3-2-1-0)

When does “taking notes” mean to you? (3-2-1-0)

What does “being by yourself” mean to you? (3-2-1-0)

Why do people use maps? (3-2-1-0)

Score:

\_\_\_\_\_ /12= \_\_\_\_\_ %

\_\_\_\_\_ FAMILAR \_\_\_\_\_ UNFAMILIAR

Prediction:

**“The Trip to the Zoo” (Teacher copy)**

The day was bright and sunny. Carlos and Maria jumped out of bed and dressed in a hurry. They didn't want to be late for school today. It was a special day because their classes were going



to the zoo. When they got to school, all of the children were waiting outside to get on the bus. When everyone was there, the second and third graders got on the bus and rode to the zoo. On the bus, the children talked about the zoo animals that they liked the best. Joe and Carlos wanted to see the lion, king of the beasts. Maria and Angela wanted to see the chimps. Maria thought they acted a lot like people.

When they got to the zoo, their teachers divided the children into four groups. One teacher, Mr. Lopez, told them if anyone got lost to go to the ice cream stand. Everyone would meet there at noon. Maria went with the group to the monkey house, where she spent a long time watching the chimps groom each other. She wrote down all the ways that the chimps acted like people. Her notes would help her write a good report of what she liked best at the zoo.

Carlos went with the group to the lion house. He watched the cats pace in front of the glass. Carlos was watching a lion so carefully that he didn't see his group leave. Finally, he noticed that it was very quiet in the lion house. He turned around and didn't see anyone. At first he was worried. Then he remembered what Mr. Lopez had said. He traced his way back to the entrance and found a map. He followed the map to the ice cream stand, just as everyone was meeting there for lunch. Joe smiled and said, "We thought that the lion had you for lunch!" (312 words)

**Level: Three**

Number of Total Miscues (Total Accuracy):	
Number of Meaning-Change Miscues (Total Acceptability):	
<b>Total Accuracy</b>	<b>Total Acceptability</b>
0–7 miscues _____ Independent miscues	_____ 0–8
8–32 miscues _____ Instructional miscues	_____ 8–17
33+ miscues _____ Frustration miscues	_____ 18+
Rate: $312 \times 60 = 18,720 / \text{_____ seconds} = \text{_____ WPM}$	
Correct WPM: $(312 - \text{_____ errors}) \times 60 = \text{_____} / \text{_____ seconds} = \text{CWPM}$	

**Retelling Scoring Sheet for "The Trip to the Zoo"**

**Setting/Background**

\_\_\_\_\_ Carlos  
\_\_\_\_\_ and Maria jumped  
\_\_\_\_\_ out of bed.  
\_\_\_\_\_ They didn't want  
\_\_\_\_\_ to be late  
\_\_\_\_\_ for school.  
\_\_\_\_\_ Their classes were going  
\_\_\_\_\_ to the zoo.  
\_\_\_\_\_ The second

\_\_\_\_\_ and third graders

\_\_\_\_\_ got on the bus

\_\_\_\_\_ and rode

\_\_\_\_\_ to the zoo.

\_\_\_\_\_ They talked

\_\_\_\_\_ about the animals

\_\_\_\_\_ they liked best.

### **Goal**

\_\_\_\_\_ Carlos wanted

\_\_\_\_\_ to see the lion.

\_\_\_\_\_ Maria wanted

\_\_\_\_\_ to see the chimps.

### **Events**

\_\_\_\_\_ Their teacher told them

\_\_\_\_\_ their teacher, Mr. Lopez

\_\_\_\_\_ if anyone got lost

\_\_\_\_\_ to go

\_\_\_\_\_ to the ice cream stand

\_\_\_\_\_ where everyone would meet

\_\_\_\_\_ at noon.

\_\_\_\_\_ Maria went

\_\_\_\_\_ to the monkey house.

\_\_\_\_\_ She wrote down all the ways

\_\_\_\_\_ the chimps acted like people.

\_\_\_\_\_ Her notes would help her

\_\_\_\_\_ write a report.

\_\_\_\_\_ Carlos went

### **Problem**

\_\_\_\_\_ Carlos was watching a lion

\_\_\_\_\_ so carefully

\_\_\_\_\_ he didn't see his group

\_\_\_\_\_ leave.

\_\_\_\_\_ He noticed

\_\_\_\_\_ that it was quiet.

\_\_\_\_\_ He turned around

\_\_\_\_\_ and didn't see anyone.

\_\_\_\_\_ He remembered

\_\_\_\_\_ what Mr. Lopez said.

\_\_\_\_\_ He traced his way

\_\_\_\_\_ to the entrance

\_\_\_\_\_ and found a map.

\_\_\_\_\_ He followed the map

\_\_\_\_\_ to the ice cream stand.

### **Resolution**

\_\_\_\_\_ Everyone was there

\_\_\_\_\_ for lunch.

\_\_\_\_\_ They thought

\_\_\_\_\_ the lion had Carlos

\_\_\_\_\_ for lunch.

55 Ideas

Number of ideas recalled:

Other ideas recalled, including inferences:

**Level: Three**

**Questions for "The Trip to the Zoo"**

1. Why was it a special day for Carlos and Maria?

*Explicit:* their classes were going to the zoo

2. What grades were Carlos and Maria in?

*Implicit:* second and third

3. What animal did Carlos want to see?

*Explicit:* lions

4. Why was Maria watching the chimps so carefully?

*Implicit:* so she could write a report for school

5. How did Carlos get separated from his group?

*Explicit:* he was watching the lions so carefully he didn't see his group leave

6. What made Carlos realize that his classmates had left the lion house?

*Implicit:* it was quiet; he didn't hear any talking; or he turned around and no one was there

7. Where did Carlos find the map?

*Explicit:* at the zoo entrance

8. Why did Carlos go to get a map from the zoo entrance?

*Implicit:* to help him find his way to the ice cream stand

**Level: Three**

**Without Look-Backs**

Number Correct Explicit: \_\_\_\_\_

Number Correct Implicit: \_\_\_\_\_

Total: \_\_\_\_\_

\_\_\_\_\_ Independent: 8 correct

\_\_\_\_\_ Instructional: 6–7 correct

\_\_\_\_\_ Frustration: 0–5 correct

**With Look-Backs**

Number Correct Explicit: \_\_\_\_\_

Number Correct Implicit: \_\_\_\_\_

Total: \_\_\_\_\_

\_\_\_\_\_ Independent: 8 correct

\_\_\_\_\_ Instructional: 6–7 correct

\_\_\_\_\_ Frustration: 0–5 correct



**Level: Four**

**Johnny Appleseed (Student Copy)**

John Chapman was born in 1774 and grew up in Massachusetts. He became a farmer and learned how to grow different kinds of crops and trees. John especially liked to grow and eat apples. Many people were moving west at that time. They were heading for Ohio and Pennsylvania. John knew that apples were a good food for settlers to have. Apple trees were strong and easy to grow. Apples could be eaten raw and they could be cooked in many ways. They could also be dried for later use. So in 1797, John decided to go west. He wanted to plant apple trees for people who would build their new homes there.

John first gathered bags of apple seeds. He got many of his seeds from farmers who squeezed apples to make a drink called cider. Then, in the spring, he left for the western frontier. He planted seeds as he went along. Also, he gave them to people who knew how valuable apple trees were.

John walked many miles in all kinds of weather. He had to cross dangerous rivers and find his way through strange forests. Often he was hungry, cold, and wet. Sometimes he had to hide from unfriendly Indians. His clothes became ragged and torn. He used a sack for a shirt, and he cut out holes for the arms. He wore no shoes. But he never gave up. He guarded his precious seeds and carefully planted them where they had the best chance of growing into strong trees.

John's fame spread. He was nicknamed Johnny Appleseed. New settlers welcomed him and gratefully accepted a gift of apple seeds. Many legends grew up about Johnny Appleseed that were not always true. However, one thing is true. Thanks to Johnny Appleseed, apple trees now grow in parts of America where they once never did.

**Level: Four**

Narrative

**Concept Questions:**

Who was Johnny Appleseed? (3-2-1-0)

Why do people plant fruit trees in certain places? (3-2-1-0)

Why do people plant apple trees? (3-2-1-0)

What does “making apple cider” mean to you? (3-2-1-0)

Score:

\_\_\_\_/12= \_\_\_\_%

\_\_\_\_ FAMILIAR \_\_\_\_ UNFAMILIAR

Prediction:

## **Johnny Appleseed (Teacher Copy)**

John Chapman was born in 1774 and grew up in Massachusetts. He became a farmer and learned how to grow different kinds of crops and trees. John especially liked to grow and eat apples. Many people were moving west at that time. They were heading for Ohio and Pennsylvania. John knew that apples were a good food for settlers to have. Apple trees were strong and easy to grow. Apples could be eaten raw and they could be cooked in many ways. They could also be dried for later use. So in 1797, John decided to go west. He wanted to plant apple trees for people who would build their new homes there.

John first gathered bags of apple seeds. He got many of his seeds from farmers who squeezed apples to make a drink called cider. Then, in the spring, he left for the western frontier. He planted seeds as he went along. Also, he gave them to people who knew how valuable apple trees were.

John walked many miles in all kinds of weather. He had to cross dangerous rivers and find his way through strange forests. Often he was hungry, cold, and wet. Sometimes he had to hide from unfriendly Indians. His clothes became ragged and torn. He used a sack for a shirt, and he cut out holes for the arms. He wore no shoes. But he never gave up. He guarded his precious seeds and carefully planted them where they had the best chance of growing into strong trees.

