Innovative Teaching Practices to Accelerate Student Learning in the Areas of Literacy and Science

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Innovative Teaching Practices to Accelerate Student Learning in the Areas of Literacy and Science

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A Co-Authored Dissertation submitted to
The Graduate School at the University of Missouri-St. Louis
in partial fulfillment of the requirements for the degree
Doctor of Education with an emphasis in Educational Practice

August 2019

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Keith Miller, Ph.D.
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Co-Authored Abstract

The researchers of this joint dissertation aspired to create and implement innovative instructional practices that would accelerate student learning. Both researchers believed in the importance of experimenting with structures and processes that lead to instructional impact. They were both passionate about developing an instructional model that would accelerate student learning by focusing on student transfer of skills. They sought to answer the question, *Can learning be accelerated when teachers are supported and encouraged to create and implement instructional practices grounded in research?* One researcher studied a practice that would potentially increase students’ ability to think critically and problem solve using 5th grade science content. The other researcher created an instructional intervention practice for underperforming students whose progress was flat and not on track to close reading gaps between their same-grade peers.

Both researchers used action research to study their respective instructional practices. One researcher used qualitative data to inform and monitor the instructional practice being studied; the other researcher used both qualitative and quantitative data. One study used critical thinking skills to aid students’ ability to learn science content. The other study used an innovative model of intervention to aid students’ ability to transfer learning from one instructional setting to another.

The researchers believed all students have the ability to accelerate learning when teachers are encouraged and given freedom to create and implement innovative teaching practices in their classrooms. Both faced obstacles while working within a defined
system but found that when teachers were given the opportunity to create instructional practices that were grounded in research, student achievement was accelerated.
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Co-Authored Introduction

If you pay attention any form of news, you eventually will hear something about the U.S. education system, a failing school somewhere in the U.S., disagreements on school policies, on school reform, on curriculum, teacher performance, and the topics are endless. Because everyone has attended school at some point in their life, everyone has an opinion. Education is not only personal, it is political. In 1983 President Ronald Regan’s National Commission on Excellence in Education published *A Nation at Risk: The Imperative for Educational Reform*. This report highlighted facts such as U.S. students being outperformed by students from other industrialized nations on international comparisons, high numbers of functionally illiterate adults, and declining performance of high school students on standardized tests. These were just a few of the alarming statistics reported. In 2000 the *National Reading Panel* report reviewed literature relevant to critical skills and acquisition of beginning reading (U.S. Department of Health and Human Services, National Institute of Health and Human Services, National Reading Panel, 2000). In 2002 the *No Child Left Behind Act* was enacted holding schools accountable for student achievement. In 2009, another reform measure called *Race to the Top* grant program. This program awarded funds to states who were implementing innovative strategies that would lead to improved results for students and long term gains in schools (U.S. Department of Education, 2009). June 2010 brought the release of the *Common Core State Standards* (CCSS) for English Language Arts and Math. The CCSS were an effort to ensure all students, regardless of where they live or what school they attend, have access to a rigorous curriculum and are prepared for college, career, and life (National Governors Association Center for Best Practices & Council of Chief State School
In April 2013 the *Next Generation Science Standards* were released (NGSS). This is a set of science standards adopted by 26 states, the National Science Teachers of America (NSTA), several organizations and other non-profits who came together to create science standards that were more robust and arranged in a practical way for teaching. Currently, the hot topic of dyslexia has many states enacting legislation to ensure schools have proper screening, progress monitoring, and evidence-based reading instruction in place to ensure all students have access to the curriculum and the supports they need to be successful. (Missouri Board of Education, Legislative Task Force on Dyslexia, 2017).

According to Kilpatrick (2016) there is a 40-year gap between research and classroom instruction in psychology, education, special education, linguistics, speech pathology, pediatrics, and neurology. Today’s educators are fortunate to have access to a wealth of research to inform the design of curriculum and instruction, but due to a variety of factors such as communication, lack of quality professional development, teacher motivation, money, and the pace of change in the field of education, best practices from the research community rarely make it into classrooms. As described in a Ted Talk by Sir Ken Robinson, (Robinson, Ken. 2010. Changing the Education Paradigm. CEP. Available from https://www.ted.com/talks/ken_robinson_changing_education_paradigms?utm_campaign=tedspread&utm_medium=referral&utm_source=tedcomshare) today’s education system was designed and structured for a different age: the Industrial Revolution. This structure was based on a production line mentality where students were tracked into an academic pathway or a non-academic skilled worker pathway. This old model does not reflect the
research that exists in fields such as psychology, education, special education, linguistics, and neurology. Unfortunately, in many instances, some U.S. schools still reflect this outdated model.

Paris Bouchard has been in the academic setting for 15 years, teaching 5th grade science for the past 9 years in a suburban Midwestern school district. Previously when teaching reading, Bouchard used standardized reading skills to enhance students’ reading abilities. When the Next Generation Science Standards (NGSS) were introduced in 2012, he began teaching crosscutting concepts to his science students. His students’ state standardized scores improved year after year as he continued to refine his teaching of crosscutting concepts. Based on the premise that crosscutting concepts improve critical thinking, he designed his dissertation to dig deeper into a study of this innovation. In studying the teaching of crosscutting concepts he hypothesized that when students are able to build a cognitive foundation with everyday content, they acquire the confidence and competence they need to apply critical thinking to science content. A deeper understanding of this teaching strategy could accelerate learning in children who underachieve in the sciences.

Michelle Simmons, a reading specialist in another suburban Midwestern school district provided reading intervention to students who displayed a need for an intense, individualized intervention. She had witnessed students not achieving at the accelerated rate they need in order to close the reading gap between them their peers. The district she works in used a published reading, writing and phonics program. These resources used very specific, kid-friendly language to teach students decoding, reading, and writing strategies. The programs used in the intervention also had specific language and
strategies. Simmons hypothesized that if the strategies, language, and activities were bridged, the instructional gaps between the two learning environments would be minimized and students’ progress in reading would accelerate. In order to determine how to bridge the two instructional environments, she participated in a second-grade class Phonics Workshop and Reading Workshop. She believed participating in core instruction would allow her to experience what the students were experiencing, collaborate with teachers during instruction, and help students receiving intervention transfer what they were learning in reading intervention to classroom work.