John's fame spread. He was nicknamed Johnny Appleseed. New settlers welcomed him and gratefully accepted a gift of apple seeds. Many legends grew up about Johnny Appleseed that were not always true. However, one thing is true. Thanks to Johnny Appleseed, apple trees now grow in parts of America where they once never did. (308 words)

Number of Total Miscues (Total Accuracy):

Number of Meaning-Change Miscues (Total Acceptability):

<b>Total Accuracy</b>		<b>Total</b>
<b>Acceptability</b>		
0-7 miscues _____	Independent	_____ 0-8
miscues		
8-32 miscues _____	Instructional	_____ 8-16
miscues		
33+ miscues _____	Frustration	_____ 17+
miscues		
Rate: $308 \times 60 = 18,480 /$ _____ seconds = _____ WPM		
Correct WPM: $(308 -$ _____ errors) $\times 60 =$ _____ / _____ seconds = CWPM		

**Level: Four**

### **Retelling Scoring Sheet for "Johnny Appleseed"**

#### **Setting/Background**

\_\_\_\_\_ John Chapman was born

\_\_\_\_\_ in 1774.

\_\_\_\_\_ He became a farmer

\_\_\_\_\_ and grew crops.

\_\_\_\_\_ John liked

\_\_\_\_\_ to grow

\_\_\_\_\_ and eat apples.

\_\_\_\_\_ People were moving west.

\_\_\_\_\_ Apples were a good food  
\_\_\_\_\_ for settlers to have.

### **Goal**

\_\_\_\_\_ John decided  
\_\_\_\_\_ to go west.

\_\_\_\_\_ He wanted

\_\_\_\_\_ To plant apple trees.

### **Event**

\_\_\_\_\_ John got many seeds

\_\_\_\_\_ From farmers

\_\_\_\_\_ Who squeezed apples

\_\_\_\_\_ To make a drink

\_\_\_\_\_ Called cider.

\_\_\_\_\_ He left

\_\_\_\_\_ For the frontier.

\_\_\_\_\_ He planted seeds

\_\_\_\_\_ As he went along.

\_\_\_\_\_ He gave them away.

\_\_\_\_\_ John walked miles.

\_\_\_\_\_ He crossed rivers

\_\_\_\_\_ And went through forests.

\_\_\_\_\_ He was hungry

\_\_\_\_\_ And wet

\_\_\_\_\_ He had to hide  
\_\_\_\_\_ From Indians  
\_\_\_\_\_ Unfriendly Indians.  
\_\_\_\_\_ His clothes were torn.  
\_\_\_\_\_ He used a sack  
\_\_\_\_\_ For a shirt  
\_\_\_\_\_ And he cut out holes  
\_\_\_\_\_ For the arms.  
\_\_\_\_\_ He wore no shoes.

### **Resolution**

\_\_\_\_\_ John's fame spread.  
\_\_\_\_\_ He was nicknamed  
\_\_\_\_\_ Johnny Appleseed.  
\_\_\_\_\_ Settlers accepted seeds  
\_\_\_\_\_ gratefully.  
\_\_\_\_\_ Thanks to Johnny Appleseed,  
\_\_\_\_\_ apple trees grow  
\_\_\_\_\_ in many parts  
\_\_\_\_\_ of America.

47 ideas

Number of ideas recalled \_\_\_\_\_

Other ideas recalled, including inferences:

**Level: Four**

Questions for "Jonny Appleseed"

1. What was John Chapman's main goal?

*Implicit:* to plant apple trees across the county

2. Why did John choose apples to plant instead of some other fruit?

*Implicit:* the trees were easy to grow: the fruit could be used in a lot of ways; or he especially liked apples.

3. Where did John get most of his seeds?

*Explicit:* from farmers or from people who made cider

4. Why would John be able to get so many seeds from cider makers?

*Implicit:* cider is a drink and you don't drink seeds; or apples have a lot of seeds and you don't use seeds in cider

5. How do we know that John cared about planting apple trees?

*Implicit:* he suffered hardships; or he guarded the apple seeds carefully

6. How did John get to the many places he visited?

*Explicit:* he walked

7. Name one hardship John suffered?

*Explicit:* being hungry, cold, wet, lost, in danger from unfriendly Indians.

8. Why should we thank Johnny Appleseed?

*Explicit:* apple trees now grow in parts of America where they once never did



**Level: Four**

**Without Look-Backs**

Number Correct Explicit: \_\_\_\_\_

Number Correct Implicit: \_\_\_\_\_

Total: \_\_\_\_\_

\_\_\_\_\_ Independent: 8 correct

\_\_\_\_\_ Instructional: 6–7 correct

\_\_\_\_\_ Frustration: 0–5 correct

**With Look-Backs**

Number Correct Explicit: \_\_\_\_\_

Number Correct Implicit: \_\_\_\_\_

Total: \_\_\_\_\_

\_\_\_\_\_ Independent: 8 correct

\_\_\_\_\_ Instructional: 6–7 correct

\_\_\_\_\_ Frustration: 0–5 correct

**Level: Five**

**Martin Luther King, Jr. (Student Copy)**

When Martin Luther King, Jr., was a boy, many laws would not allow black people to go to the same places as whites. Some people thought blacks were not as good as whites. Black children could not attend some schools, and certain restaurants had signs that said “whites only.” Blacks could not sit in the front of a bus and, if a bus got crowded, they had to give up their seat to a white person. King did not agree with laws like these, for he believed that all people are equal. He did not think that skin color should keep people apart. Laws separating blacks and whites were unjust, and King decided to protest such laws.

Many people organized to help him. King said that they must protest in a peaceful way. King told his followers to “meet hate with love.” In Montgomery, Alabama, Rosa Parks, a black woman, was arrested and fined for not giving up her seat to a white man on a bus. King led the movement to protest this action. Thousands of people refused to ride the buses. The bus companies began to lose money. In time the law was changed. King traveled to many cities. He talked to the people and led them in peaceful marches.

More and more people heard about King's peaceful protests and joined him. King led a march to our center of government, Washington, D.C., to ask that the unjust laws be changed. Finally, the United States Supreme Court agreed with King. The laws separating blacks and whites were changed. King was given the Nobel Peace Prize for his work. Today people still admire King because he fought for justice in a peaceful way. January 15 was named as a national holiday in honor of Martin Luther King, Jr.

**Level: Five**

Narrative

**Concept Questions:**

Who was Martin Luther King? (3-2-1-0)

What is racism? (3-2-1-0)

What is Washington, D.C.? (3-2-1-0)

What does “equal rights for blacks” mean to you? (3-2-1-0)

Score:

\_\_\_\_/12= \_\_\_\_%

\_\_\_\_ FAMILIAR \_\_\_\_ UNFAMILIAR

Prediction:

**Level: Five**

**Martin Luther King, Jr. (Teacher Copy)**

When Martin Luther King, Jr., was a boy, many laws would not allow black people to go to the same places as whites. Some people thought blacks were not as good as whites. Black children could not attend some schools, and certain restaurants had signs that said “whites only.” Blacks could not sit in the front of a bus and, if a bus got crowded, they had to give up their seat to a white person. King did not agree with laws like these, for he believed that all people are equal. He did not think that skin color should keep people apart. Laws separating blacks and whites were unjust, and King decided to protest such laws.

Many people organized to help him. King said that they must protest in a peaceful way. King told his followers to “meet hate with love.” In Montgomery, Alabama, Rosa Parks, a black woman, was arrested and fined for not giving up her seat to a white man on a bus. King led the movement to protest this action. Thousands of people refused to ride the buses. The bus companies began to lose money. In time the law was changed. King traveled to many cities. He talked to the people and led them in peaceful marches.

More and more people heard about King's peaceful protests and joined him. King led a march to our center of government, Washington, D.C., to ask that the unjust laws be changed. Finally, the United States Supreme Court agreed with King. The laws separating blacks and whites were changed. King was given the Nobel Peace Prize for his work. Today people still admire King because he fought for justice in a peaceful way. January 15 was named as a national holiday in honor of Martin Luther King, Jr. (297 words)

**Level: Five**

Number of Total Miscues (Total Accuracy):	
Number of Meaning-Change Miscues (Total Acceptability):	
<b>Total Accuracy</b>	<b>Total</b>
<b>Acceptability</b>	
0–7 miscues _____ Independent	_____ 0–7
miscues	
8–31 miscues _____ Instructional	_____ 8–16
miscues	
32+ miscues _____ Frustration	_____ 17+
miscues	
Rate: $297 \times 60 = 17,820 / \text{_____ seconds} = \text{_____ WPM}$	
Correct WPM: $(308 - \text{_____ errors}) \times 60 = \text{_____} / \text{_____ seconds} = \text{CWPM}$	

**Retelling Scoring Sheet for “Martin Luther King, Jr.”**

**Setting/Background**

- \_\_\_\_\_ When Martin Luther King, Jr., was a boy,
- \_\_\_\_\_ laws would not allow blacks
- \_\_\_\_\_ to go to the same places
- \_\_\_\_\_ as whites. People thought
- \_\_\_\_\_ blacks weren't as good as whites.
- \_\_\_\_\_ Black children could not attend some schools.
- \_\_\_\_\_ Certain restaurants had signs
- \_\_\_\_\_ that said

\_\_\_\_\_ “whites only.”  
\_\_\_\_\_ Blacks could not sit  
\_\_\_\_\_ in front  
\_\_\_\_\_ of a bus.  
\_\_\_\_\_ If the bus got crowded,  
\_\_\_\_\_ they had to give up their seat  
\_\_\_\_\_ to a white.

### **Goal**

\_\_\_\_\_ King did not agree  
\_\_\_\_\_ with these laws.  
\_\_\_\_\_ He believed  
\_\_\_\_\_ that all people are equal.  
\_\_\_\_\_ He decided  
\_\_\_\_\_ to protest these laws.