The innovation in each of these research studies varied, however, the methodology used by both researches was Action Research. The Action Research process allows the practitioner to study innovation at their own site, students, and/or teachers. Action Research is a systematic enquiry based on continues reflection. The process is a series of repetitive steps in which the action researcher reflects, acts and evaluates. Because the researcher positionality is close to the subjects of the research, particular attention needs to be paid to the possible threats to validity. Recognizing researcher bias is the first step in addressing bias. Other threats to validity and credibility of this qualitative study were addressed through: the triangulation of data (Anderson, Herr, & Nihlen, 2007; Rossman & Rallis, 2012), engaging in continuous ongoing reflective planning, making an audit trail accurate and available (Lincoln & Guba, 1985; Richards, 2005), utilizing peer debriefing (Rossman & Rallis, 2012), and employing techniques in negative case analysis (Maxwell, 2009).

It is easy for educators to become complacent and not make changes to their practice given the pendulum swing of frequent reform and improvement initiatives. New
initiatives and mandates are frequently brought to teachers to implement new research to inform instruction, a new technology, social/emotional/behavioral initiatives such as trauma-informed care, anti-bullying curriculum, social justice and the like. In other cases, teachers march from one mandate to the next never fully implementing any improvement well.

Both researchers, because of our shared belief in the ability to accelerate student growth when innovative teaching practices are implemented, decided to collaborate on a joint research project. We believe all students can learn and can learn at an accelerated pace when educators stay informed of research and are unafraid to implement their own innovative practices. Both of our projects are aimed at bridging research-based practices and core curriculum in order to accelerate student learning. It is our hope that with a consistent focus on accelerating student growth we can equip students with the skills and strategies needed to achieve success across their academic careers and throughout their lives.
References


CROSSCUTTING CONCEPTS AND CRITICAL THINKING

AN ACTION RESEARCH PROJECT:

Paris Bouchard

M.A. Ed. Curriculum and Instruction, Fontbonne University, 2010
B.A., Special Education, Fontbonne University, 2008

A proposal submitted to The Graduate School at the University of Missouri-St. Louis
in partial fulfillment of the requirements for the degree
Doctor of Education with an emphasis in Educational Practice

August 2019

Dissertation Committee

Phyllis Balcerzak, Ph.D., Chairperson
Keith Miller, Ph.D.
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Chapter 1: Introduction

Purpose and Rationale

The need to teach critical thinking skills has been discussed for decades; however, school curricula still stress rote memory skills (Brookfield, S. D. (1987). Our world is changing faster through the use of technology, where rote memory answers can be found in seconds using a cell phone or other devices. Although facts are important to learning, factual recall is less important (National Academies Press, 2018). It is more important for our students to be able to take information, find similarities and differences, analyze information and use deductive reasoning. We build new understanding through critical thinking skills, seeing how one thing affects another, developing questions, and figuring out solutions to given problems.

For more than a century companies are looking for problem solvers, not individuals who can repeat what has already been done (Doyle, 2019). In order to compete, companies require a workforce that can critically think and apply complex skill sets to new situations. (Norshima, 2011). In addition, as someone in the teaching profession, I want my students to not only compete in the workforce but to be productive problem solvers in their own lives. One of the ways this can happen for students to develop and practice critical thinking skills.

In December of 2012, I first introduced crosscutting concepts as described in the Next Generation Science Standards (NGSS, 2012) to my science classes. I have been teaching my students about crosscutting concepts and how they can use them to better understand phenomena, problems and the world around them. The crosscutting concepts were established by the NGSS and supported by the National Science Teachers Association (NSTA).
Crosscutting concepts can be used throughout all areas of science; they bridge all the different types of science content and practices. They are skills that we use to find connections between concepts so that we can problem solve (Table 1).

**Table 1.**
The Crosscutting Concepts as Defined by NGSS, 2012

<table>
<thead>
<tr>
<th>Crosscutting Concept</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patterns</td>
<td>What patterns do students see, hear, feel? (Example: The sound of a train)</td>
</tr>
<tr>
<td>Cause and Effect</td>
<td>What causes something to happen and what is the effect (Example: If you don’t do your homework, you may lose recess.)</td>
</tr>
<tr>
<td>Scale, Proportion and Quantity</td>
<td>What is the amount, size, or percentage of something (Example: Pizza – the size, portions, how many slices.)</td>
</tr>
<tr>
<td>Systems and Systems Model</td>
<td>What systems do you see? What models are used? (Example: The solar system and a model of the solar system.)</td>
</tr>
<tr>
<td>Energy and Matter, Flows, cycles and conservation</td>
<td>How does a source of energy affect a form of matter? (Example: The heat from the Sun can evaporate water.)</td>
</tr>
<tr>
<td>Structure and Function</td>
<td>What structures does an animal, plant or man-made object have and what exactly are their functions? (Example: A bird’s wing is a structure and its function is to help the bird fly.)</td>
</tr>
<tr>
<td>Stability and Change</td>
<td>Why and how does something stay stable and what can change its stability? (Example: A volcano stays non-active then all of a sudden the volcano erupts. Why?)</td>
</tr>
</tbody>
</table>