### **Events**

\_\_\_\_\_ King said  
\_\_\_\_\_ they must protest  
\_\_\_\_\_ in a peaceful way.  
\_\_\_\_\_ In Alabama,  
\_\_\_\_\_ Rosa Parks was arrested  
\_\_\_\_\_ for not giving up her seat  
\_\_\_\_\_ to a white man.  
\_\_\_\_\_ King led a movement

\_\_\_\_\_ to protest this action.

\_\_\_\_\_ Thousands refused

\_\_\_\_\_ to ride the buses.

\_\_\_\_\_ The bus company

\_\_\_\_\_ lost money.

\_\_\_\_\_ The law was changed.

\_\_\_\_\_ King led a march

\_\_\_\_\_ to our center of government,

\_\_\_\_\_ Washington, D.C.,

\_\_\_\_\_ to ask

\_\_\_\_\_ that the laws be changed

\_\_\_\_\_ the unjust laws.

### **Resolution**

\_\_\_\_\_ The Supreme Court agreed.

\_\_\_\_\_ The laws were changed

\_\_\_\_\_ laws separating blacks and whites.

\_\_\_\_\_ King was given a prize

\_\_\_\_\_ the Nobel Peace Prize

\_\_\_\_\_ for his work.

\_\_\_\_\_ People still admire King.

\_\_\_\_\_ January 15 was named

\_\_\_\_\_ as a holiday

\_\_\_\_\_ a national holiday

\_\_\_\_\_ in honor of King.

53 Ideas

Number of ideas recalled \_\_\_\_\_

Other ideas recalled, including references:

### **Questions for "Martin Luther King, Jr."**

1. What was Martin Luther King's main goal?

*Implicit:* he wanted equality for black people

2. Why had people made laws separating blacks and whites?

*Implicit:* they thought blacks were not as good as whites

3. In some cities, what did blacks have to do on a crowded bus?

*Explicit:* give up their seat to a white person

4. Why was Rosa Parks arrested?

*Explicit:* she refused to give up her seat



5. What did many people do to protest Rosa Parks's arrest?

*Explicit:* they refused to ride the buses

6. What happened when people refused to ride the buses?

*Implicit:* the law was changed. If the student says, "The bus companies lost money," ask "What happened because of that?"

7. Why was Washington, D.C., an important place to protest unjust laws?

*Implicit:* it is where the president and government officials are, so they would see the protest

8. Name one way in which Martin Luther King was honored for his work.

*Explicit:* the Nobel Peace Prize; or the national holiday

**Level: Five**

**Without Look-Backs**

Number Correct Explicit: \_\_\_\_\_

Number Correct Implicit: \_\_\_\_\_

Total: \_\_\_\_\_

\_\_\_\_\_ Independent: 8 correct

\_\_\_\_\_ Instructional: 6–7 correct

\_\_\_\_\_ Frustration: 0–5 correct

**With Look-Backs**

Number Correct Explicit: \_\_\_\_\_

Number Correct Implicit: \_\_\_\_\_

Total: \_\_\_\_\_

\_\_\_\_\_ Independent: 8 correct

\_\_\_\_\_ Instructional: 6–7 correct

\_\_\_\_\_ Frustration: 0–5 correct

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Appendix D: Publisher Permission Form



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4th Floor, Auto Atlantic  
Corner of Hertzog Boulevard  
and Heerengracht street

Cape Town, 8001  
South Africa  
USAPermissions@pearson.com

Jun 15, 2017

PE Ref # 200891

Donna Weikert

DRIPPINGS SPRINGS INDEPENDENT SCHOOL DISTRICT

504 W. Mercer Street

Dripping Springs, TX 78620

Dear Donna Weikert,

You have our permission to include content from our text, *QUALITATIVE READING INVENTORY, 5th Ed.* by *LESLIE, LAUREN; CALDWELL, JOANNE SCHUDT*, in your dissertation or masters thesis at Concordia University–Portland.

Content to be included is:

pp.315-408

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Sincerely,

Julia Payle, Permissions Administrator

**Appendix E: Concordia University–Portland IRB Approval Letter**

**Concordia University–Portland Institutional Review Board Approved: June 27,**

**2017; Expires: June 27, 2018**

**Research Study Title:** Quasi-experimental Study of the Correlation Between Reading Intervention Programs and Increased Understanding of Grade Level Texts for Intermediate School Students, Grades 3-5.

**Principal Investigator:** Donna Weikert, **Research Institution:** Concordia University–Portland Oregon, **Faculty Advisor:** Audrey Rabas

**Child Assent Form**

I am studying the best reading program designed to increase understanding of grade-level texts. I will assess your comprehension before intervention and after intervention and compare all scores between intervention types to determine which reading program is best.

**Sign this page, if you want to do this:**

**Name** of Student: \_\_\_\_\_

**Signature** of Student: \_\_\_\_\_

**Date:** \_\_\_\_\_

**Name** of Investigator: \_\_\_\_\_

**Signature** of Investigator: \_\_\_\_\_

**Date:** \_\_\_\_\_

Investigator: Donna Weikert; email: [Researcher email redacted]/c/o: Professor Audrey Rabas Concordia University–Portland, 2811 NE Holman Street, Portland, Oregon 97221  
There are two copies. Please keep one copy for you.

Concordia University–Portland Institutional Review Board Approved: June 27, 2017; Expires: June 27, 2018

## **Appendix F: Facility Permission**

### **Permission from Facility where recruitment and/or research will take place**

Institutional Review Board and Human Subjects Research

Principle

I am in the final journey of my Dissertation process and am requesting approval to begin the research! I have attached my IRB documents that outline my research into effective reading intervention programs and parent permission/student assent forms that may be distributed to intervention groups, once they have been formed. Since intervention is a natural part of our educational programs, providing support to students based on their individual needs, initial approval is embedded in registration paperwork. Please let me know what else I need to do.

Ms. Warren's response, Assistant Superintendent of Curriculum & Instruction:

Yes. Let's meet about your proposal.

## **Appendix G: Participant and Parent Permission Form**

Dear Parents and Guardians,

I am writing because I am researching the most effective way to conduct reading intervention to increase comprehension in our district. I am working on this study, as my graduate level research with Concordia University – Portland, with Professor Audrey Rabas as my faculty advisor. This study is scheduled to begin during the first few months of school and continue through the end of the semester. We expect 120 students to participate.

Should you choose to agree to have your child participate in the study, your child will participate in a reading group during the school day either as part of his/her ELA class or during S.O.A.R time. Your child will not miss core instructional class time. If your child does not want to participate in the research, or you do not want your child to participate in the research, then your child will still receive quality reading instruction, but no data will be collected.

Your child does not have to participate in the research. It is optional. There will be no penalty for not participating. In the same way, there is no advantage or favoritism for your child participating. If your child wants to stop participating at any point in the research, his/her assessment results will not be used but he/she will still receive reading intervention instruction.

The results will be collected in a way that protects the student's identity. The name and other identifying characteristics of your child will not be stored with the answers/observations specific to you or your child. To do this, your child will be given a code that only I, the researcher, will know. The code, and not the name or other identifying characteristics, will be stored with this private information. Reports will be made in group aggregate form; such as the average and general group findings, with no individual identifying information linked to the information. The information will be stored on a password-protected computer while using file

encryption to keep the data secure. The paper documents, such as this form, will be kept in a locked file cabinet. Three years after the study is completed, the study documents will all be deleted and destroyed.

The results of the study could benefit children and the school systems by providing only the most effective reading intervention strategies and programs for the near future. We want to provide only effective and proven reading intervention programs that best meet the varying needs of our students, on both campuses. The outcome of this study will determine which curriculum will be purchased and which reading intervention program will be offered on both campuses the following year. It is important to investigate new ways to support our students and only offer programs that are proven to be successful in providing differentiated and personalized intervention to all our students.

We will ask your child if they want to participate. For us to ask your child, we need your permission or consent.

Please read the parental consent form on the next page. If you agree, please fill out the form below and return this page before \_\_\_\_\_.

**Parent Consent**

*As the parent or guardian of the child* \_\_\_\_\_,

*I consent.*

Parent/Guardian Name: \_\_\_\_\_

Parent/Guardian signature: \_\_\_\_\_

If you have any questions or concerns, you can call me at [redacted] or send me an email [redacted]. You can also let your child's teacher know if you have questions.

I have also attached a second copy of this page for you to keep for your records. This study was approved by the Concordia University–Portland IRB. If you want to talk with a participant advocate, you can contact Dr. OraLee Branch (email [redacted] or call [redacted]).

Sincerely, Donna Weikert

Dear Parents and Guardians,

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There are two copies. Please keep one copy for you.