As soon as I read about the crosscutting concepts, I thought, we teach students how to read by teaching general skills that help them to better think, it stood to reason that I should be teaching my students science concepts by emphasizing thinking skills.
as well. This was confirmed when I started creating lessons specifically using the crosscutting concepts in my 2012 science classroom. That first year my Missouri Assessment Program (MAP) scores in science went from 39.5 percent to 57.4 percent proficient and advanced. My class’ scores continued to improve, going from 63.6 percent proficient and advanced in 2013 to 69.5 percent proficient and advanced in 2014. Students’ scores peaked at 79.7 percent proficient and advanced in 2015, and then seemed to level off in 2016 at 68.5 percent proficient and advanced, and 69.3 percent proficient and advanced in 2017. Currently, my student’s MAP science scores are in the top two percent to five percent of the state (Table 2). This is noteworthy because my student population is 85 percent African-American and part of the well-documented achievement gap based on race. Looking at the table below, one can see that my students’ scores have increased dramatically since 2011 and the district and state averages essentially flat lined between 2012 and 2013. Although, any teacher would be pleased with an increase in test scores, I did not fully understand how the processes in my class were contributing to these scores. Therefore, I designed this study to look for an increase in critical thinking skills which possibly was developed by using crosscutting concepts both in non-science content and in direct instruction of science content by 60 5TH graders. The premise held is that, in science, we use these concepts not only to better understand science phenomena, but to see how other factors affect/play on the phenomena so that we can more adequately solve pressing dilemmas or problems. My study hypothesized that the order in which crosscutting concepts are taught, real life content first, followed by science content would increase student understanding of science content. This innovative teaching framework has possibly
resulted in higher achievement in 5th grade students in my class compared to other 5th grade science classes both in the district, using the same instructional materials and the state (Table 2). I used Action Research methodology which allowed me to take a deeper look into how this relationship between crosscutting concepts taught in this way impacted student achievement in science.

Table 2. 
Fifth Grade State Science Assessments Scores: Percentage of proficient and advanced students per Elementary School, School District and the State

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Barrington</td>
<td>34.7</td>
<td>39.5</td>
<td>57.4</td>
<td>63.6</td>
<td>69.5</td>
<td>79.7</td>
<td>68.5</td>
<td>69.0</td>
</tr>
<tr>
<td>District</td>
<td>29.1</td>
<td>35.8</td>
<td>43.2</td>
<td>48.0</td>
<td>41.6</td>
<td>42.8</td>
<td>31.5</td>
<td>36.6</td>
</tr>
<tr>
<td>State</td>
<td>49.7</td>
<td>34.6</td>
<td>34.3</td>
<td>51.9</td>
<td>48.0</td>
<td>47.5</td>
<td>42.7</td>
<td>45.7</td>
</tr>
</tbody>
</table>

Research Questions

This Action Research study asks, ‘How does teaching students to use crosscutting concepts lead to improved science learning?’

This research assumes that teaching crosscutting concepts through everyday examples prior to beginning science content provides the foundation to learn science at a higher level versus merely teaching crosscutting concepts through science content only.
Chapter 2: Review of Literature

To better understand the possible links between existing literature and the successful achievement of students within my classroom, I researched the similarities between crosscutting concepts and critical thinking. Additionally, I became interested in understanding the connection between student achievement and how their level of motivation and perseverance might be influenced by increased confidence in applying the crosscutting concepts. This relationship between achievement, crosscutting concepts, critical thinking, and perseverance is discussed below.

Crosscutting Concepts

The crosscutting concepts are a set of seven thought processes that scientists and engineers use to answer questions and/or to better understand the world around them. Research shows that learning the crosscutting concepts affects student critical thinking skills (NGSS, 2012). Scientists and engineers apply these practices when looking for how one concept influences another (Table 1).

According to Cary Sneider (2013), one of the authors of the NGSS, science education is fragmented, especially in the elementary and middle school levels. Teaching the crosscutting concepts can fix this. The National Academies Press (2018) argued that the crosscutting concepts assist or give people a system of bringing together information from different sources so they can get a more complex picture. They further attested that the crosscutting concepts can help students create a better and more precise understanding science content. Sneider (2013) agreed that the use of the crosscutting concepts helps students understand science concepts, gives a common vocabulary for
discussing about science content, is used across science and engineering disciplines, and helps students grow in complexity with each grade level.

**Crosscutting Concepts and Critical Thinking**

This section reviews literature to understand what different views of critical thinking and the research that explains how to improve it. McConnell (2008) pointed out that ancient philosophers, such as Aristotle, Plato, and Socrates, agreed that critical thinking was the ability to ask questions, test, and think about ideas and values.

According to Ruggiero (2012) critical thinking is the art of thinking about thinking. He further explained that it is really anything we think about that helps us come up with answers to problems and stated that critical thinking has more to do with problem solving, looking over all aspects of a problem, and formulating a decision. He stated that a person who is a critical thinker is: aware of personal limitations, excited about new challenges, goal oriented, open to the views of others, circumspect, not emotional and an intent listener. He lists persons who are non-critical thinkers as those who: do not listen intently, use stereotypes, judge problems quickly without investigation, do not take other people’s views seriously, and will likely try to solve a problem with the first thing that comes to mind. In addition to these qualities of critical thinking, he links critical thinkers to effective problem solvers. Table 3 shows this relationship between the mechanics of critical thinkers and problem solvers (Ruggiero, 2012).
Table 3.

Qualities of Critical Thinking by Effective Problem Solvers (Ruggiero, 2012)

<table>
<thead>
<tr>
<th>Effective Problem Solvers</th>
<th>Ineffective Problem Solvers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read a problem and decide how to attack it.</td>
<td>Cannot determine where or how to begin.</td>
</tr>
<tr>
<td>Bring their knowledge to bear on the problem.</td>
<td>Convince themselves they lack sufficient knowledge.</td>
</tr>
<tr>
<td>Solve a problem systematically.</td>
<td>Convince themselves they lack sufficient knowledge.</td>
</tr>
<tr>
<td>Trust their reasoning.</td>
<td>Distrust their reasoning.</td>
</tr>
<tr>
<td>Maintain a critical attitude.</td>
<td>Lack a critical attitude.</td>
</tr>
</tbody>
</table>

Like Ruggiero, Ennis (2011) stated that critical thinkers can think about a problem, dig deep into all parts of the problem, look over the “credibility of the sources,” develop an understanding, and effectively argue this understanding to others. Flavell (1979) explains that critical thinking is “the set of skills” and views which allow an individual to solve problems “logically.” In other words, these are logic based skills that people use to actively think about events by using activities that help them figure out a problem. This is the same process that the NGSS uses to describe the impact of using the crosscutting concepts.