## Appendix H: G\*Power Analysis to Determine Sample Size

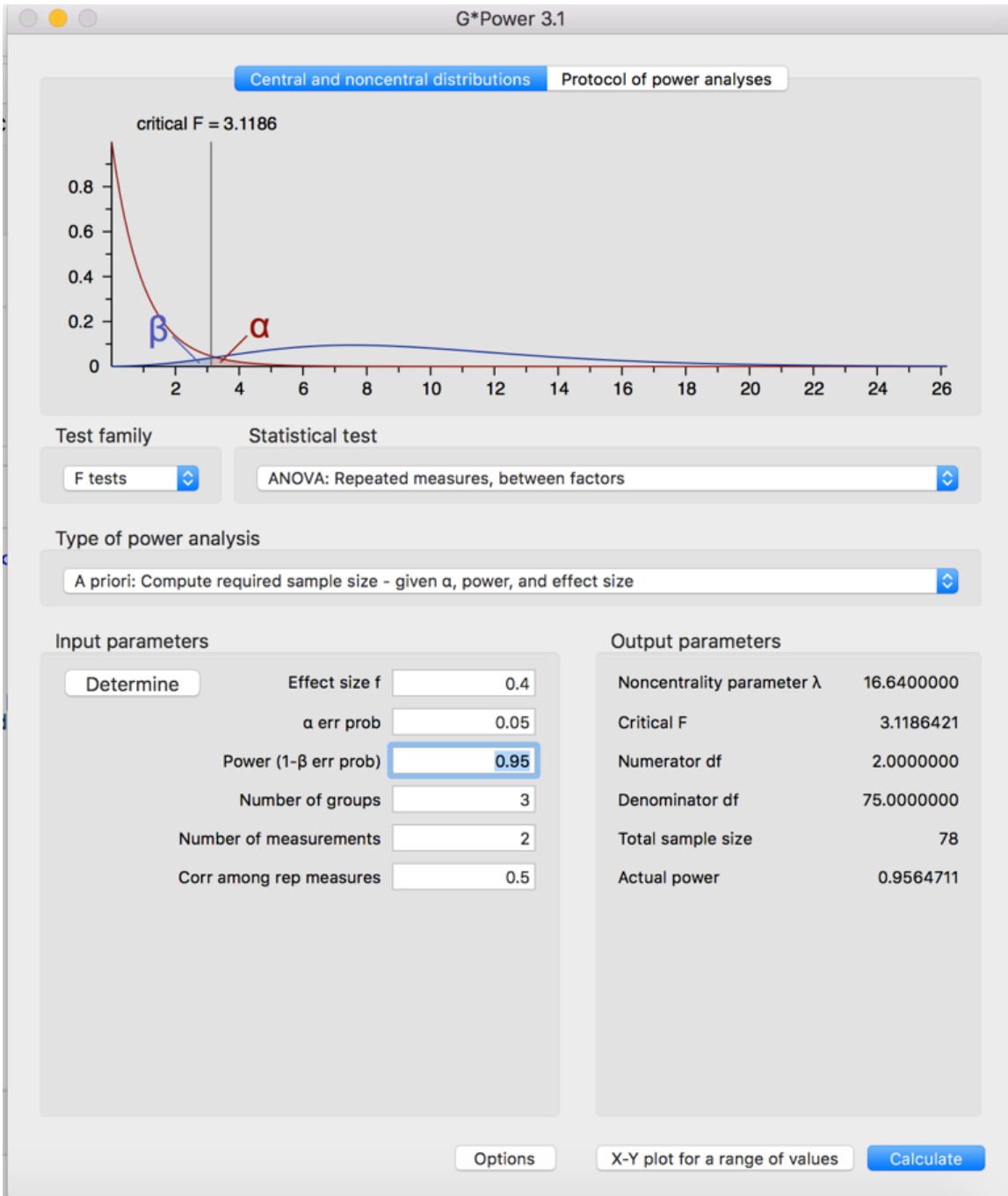


Figure 5. G\*Power analysis .

## Appendix I: Outliers Z-Score Test

Table 13

*Pull-out Intervention—Pretest and Posttest Implicit*

<b>Zscore (Pretest_Implicit)</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1.70599	3	3.8	11.5	11.5
	-.63718	8	10.3	30.8	42.3
	.43163	13	16.7	50.0	92.3
	2.30205	2	2.6	7.7	100.0
	<b>Total</b>	<b>26</b>	<b>33.3</b>	<b>100.0</b>	
Missing	System	52	66.7		
<b>Total</b>		<b>78</b>	<b>100.0</b>		

<b>Zscore (Posttest_Implicit)</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<b>-1.43900</b>	7	9.0	26.9	26.9
	<b>.21858</b>	14	17.9	53.8	80.8
	1.40257	5	6.4	19.2	100.0
	<b>Total</b>	<b>26</b>	<b>33.3</b>	<b>100.0</b>	
Missing	System	52	66.7		
<b>Total</b>		<b>78</b>	<b>100.0</b>		

Table 14

*Pull-out Intervention—Pretest and Posttest Explicit*

<b>Zscore (Pretest_Explicit)</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1.90109	1	1.3	3.8	3.8
	-.97719	7	9.0	26.9	30.8
	-.05330	12	15.4	46.2	76.9
	1.56351	6	7.7	23.1	100.0
	<b>Total</b>	<b>26</b>	<b>33.3</b>	<b>100.0</b>	
Missing	System	52	66.7		
<b>Total</b>		<b>78</b>	<b>100.0</b>		

<b>Zscore (Posttest_Explicit)</b>					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1.88803	4	5.1	15.4	15.4
	-.11679	14	17.9	53.8	69.2
	1.14839	8	10.3	30.8	100.0
	<b>Total</b>	<b>26</b>	<b>33.3</b>	<b>100.0</b>	
Missing	System	52	66.7		
<b>Total</b>		<b>78</b>	<b>100.0</b>		

Table 15

*Computer-Based Intervention—Pretest and Posttest Implicit*

		<b>Zscore (Pretest_Implicit)</b>			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1.68430	2	2.6	7.7	7.7
	-.84215	6	7.7	23.1	30.8
	.00000	13	16.7	50.0	80.8
	1.47377	4	5.1	15.4	96.2
	2.52646	1	1.3	3.8	100.0
	Total	26	33.3	100.0	
Missing	System	52	66.7		
Total		78	100.0		

		<b>Zscore (Posttest_Implicit)</b>			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1.59720	2	2.6	7.7	7.7
	-.97038	6	7.7	23.1	30.8
	-.34355	7	9.0	26.9	57.7
	.75340	7	9.0	26.9	84.6
	1.53693	4	5.1	15.4	100.0
	Total	26	33.3	100.0	
Missing	System	52	66.7		
Total		78	100.0		

Table 16

*Computer-Based Intervention—Pretest and Posttest Explicit*

		<b>Zscore (Pretest_Explicit)</b>			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1.83313	2	2.6	7.7	7.7
	-1.06749	5	6.4	19.2	26.9
	-.30184	8	10.3	30.8	57.7
	1.03804	11	14.1	42.3	100.0
	Total	26	33.3	100.0	
Missing	System	52	66.7		
Total		78	100.0		

		<b>Zscore (Posttest_Explicit)</b>			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1.79377	2	2.6	7.7	7.7
	-1.07901	5	6.4	19.2	26.9
	-.36425	7	9.0	26.9	53.8
	.88658	11	14.1	42.3	96.2
	1.78003	1	1.3	3.8	100.0
	Total	26	33.3	100.0	
Missing	System	52	66.7		
Total		78	100.0		

Table 17

*Integrated-Content Intervention—Implicit*

		<b>Zscore (Pretest_Implicit)</b>			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1.73023	2	2.6	7.7	7.7
	-.77308	8	10.3	30.8	38.5
	.18407	12	15.4	46.2	84.6
	1.85908	4	5.1	15.4	100.0
	Total	26	33.3	100.0	
Missing	System	52	66.7		
Total		78	100.0		

		<b>Zscore (Posttest_Implicit)</b>			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-.98058	13	16.7	50.0	50.0
	.98058	13	16.7	50.0	100.0
	Total	26	33.3	100.0	
Missing	System	52	66.7		
Total		78	100.0		

Table 18

*Integrated-Content Intervention—Explicit*

		<b>Zscore (Pretest_Explicit)</b>			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1.27285	5	6.4	19.2	19.2
	-.40195	12	15.4	46.2	65.4
	1.12212	8	10.3	30.8	96.2
	2.21074	1	1.3	3.8	100.0
	Total	26	33.3	100.0	
Missing	System	52	66.7		
Total		78	100.0		

		<b>Zscore(Posttest_Explicit)</b>			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	-1.61552	7	9.0	26.9	26.9
	.59519	19	24.4	73.1	100.0
	Total	26	33.3	100.0	
Missing	System	52	66.7		
Total		78	100.0		

Screening for outliers was accomplished by standardizing the scores within each cell and searching for scores exceeding  $\pm 3.3$  ( $p < .001$  in a normal distribution).

## Appendix J: Histograms

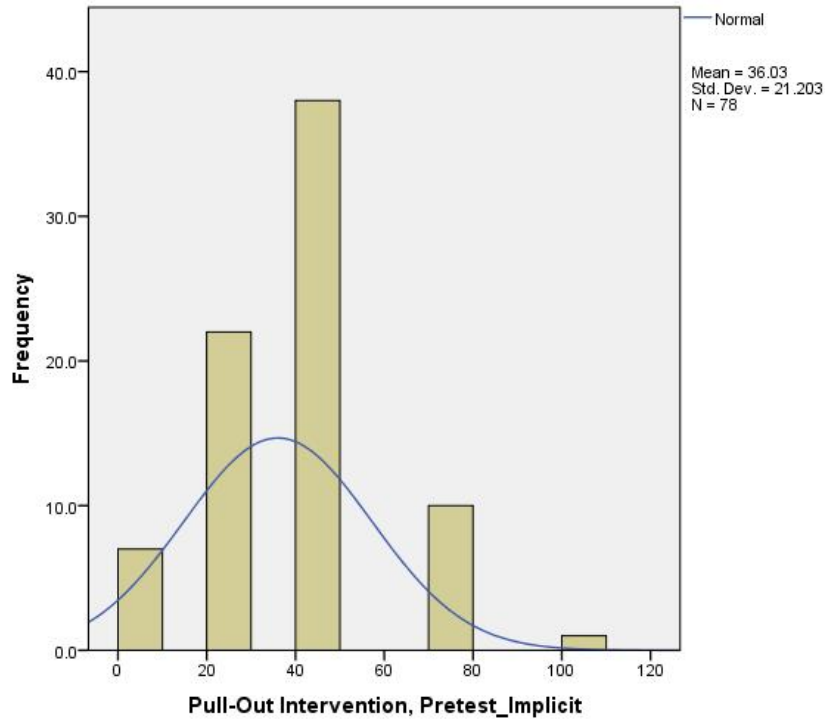


Figure 6. Frequency histogram with superimposed normal curve for implicit reading comprehension test scores for students in pull-out interventions at pretest.