Bloom, et al. (1956) presented Bloom’s cognitive taxonomy, which he felt should be used to teach and evaluate critical thinking skills. Debono (2004) agreed that just knowing something is not enough to be considered critical thinking, citing that other equally important elements are creativity and constructive thought. Similarly, Ozden (2011) explained that critical thinking was a methodical, mental activity which is used to problem solve. In contrast, Ennis (1985a) pointed out that critical thinking is basically a matter of reflecting on a problem with logic to determine what is right and what is wrong.
He felt that Bloom’s taxonomy was not specific enough to be useful for teaching critical thinking. Lipman (2003) pointed out that “critical thinking is one kind of reflective thinking that helps people to judge easily and correctly. It is related to cognitive growth and intellectual responsibility, further stating that self-correction is one of the most important features of critical thinking. He asserts that reading, writing, arithmetic and verbal communication have an important role in developing social skills, but they are not enough to promote critical thinking. This was more clearly put by Garrison (1991, p 287-303): “critical thinking includes identifying the problem, defining the problem clearly, searching possible solutions, evaluating their functions, and integrating their understanding with available knowledge.” Most of the research agreed that critical thinking is a set of skills a person needs in order to solve problems such as those that use logic in assessing the question at hand. The problem solver thinks about the connections between elements and systematically asks and answers their questions. They are open to new ideas and views and reflect on where they are on a given problem and where they need to go.

However, I think Vacek (2009) summed it up best when he stated that critical thinking is complex and are hard to measure. Some researchers do not think that critical thinking can actually be taught, or that it is actually transferrable. Challenging these notions, McPeck (1981) was harshly criticized by others for his idea that critical thinking is not transferable. However, Halpern (1998) feels that critical thinking is transferable and this belief is important to how one teaches critical thinking. Ennis (2004) argued that critical thinking skills could be taught as well, and stated that critical thinking is a set of skills that one learns and is and can be transferred if it is actually
taught. Hove (2011) found that students who were taught critical thinking skills through practice performed better than those who were not taught these sets of skills. Barnett, et al. (2012) showed that students performed better in a psychology course where critical thinking skills were taught than students who were not taught these skills.

Jones (2012) insists that getting students to think critically must include a change from a teacher-centered classroom to a classroom that is critical thinking-centered. According to Jones, this involves relinquishing the role of a teacher as the sole disseminator of knowledge and defined the role of the teacher as structuring lessons to allow student inquiry, research and collaboration.

Cave (1993) found that the teachers with high levels of critical thinking often taught their students by varying learning activities and provided the higher order thinking skills through application of content. This is in contrast to teachers being evaluated as low critical thinkers, who teach by a “teacher-centered” method. Wasi (1994) stated that the materials used in the classroom are used more for rote memory development thus effectively reducing the amount of experiences students have to think critically.

Shabani (2004) pointed out that creative thinking is ignored in the classroom as teachers continue to emphasize rote memory. Norshima (2011) used Facione’s model to analyze and evaluate curriculum material in Iran and discovered that it was not only students who lacked critical thinking skills, but also the teachers. Even more evidence of this was supported by Spelton (2001) who, while doing research in Hong Kong, found that most teachers did not have the skill set to critically think or understand how to teach critical thinking. T. Brookfield (1987) stated that critical thinking must involve taking risks on experimentation, must be modeled and enhance a willingness in learners. In his
view, modeling by the teacher on how to critically think is very important. Snyder (2008) stated that modeling the use of critical thinking skills, questioning, and helping students through the thinking process can be an effective pedagogy. He further proposed having students use project-based activities or cooperative learning to increase students’ critical thinking development. Wasi (1994) further stated that throughout their education, students must be given opportunities to practice critical thinking skills. Yoruk (2016) focused on cooperative learning as a tool to teach critical thinking. His research suggests that self-efficacy, students’ ability to socialize and confidence are enhanced.

Additionally, cooperative learning methods increase students’ awareness to their environment, self-efficacy, self-confidence and helps students to socialize. He also suggested that cooperative learning methods are effective in teaching students a variety of skills such as sociability, self-awareness, and confidence. He further surmised that when a person becomes more self-sufficient, they become a person who is more introspective and better at analytical thinking.

With an understanding that critical thinking skills are transferrable, why is teaching critical thinking important? Ali Mohammad, et al. (2015) stated that to be able to problem solve effectively, we have to have skills associated with critical thinking and be able to communicate clearly. They further stated that educational systems’ actual goals should be to teach critical thinking and to teach students to be independent and clear, logical thinkers. He insisted that all students must gain an education and a strong desire to problem solve. He believes that critical thinking should be the end product of any educational system.
Doyle (2019) believed schools need to educate learners who can analyze and judge in order to meet the demand for jobs in the global economy. Facione (2013) reflects on the fact that critical thinking skills are a must in any workplace, further stating that the countries with populations that are better critical thinkers will be more competitive. Unfortunately, Flores, et al. (2012) argued that schools were not teaching critical thinking skills and suggested that today’s graduates are not prepared for the job market because they are not able to critically think.

In summary, most researchers agree that critical thinking skills can be taught and are transferrable. This is the foundation for NGSS’s crosscutting concepts.

**Perseverance/Motivation**

Perseverance and motivation have been mentioned in some of the research already cited. For the purpose of clarity, it is important to define these characteristics and discuss its role in education and critical thinking. Chun, et al. (2005) called motivation a way to make sure that students are engaged in lessons. Gredler (2001) views perseverance as a personal need that allows an individual to be involved in purposeful behavior. Keller, J. M. (2006) stated that motivation of individuals can be driven by outside forces, further indicating that a student’s motivation can be seen by how much progress a student makes in order to be successful at the desired goal. Constantin, et al. (2011) indicated that rigor toward reaching one’s goals is as important as having motivation itself.

Many of us have seen that perseverance and motivation can have a huge effect on a student’s education. In fact, La Paro, et al. (2000) pointed out that at an early age, a student’s level of perseverance and motivation is a key indicator of a child’s academic
achievement. Sing (2002) stated that in order to learn, one must have a sense of motivation. Furrer (2003) concurred with Gottfried (1990) that a child’s academic success can be directly associated with his/her own motivation. His notion is supported by other research such as work that was done by Wigfield, et al. (2006) who surmised that motivation is a source of energy for behavior. Wigfield also states that students need motivation to practice new skills and obtain new skills. As we say, practice makes perfect, but one must have the motivation to get there. Simply put, persistence of motivation is a key for achievement (Usbioda, 2015). Paterson (2004) defines persistence and motivation as an individual’s desire to achieve a given goal despite any challenges one might face.

Deci, et al. (2000) explained the difference in intrinsic and extrinsic motivation: Intrinsic motivation is when a person displays a behavior simply because they find a need to do it for themselves. Extrinsic motivation is when a person needs outside forces to push the person toward completion. According to researchers summarized, here, all are agreeing that persistence and motivation is a feeling of wanting to complete a given task and that it is directly related to student success.
Chapter 3: Methods

Overview

The methodology used in this study is Action Research, which is a systemic approach to investigation that enables people to find effective solutions to everyday problems, such as teachers encounter in the classroom (Hendricks, 2017). The Action Research process involves these steps: plan, act and observe, reflect, revise the plan, act and observe, and so on (Cole and Knowles, 2009). Action Research values the interpretation that teachers make based on information collected from their students. This method allowed me as a researcher who was looking at the bigger picture to be connected to those being studied. The study utilized both quantitative and qualitative data generated by the students while they engaged in the relevant classroom learning.

Methods: Description of the Teaching Innovation

I taught my students what the crosscutting concepts were one concept at a time. One day, I taught only the concept of patterns, the next day I taught the concept cause and effect, and soon I taught all seven concepts. I did this by showing a picture of everyday phenomena and having the students find the crosscutting concept we were working on for that day in the pictures. I spent between 10 to 15 minutes of each day practicing a crosscutting concept using a picture, and demonstrated an ability to vary the crosscutting concepts they discover in the picture each day. This initial emphasis on higher order scientific thinking as applied to everyday content and processes is counter to the way most teachers teach science: focusing on teaching science content first, then applying the science content in the real world (Pacing Guide and District Scope and Sequence, 2015). The model being explored in this research assumes that the order of teaching scientific crosscutting concepts is key to the success of student
learning (Table 4).

**Table 4.**

*Example of traditional teaching method compared teaching crosscutting concepts prior to science instruction.*

<table>
<thead>
<tr>
<th>Traditional Method to Teaching Science Content</th>
<th>Critical Thinking First Model (CTF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher introduces subject content such as water cycle.</td>
<td>In the CTF model, I introduce the crosscutting concepts individually until all seven crosscutting concepts have been learned.</td>
</tr>
<tr>
<td>Teacher continues to introduce vocabulary.</td>
<td>I have students find crosscutting concepts in a non-complex photos.</td>
</tr>
<tr>
<td>Teacher introduces water cycle experiment.</td>
<td>Teacher introduces water cycle experiment.</td>
</tr>
<tr>
<td>Teacher may then discuss and point out the crosscutting concepts found within the experiment.</td>
<td>As students build more confidence and skill at finding crosscutting concepts, I have them start to “bridge/link” them together. This forces them to practice thinking as scientists think, thus building more confidence and applying using more and more critical thinking skills.</td>
</tr>
<tr>
<td></td>
<td>Then I introduce the subject content such as the water cycle and the experiment.</td>
</tr>
<tr>
<td></td>
<td>I will introduce vocabulary as needed in the content/lesson.</td>
</tr>
<tr>
<td></td>
<td>As students move through the experiment, they discover the crosscutting concepts with the science content as they did earlier with the everyday pictures. I will have students discuss what crosscutting concepts they may find in the experiment, and have students discuss which crosscutting concepts are affecting other crosscutting concepts during and after the experiment.</td>
</tr>
</tbody>
</table>
Table 5 outlines the learning sequence for Critical Thinking First (CTF) process that was used during this research study.

**Table 5.**
*Learning Sequence, Critical Thinking First Process, 2018 and 2019*

<table>
<thead>
<tr>
<th>2nd week</th>
<th>1st month</th>
<th>2nd month</th>
<th>3rd month</th>
<th>4th month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduce Crosscutting Concepts</td>
<td>Daily Practice</td>
<td>Multiple Connections</td>
<td>Problem Solving</td>
<td>Use Crosscutting Concepts with Science Content</td>
</tr>
</tbody>
</table>

For example, in the pictures below (Figure 1), I presented a simple everyday event in which students discover one or more of the crosscutting concepts. Following is an illustration of how this strategy prompted student thinking (teacher notes, 2015). I showed students a picture of a man carrying buckets of water.

*Figure 1. Example of simple event containing crosscutting concepts. This is from Bouchard’s Critical Thinking First curriculum.*

One student said, “I see a structure and function. The buckets are structures and their function is to hold water.”
The next student said, “I see a pattern. The buckets are swaying, and the water can spill out.”

A third student said, “I see a cause and effect. Eventually, the man might not have any water left for drinking.”

Finally, a fourth student said, “I see scale, proportion and quantity because if he is losing water, he has less quantity of water. Not only that, what proportion of water is left in the bucket and maybe the man should have had buckets in a larger scale so the water would not spill out.”

Examples such as these indicate students practicing a higher level of thinking than learning definitions or locating predetermined patterns in an example. The students are not only making simple observations, but are analyzing what they see, analyzing what the person before them saw and possibly finding a solution to a given problem. They are practicing the kind of thinking important to understanding science content and the nature of science. This teaching strategy prompts students, daily, to develop and run through some or all of the crosscutting concepts individually and showing that the student are now able to bridge/link some or all of the crosscutting concepts together.