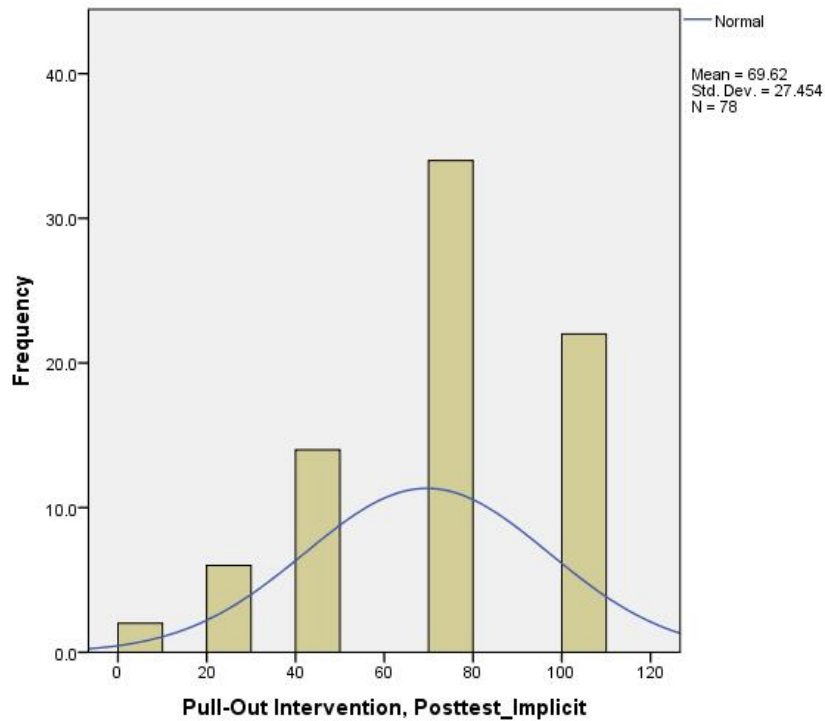


Figure 7. Frequency histogram with superimposed normal curve for implicit reading comprehension test scores for students in pull-out interventions at posttest.

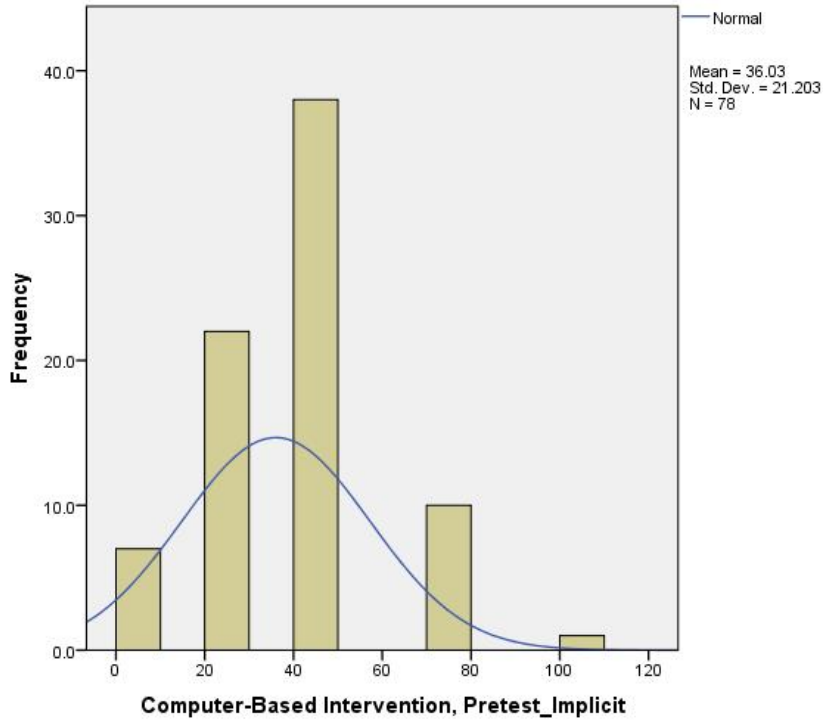


Figure 8. Frequency histogram with superimposed normal curve for implicit reading comprehension test scores for students in computer-based interventions at pretest.

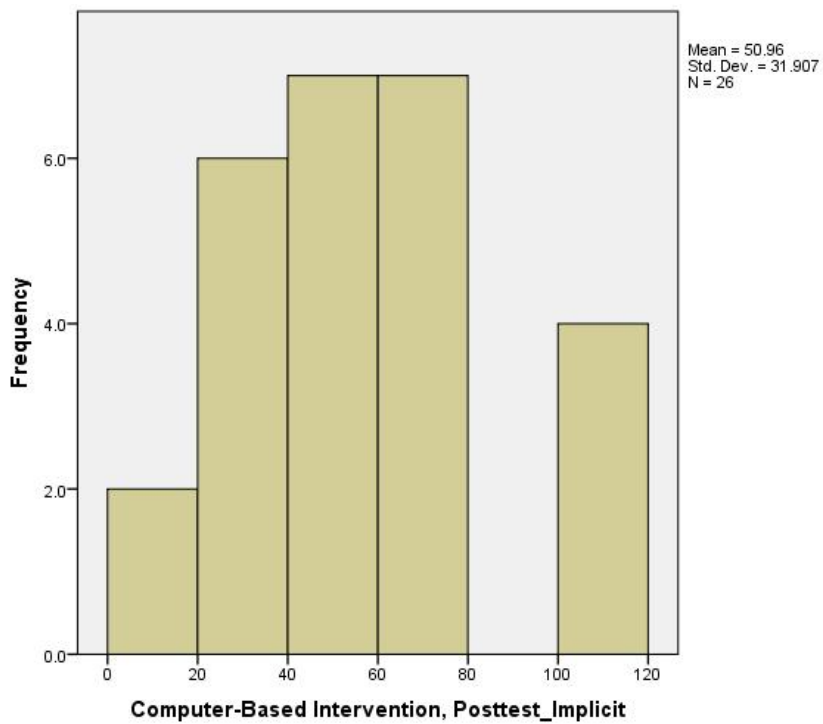


Figure 9. Frequency histogram with superimposed normal curve for implicit reading comprehension test scores for students in computer-based interventions at posttest.

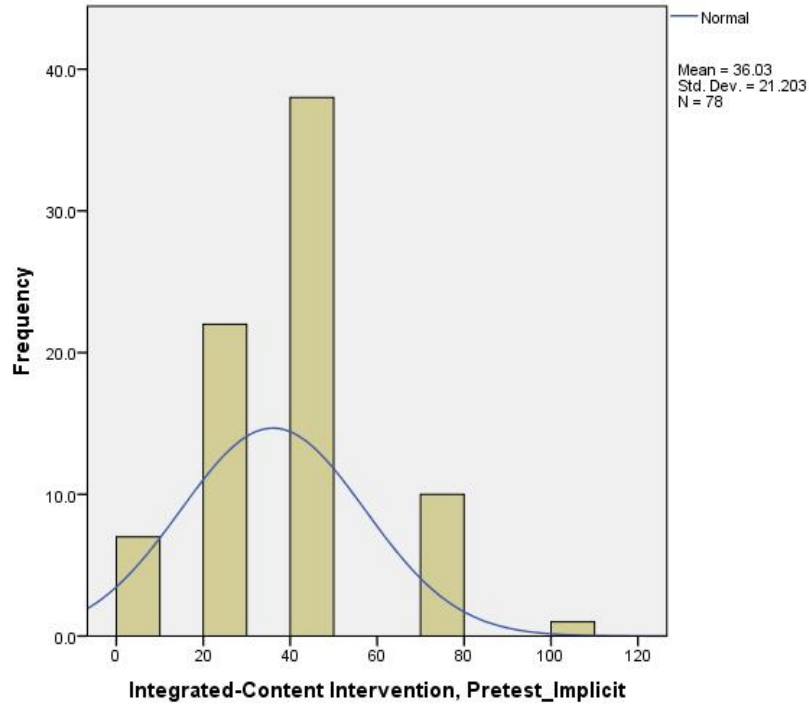


Figure 10. Frequency histogram with superimposed normal curve for implicit reading comprehension test scores for students in computer-based, and integrated-content interventions at pretest.

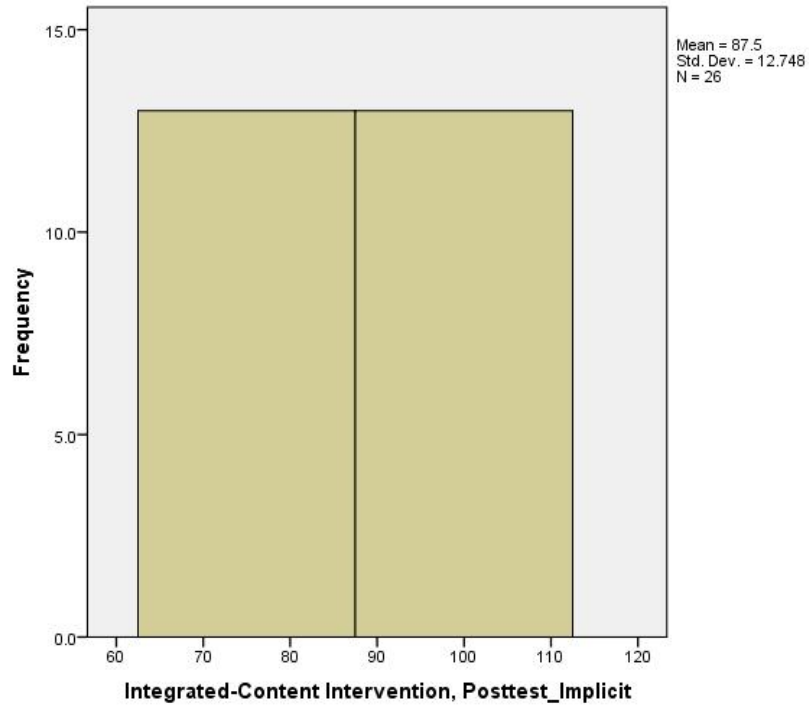


Figure 11. Frequency histogram with superimposed normal curve for implicit reading comprehension test scores for students in integrated-content interventions at posttest.