Additionally, when I teach the use of crosscutting concepts, students listen and discuss with other students what they see and explain why, in detail. They reflect on what has been said and deduce how one view affects other aspects of the given phenomena. Students are prompted to use cooperative reasoning. Research has revealed that cooperative learning can increase students’ awareness to their environment, increase self-efficacy, self-confidence and help students to socialize (Yoruk, 2016).
Participants

This classroom Action Research studied the impact of using the Critical Thinking First model (CTF), designed the teacher researcher as described above, on the critical thinking skills of 5th graders and their achievement in science within a large urban/suburban school district in the Midwest. The student population in this study was 90% African-American and 5% Caucasian of which 3% of the Caucasian population were foreign born or first-generation Palestinian immigrants. The remaining population reported to be more than one race. Out of the student’s total, there were fourteen students in the gifted program, six students received reading support, and ten students had an Individual Education Plan (IEP). The percentage of students on free and reduced lunch was 49.5%. The average student attendance rate was 94.5%.

The experimental group consisted of 60 5th graders who attended the school and classroom of the researcher during the 2018-19 school year. Thirty-nine were female and 21 were male. Three students were identified as having a learning disability. One student had been identified as having an emotional disability. One student had been identified has having a language disorder and two students had been identified as having a speech disorder. Finally, three students were identified as having a diagnosis as Other Health Impairment (OHI).

Data Collection

I chose to use a qualitative and quantitative research design because I thought that using both would provide me with more information related to students’ personal views on using crosscutting concepts and how they work to build intellectual capacity. As a researcher gathering quantitative data, I was looking for growth through the
numbers of times my students could effectively use the crosscutting concepts and other assessment data. For example, to measure this crosscutting concept use, I developed a frequency matrix that would allow me to track student proficiency in seeing and connecting crosscutting concepts (Appendix A). During each class, while students were identifying crosscutting concepts, I recorded the event on the frequency matrix allowing me to see growth over time in the application of the crosscutting concepts. Other forms of data collection were triangulated with the frequency data to increase the validity of findings (Table 6).

Table 6.

Table of data type and sources collected over study period, 2018 - 2019.

<table>
<thead>
<tr>
<th>Date</th>
<th>Data Source</th>
<th>Population Sampled</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sept. 2018</td>
<td>Pre-Survey</td>
<td>65 5th Grade students</td>
<td>Descriptive analysis of scores</td>
</tr>
<tr>
<td>Sept. 2018 - Feb., 2019</td>
<td>Frequency Matrix</td>
<td>65 5th Grade students</td>
<td>Total occurrences &amp; growth over time</td>
</tr>
<tr>
<td>Sept. 2018</td>
<td>District-Wide Assessments</td>
<td>65 5th Grade students</td>
<td>Comparisons of district-wide averages to my school’s averages.</td>
</tr>
<tr>
<td>Dec. 2018</td>
<td>Field Notes</td>
<td>65 5th Grade students</td>
<td>Analysis of student statements, my observations &amp; growth overtime.</td>
</tr>
<tr>
<td>Jan. 2019</td>
<td>Post-Survey</td>
<td>65 5th Grade students</td>
<td>Gain scores, understanding of growth &amp; perceptions of the crosscutting concepts.</td>
</tr>
</tbody>
</table>

Additionally, I gave my students surveys at two different stages of the study to discern students’ confidence and competence of using the crosscutting concepts. These surveys were given at the beginning of the school year prior to learning about the crosscutting concepts, and at the end of the research period. Also, I kept field notes of
my reflection of each day’s observations. In this way, I was able to keep a log of changes in overall class performance in utilizing the crosscutting concepts.

In addition, I analyzed student work. This allowed me to see how students were thinking and using the crosscutting concepts. Frequency data was collected using the Frequency Matrix on student application of crosscutting concepts to everyday phenomena and compared to their application of crosscutting concepts in science phenomena. This was an attempt to find and document if there is transference of the use of crosscutting concepts in real world problems to science learning. Finally, I compared my students’ district-wide test scores against the district’s scores. The test the district uses is USATestprep (2018).

These data sources were triangulated to determine relationships and insights into the impact of the Critical Thinking First model (CTF) on science learning. I analyzed the set of surveys to find common threads between the students, looking for students’ understanding of the crosscutting concepts, level of stress associated with using crosscutting concepts, and the confidence and competence level at using crosscutting concepts to solve problems. I kept field notes to capture each day’s observations, to reflect on progress made by students and I created a frequency table of students’ demonstration of their ability to use crosscutting concepts in everyday phenomena. In using the frequency matrix, I gave a check for each time a student either made a general observation using one of the crosscutting concepts or took one crosscutting concept and linked it to another, or made multiple connections, or finally solved a problem on their own.
Chapter 4: Results

During the period this research was conducted, there were four data sources collected. These include benchmark data, frequency matrix, student confidence data, and teacher field notes. These data points indicate students’ growth in confidence when using the crosscutting concepts, their ability to make multiple connections, and their ability to apply this learning to novel problems. This growth can be seen as students use the crosscutting concepts to solve real life problems and when applying to science content.

During the time of the study, students at my school have improved their district-wide test scores as shown below.

Table 7. Benchmark data (USATestprep)

<table>
<thead>
<tr>
<th>Month Given</th>
<th>Studied School Average</th>
<th>District Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>October 2018</td>
<td>57%</td>
<td>42%</td>
</tr>
<tr>
<td>December 2018</td>
<td>67%</td>
<td>33%</td>
</tr>
<tr>
<td>January 2019</td>
<td>91%</td>
<td>43%</td>
</tr>
<tr>
<td>March 2019</td>
<td>83%</td>
<td>56%</td>
</tr>
</tbody>
</table>

As shown in Table 7, the Studied School Average exceeded the District Averages by 15% in October 2018, 34% in December 2018, 48 percent, January 2019, and 27% in March 2019, all showing increases when crosscutting concepts are taught and practiced. It is worth noting that as students took these district-wide benchmark tests, they were required by me to follow the same learning strategies taught in the intervention which is I write down everything they knew about the subject being discussed in each question. Furthermore, they were required to write down everything they knew about each potential answer given. This extra level of writing required detailed thinking and forced the students to slow down and think before answering questions on the test, just as they
practiced in class. It also allowed them time to use the crosscutting concepts and to apply them to the question.

Further evidence that this teaching strategy impacted student thinking and learning in science is presented in students’ notes. When taking benchmark tests, they wrote explanations of their answers using language representing the way crosscutting concepts were practiced in class.

For example, when asked to “Select two statements that describe how a frog’s tongue helps it survive,” a student noted, “I know that a frog’s tongue is part of a system so the frog can digest food, but the tongue has its own function. I know that the body systems work together with other systems. I know frogs eat insects and are amphibians. I know that if he does not eat then he will die. I know they had gills but change and grow lungs and need to be near water. I know that the longer the frog’s tongue, the better it will be able to catch insects. I know that frog’s tongues are sticky so the quantity of stickiness, the more insects they can catch”.

When reviewing the student benchmark notes such as the one above, one can notice that the student used the crosscutting concepts of systems and systems model, structure and function, cause and effect, and quantity to develop an answer to the given question. The more students improved at identification and application of crosscutting concepts, the better they were at using them during science tests as indicated in student notes.
Frequency Matrix

While conducting this research, I marked in a table next to the crosscutting concept every time a student found a crosscutting concept, made connections or solved a problem. Furthermore, data from the frequency matrix indicated the growth in the number of times students were able to find crosscutting concepts after viewing a different photo each day of phenomena over time. For example, during the first week of using the crosscutting concepts, students were able to find 90 crosscutting concepts. However, during the last week of practicing the crosscutting concepts, that number increased to 706 instances (Figure 2). From Week 1 to Week 14, students grew in their ability to make multiple connections and find and solve problems as seen in the number of crosscutting concepts found the first week and progressed over time. For example, in the first week of practicing with the crosscutting concepts, students were not able to find very many individual crosscutting concepts or make any multiple connections between different crosscutting concepts. Likewise, students were not able to find and solve problems. This is in stark contrast to the last week of practicing with the crosscutting concepts, where students were able to find 79 multiple connections (Table 7) and find and solve 58 problems. These frequency counts were collected over 5 days a week and 10 minute per class. Examples of problems solved by students during the last week of practice are: “the people can build a cart,” “they could bring more people,” “raise more money for a well,” “build closer to their home,” “they could make shoes.”
In addition to increasing the frequency of finding crosscutting concepts, students were also able to make multiple connections (Table 8).

**Table 8.**
*Multiple Connects and Finding Solutions to Problems, 2018 and 2019*

<table>
<thead>
<tr>
<th></th>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 7</th>
<th>Week 8</th>
<th>Week 13</th>
<th>Week 14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple</td>
<td>0</td>
<td>0</td>
<td>32</td>
<td>48</td>
<td>72</td>
<td>79</td>
</tr>
<tr>
<td>Connections</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Found and</td>
<td>0</td>
<td>0</td>
<td>18</td>
<td>29</td>
<td>54</td>
<td>58</td>
</tr>
<tr>
<td>Solves Problems</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Additionally, students were able to use the multiple connections to solve problems (Figure 3).

**Figure 3.** Number of times students found multiple connections using the crosscutting concepts or found and solved problems. This figure shows the growth over time.

**Student Survey**

In addition to students’ increasing scores on benchmark tests and increasing in ability to apply, as evident in the frequency matrix, students reported on surveys that they were more confident with finding and applying the crosscutting concepts. The surveys were coded to identify language that students used that indicated confidence in using the crosscutting concepts. The students’ responses in the survey were coded with similar codes across surveys, then categorized and placed into larger themes.

Within the first part of the survey, students were asked seven questions and were instructed to answer by choosing a number between one and 10, one being not at all
confident, a lot, or very unlikely and 10 being very confident, very little or very likely. When the survey was given out prior to learning the crosscutting concepts, students all answered with a 1 for each question. After the practice portion of the research was complete, the survey was given out again; this time students answered that they were more confident. For example, when asked how confident they were at finding one crosscutting concept, students answered with a 7.3 average. Students also answered with a 7.3 average when asked how confident they were at finding one crosscutting concept and “linking” it to another crosscutting concept. When students were asked how confident they were at finding crosscutting concepts during a science experiment or when learning something new in science class, the students answered with a 7.4 average. After asking students how likely they were to use the crosscutting concepts to solve a problem, they answered with a 6.9 average. On the survey, students were also asked questions about the amount of anxiety they experience using the crosscutting concepts. This received a 5.4 average but when asked about how much they like using the crosscutting concepts, the students answered with a 7.2 average. Furthermore, when asked how confident they were at solving a problem when using the crosscutting concepts, the average answer was an 8.2.

Likewise, when students were asked how much they thought using the crosscutting concepts makes them think more, they answered with an 8.6. This is in sharp contrast to the students’ answers on the pre-survey where they answered one to not at all.

Lastly, in the first week of using crosscutting concepts, students found no multiple connections nor were they able to find and solve any problems. In contrast, during the
last week of the study students found 79 multiple connections and found and solved 58 problems. This survey data reveals that all student’s confidence had grown through the process of practicing the crosscutting concepts. At the same time, the survey results indicate that students believed that when using the crosscutting concepts, they were forced to think more.

Other parts of the survey included open-ended questions. When asked what they like about the crosscutting concepts, many students answered with “They make me think” (Student 1, Student Survey, 2019), “Makes me dig deeper” (Student 2, Student Survey, 2019), “Helps me figure things out” (Student 3, Student Survey, 2019) and “I’m always learning” (Student 4, Student Survey, 2019). In addition, students answered that they “Like working with others, (Student 5, Student Survey, 2019) and “Making connections” (Student 6, Student Survey, 2019). They also indicated they liked “working together” (Student 7, Student Survey, 2019) and “sharing their ideas” (Student 8, Student Survey, 2019). In fact, when asked if they thought the crosscutting concepts makes them think more, students indicated with comments like “Think in more detail” (Student 9, Student Survey, 2019), “Think more about what’s in the picture” (Student 10, Student Survey, 2019), “I take more time to think” (Student 11, Student Survey, 2019), “I have to infer” (Student 12, Student Survey, 2019), and “Makes you think about how things work” (Student 13, Student Survey, 2019). They also felt that it did make them think because you have to make connections to others.