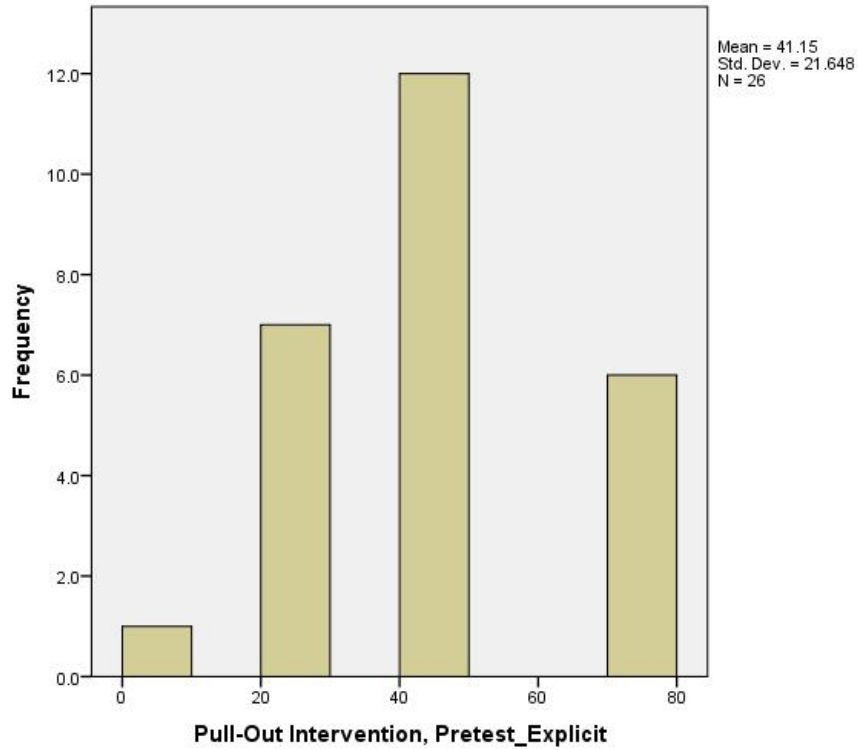


Figure 12. Frequency histogram with superimposed normal curve for explicit reading comprehension test scores for students in pull-out interventions at pretest.

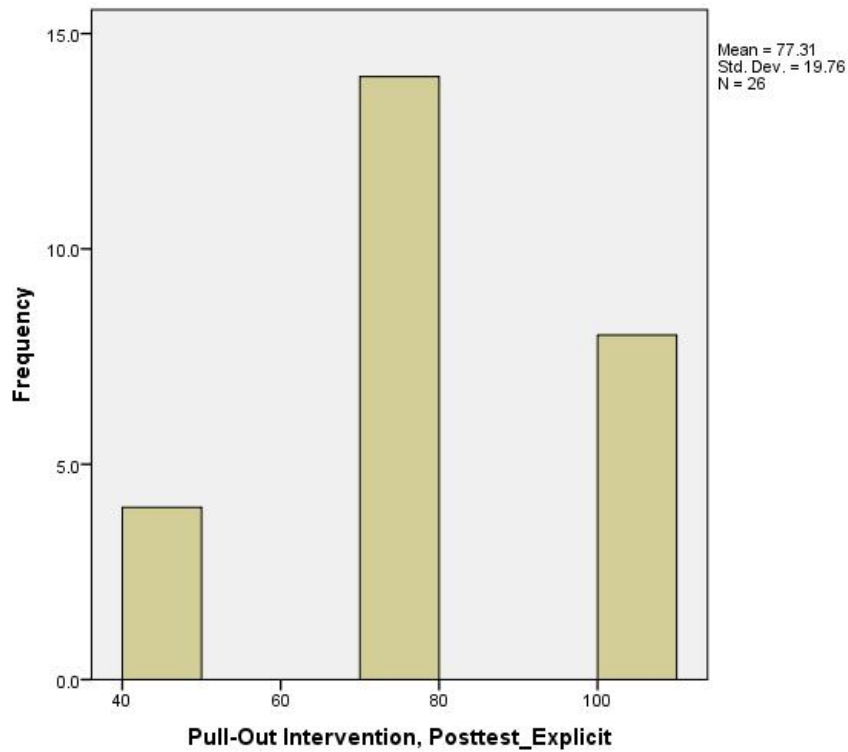


Figure 13. Frequency histogram with superimposed normal curve for explicit reading comprehension test scores for students in pull-out interventions at posttest.



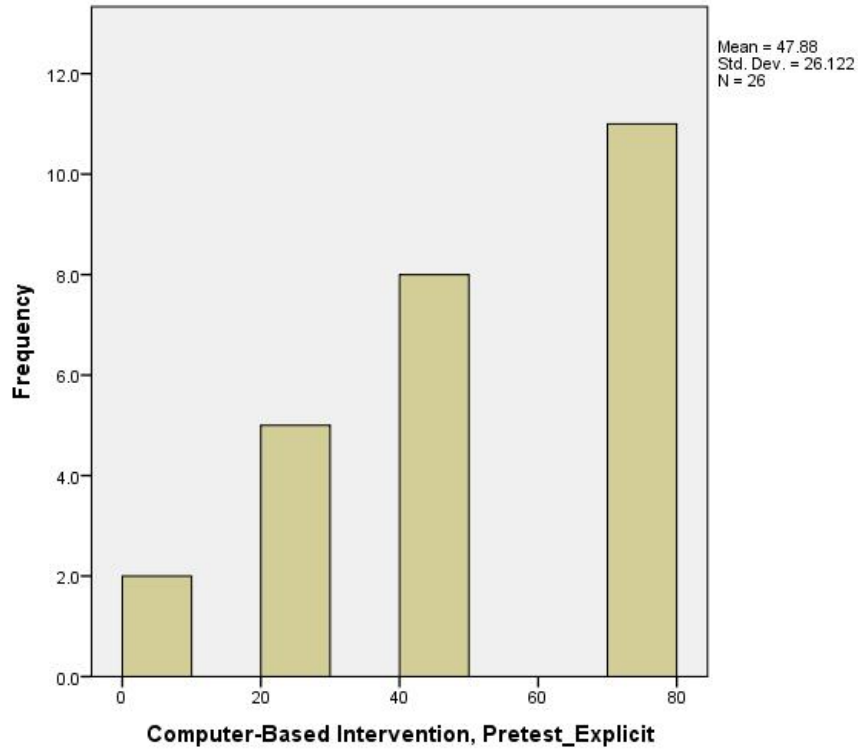


Figure 14. Frequency histogram with superimposed normal curve for explicit reading comprehension test scores for students in computer-based interventions at pretest.

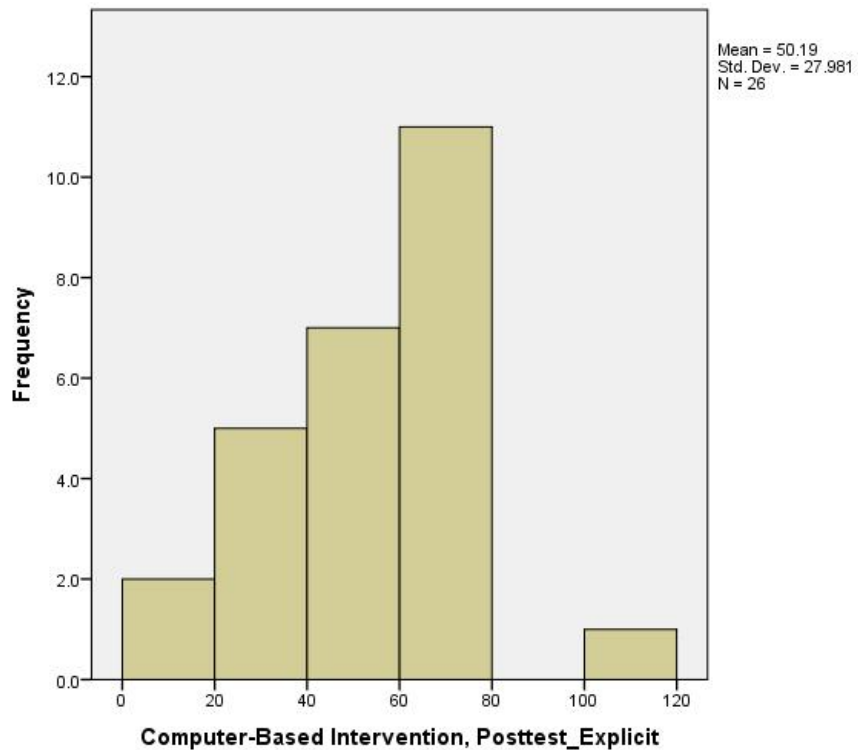


Figure 15. Frequency histogram with superimposed normal curve for explicit reading comprehension test scores for students in computer-based interventions at posttest.

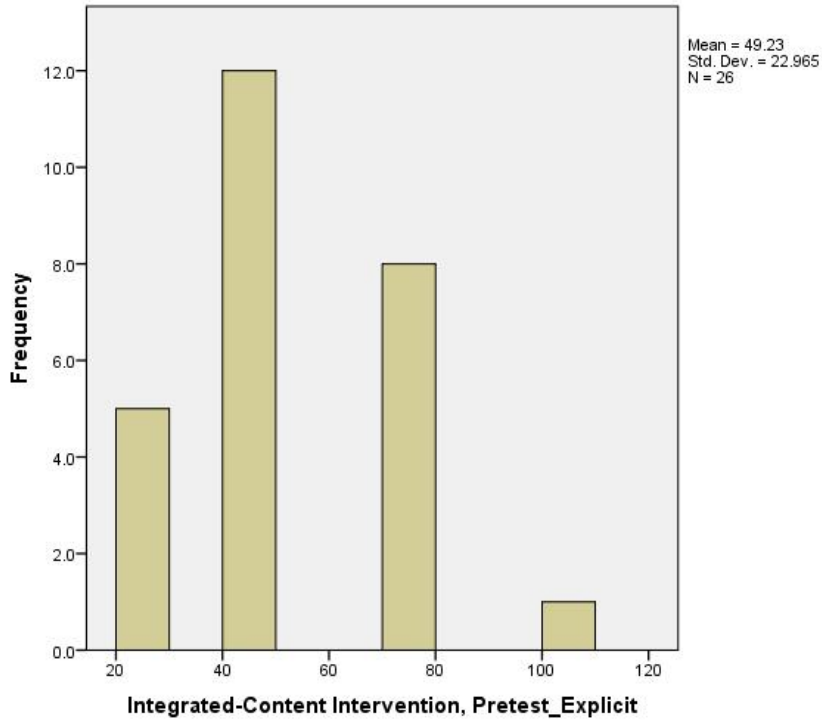


Figure 16. Frequency histogram with superimposed normal curve for explicit reading comprehension test scores for students in integrated-content interventions at pretest.

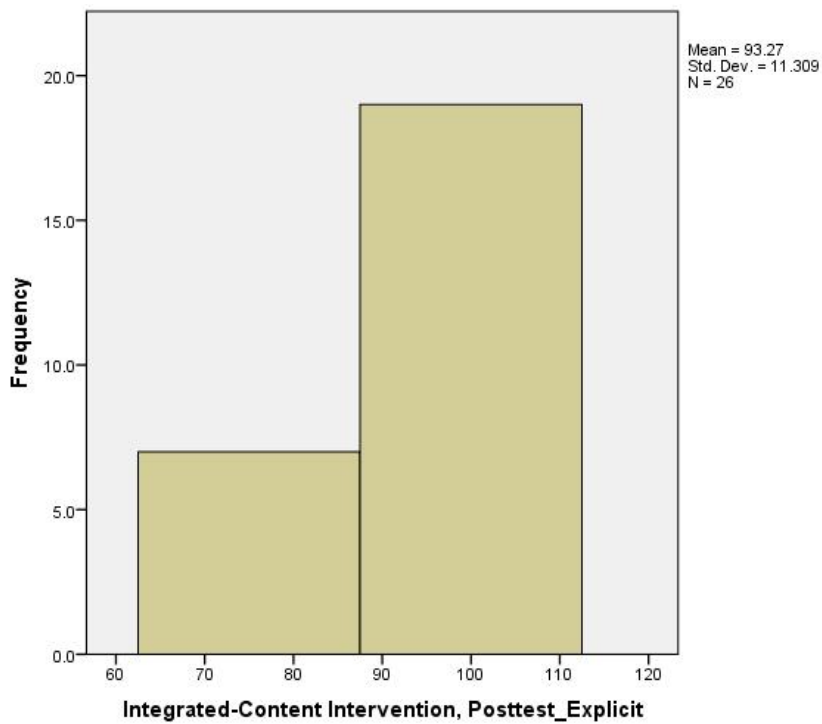


Figure 2. Frequency histogram with superimposed normal curve for explicit reading comprehension test scores for students in integrated-content interventions at posttest.

## Appendix K: ANOVA

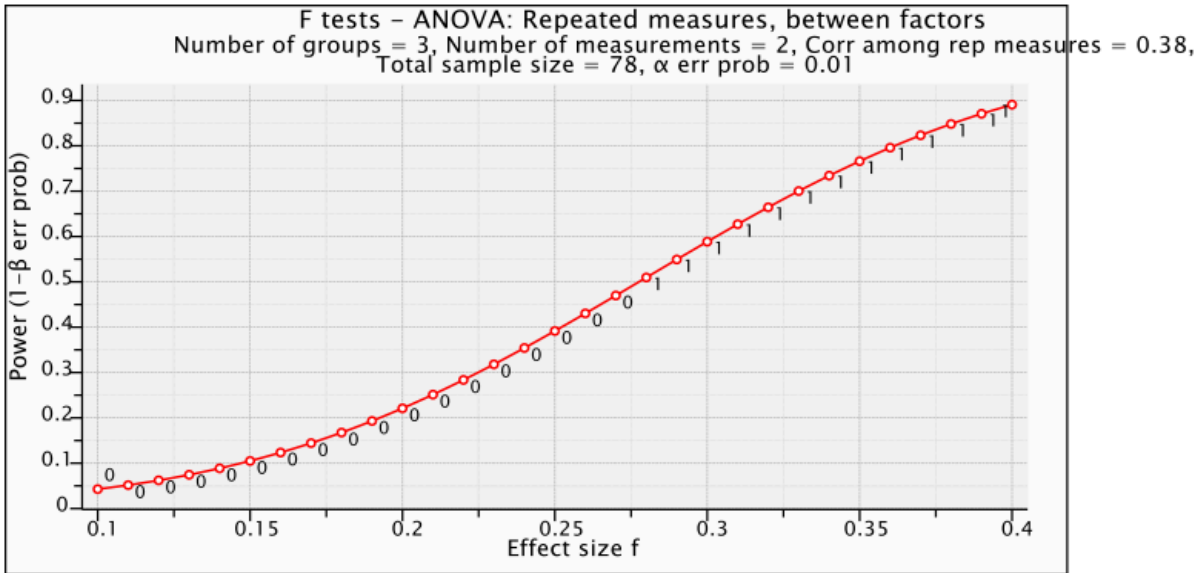


Figure 17. Statistical power ( $1 - \beta$ ) for the between-subjects main effect of Intervention Type as a function of effect size (Cohen's  $f$ ) for  $N = 78$ .

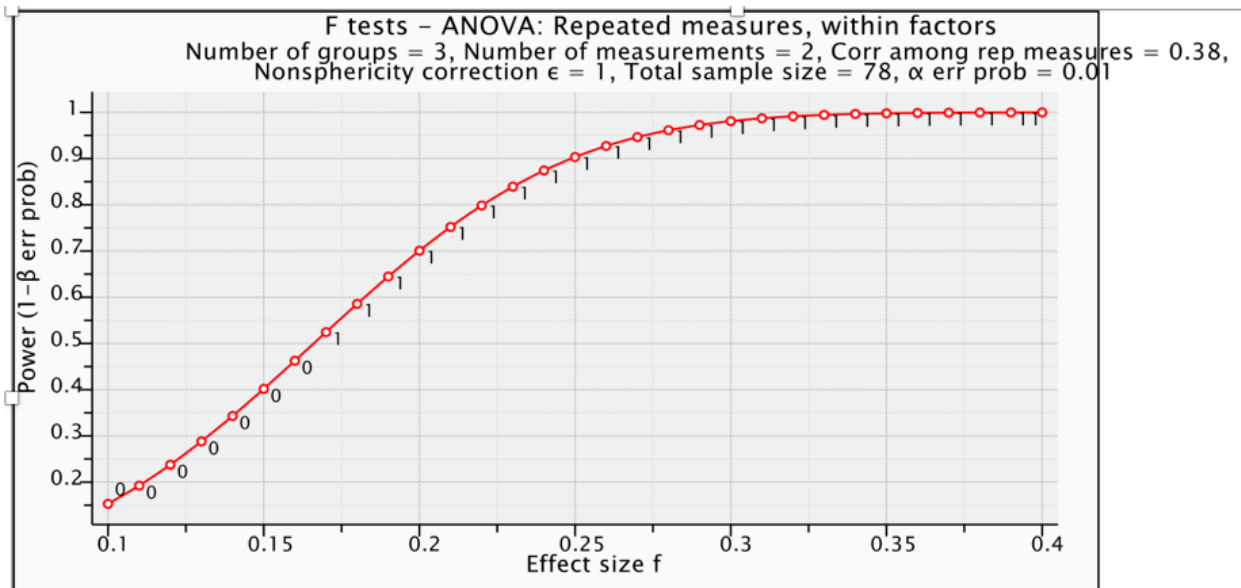


Figure 18. Statistical power ( $1 - \beta$ ) for the within-subjects main effect of Time as a function of effect size (Cohen's  $f$ ) for  $N = 78$ .

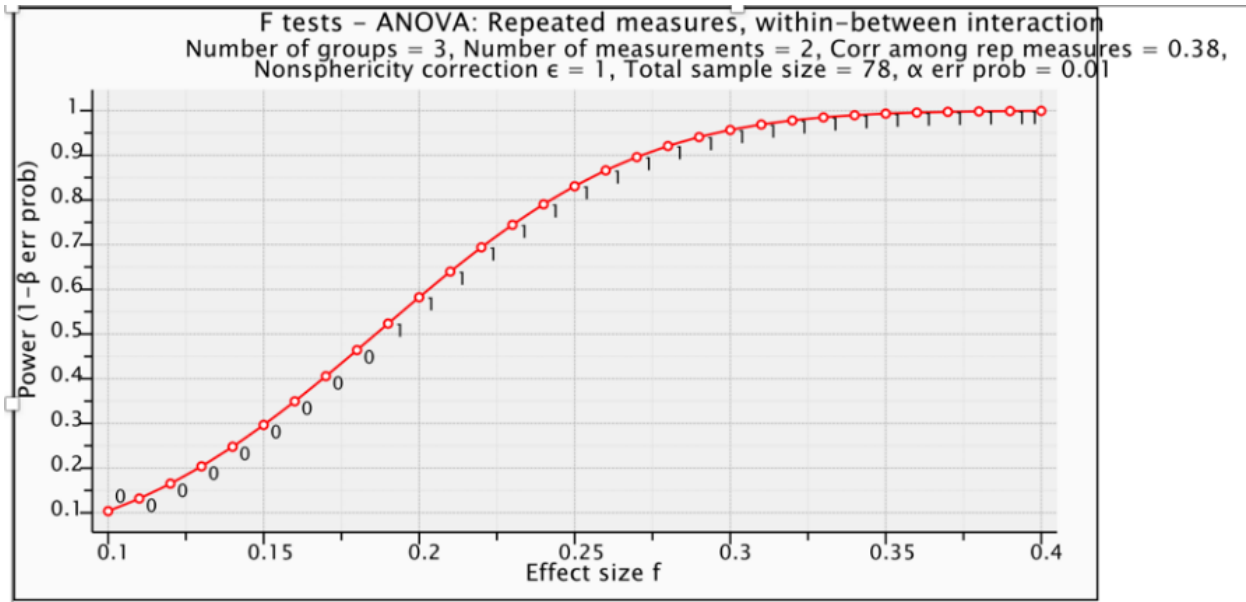


Figure 19. Statistical power ( $1 - \beta$ ) for the Intervention Type x Time interaction effect as a function of effect size (Cohen's  $f$ ) for  $N = 78$ .

## Appendix L: Cell Mean Comparison

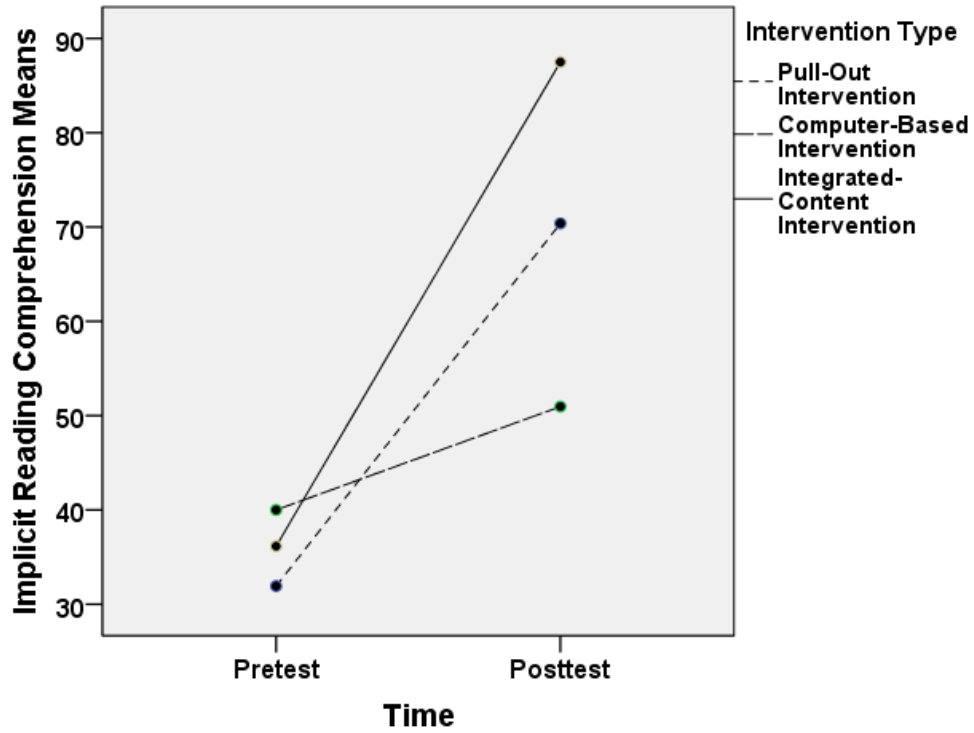


Figure 20. Cell means on implicit reading comprehension as a function of Intervention Type and Time.

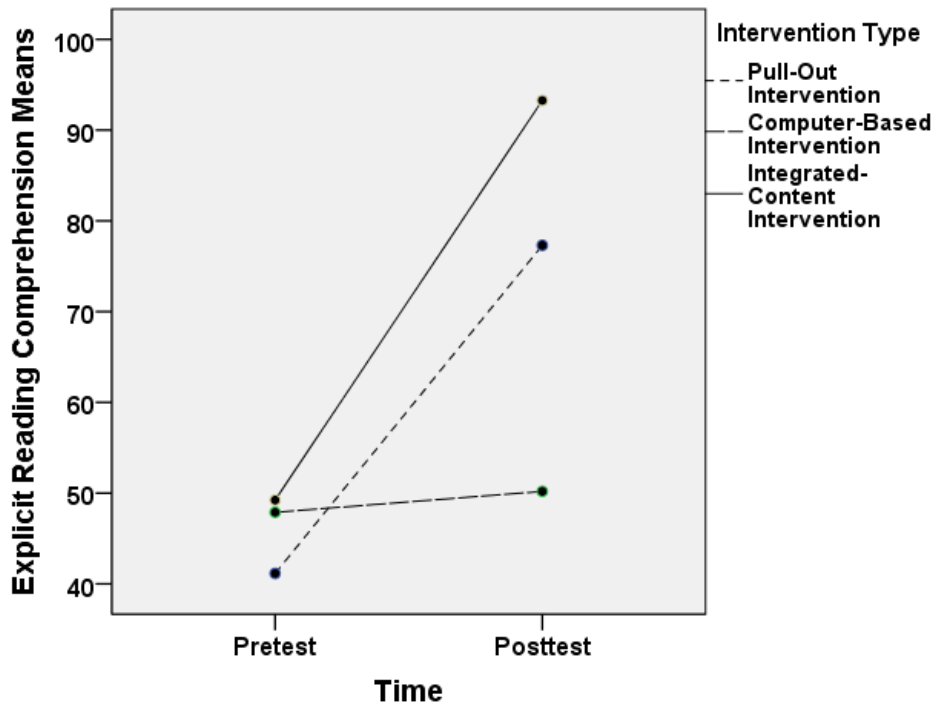


Figure 21. Cell means on explicit reading comprehension as a function of Intervention Type and Time.

### Appendix M: Distribution of Growth Scores

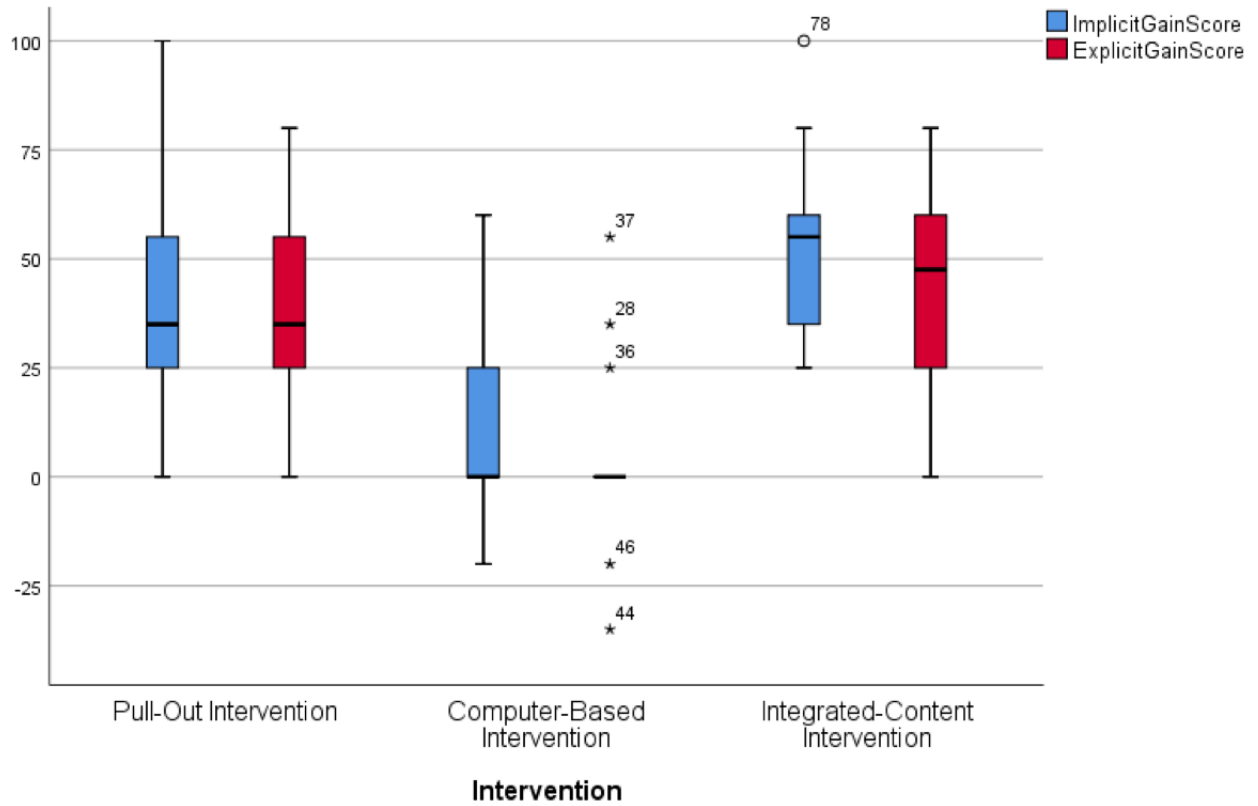


Figure 22. Distribution of reading comprehension growth scores for the three intervention types