When asked if they think the crosscutting concepts help them figure out how one thing affects another, they answered, “If you figure out one system, and other systems connect” (Student 14, Student Survey, 2019), “It goes on and on” (Student 15, Student
Students were asked if they thought that they have improved over the months in their ability to use the crosscutting concepts. The students responded with an overwhelming yes. They stated the following: “We do a lot of practice” (Student 30, Student Survey, 2019), “The more I do them, the better I get” (Student 31, Student Survey, 2019), “It was confusing at first” (Student 32, Student Survey, 2019), “It is easier now” (Student 33, Student Survey, 2019) and “I understand better” (Student 34, Student Survey, 2019). Students also indicated that using the crosscutting concepts makes them think deeper, makes them infer, that it helps them find clues and helps them explain the
crosscutting concepts to other people. They further indicated that they use these concepts in real life not just science and that they use them all the time.

The survey data clearly reveals that students’ confidence levels have increased and their ability to use and apply these concepts have improve. It also clearly indicates that the students feel that using the crosscutting concepts helps them think, think deeper, infer, and find solutions to problems. Finally, the data also indicates transference of this skill as students indicated they use them in real life and use them all the time.

Field Notes.

Upon completion of practicing using the crosscutting concepts with a picture of some kind of phenomena, students were instructed to continue using the crosscutting concepts when learning science content. For example, when teaching about space, I asked students what crosscutting concepts we as a class could use when thinking what we learned about space. As we were doing experiments, projects, or science course content, students would use the crosscutting concepts when thinking things over, when having discussions with me or other students and problem solving. One day, students were allowed to build, code, and construct anything they wanted by using robots, Erector Sets, circuit boards, and Legos. I walked around the room and took notes of what I heard. See tables 9 through 14 for a summary of student discourse. Table 9 describes student language used when conversations were recorded during the Coding of a Toy Car activity; Table 10 shows student conversations when building with an Erector set; and Table 11 shows the discussion during the Seed Dispersal activity.
In Table 9, students were coding a toy car. While they were doing this, the students were using the crosscutting concepts in their discussion with each other to problem solve.

<table>
<thead>
<tr>
<th>Student</th>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student 1</td>
<td>“That pattern is boring, but another code in.”</td>
</tr>
<tr>
<td></td>
<td>“No, it’s not broke, its wheels are still stable because they are trying to move.”</td>
</tr>
<tr>
<td>Student 2</td>
<td>“I think you broke it, the wheel system is broken.”</td>
</tr>
<tr>
<td></td>
<td>“Stop, if you do that it will cause it not to move.”</td>
</tr>
</tbody>
</table>

In Table 10, students were using an Erector Set. While they were doing this, the students were using the crosscutting concepts in their discussion with each other to problem solve.

<table>
<thead>
<tr>
<th>Student</th>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student 3</td>
<td>“I think so, let’s count the parts we need.”</td>
</tr>
<tr>
<td></td>
<td>“What do you think this part’s function is?”</td>
</tr>
<tr>
<td>Student 4</td>
<td>“Wait, it’s not, the front is not stable.”</td>
</tr>
<tr>
<td></td>
<td>“We need an energy source to make it go.”</td>
</tr>
</tbody>
</table>

In Table 11, students were discussing seed dispersal. As the students talked about seed dispersal and birds, students used the crosscutting concepts to discuss how seeds are dispersed and to ask questions about birds.
<table>
<thead>
<tr>
<th>Student</th>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student 5</td>
<td>“They have energy, well at least enough to sprout. Then it will get its energy from the sun once it has leaves.”</td>
</tr>
<tr>
<td>Student 6</td>
<td>“That makes the plant stable and with food, it is always changing because it is getting bigger and bigger.”</td>
</tr>
<tr>
<td>Student 7</td>
<td>“Leaves are a structure that allow it to collect the solar energy and make food.” “Seeds are produced by plants and that’s a system.”</td>
</tr>
<tr>
<td>Student 8</td>
<td>“Seeds drop from the plant and can blow in the wind so that wind and gravitational energy.”</td>
</tr>
<tr>
<td>Student 9</td>
<td>“That’s also a cycle because it’s a life cycle.” “What if the seed gets eaten before it grows up? That’s a change and energy for the bird.”</td>
</tr>
</tbody>
</table>

These examples are but a few of the discussions in the classroom; however, it is telling how much they talk about and discuss the crosscutting concepts on their own when studying new content. It is also revealing in how often they use the crosscutting concepts to work out problems.

Throughout this Action Research project, I was amazed at three things in particular. First, the students appeared to become very confident in finding the
crosscutting concepts quickly in science after practicing real-world science. Likewise, the students were also quickly able to find problems within the given picture and find appropriate solutions to the problems. Lastly, the amount of discussion students were having revolving around the crosscutting concepts as students were working on science curriculum, coding, or developing a project was frequent and at a high level of thinking. I was surprised at how many times I would walk by or listen in on conversations and students would be mentioning one or more of the crosscutting concepts in order to explain a phenomena or problem solve.

Table 12 below reflects both the CTF model and student growth during the research period.
Table 12.
Teacher Progression of Using the Crosscutting Concepts and Student Outcome

<table>
<thead>
<tr>
<th>Introduce Crosscutting Concepts</th>
<th>1st month</th>
<th>2nd month</th>
<th>3rd month</th>
<th>4th month</th>
<th>Outcomes</th>
</tr>
</thead>
</table>
| 2 weeks                         | Daily Practice 10 min. Daily | Multiple Connections | Problem Solving | Use Crosscutting Concepts with Science Content | A. More Confidence  
B. Deeper Thinking  
C. More Cooperation  
D. Student Enjoyment  
E. Improved Problem Solving Skills |

<table>
<thead>
<tr>
<th>No Joy</th>
<th>More Joy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Level Thinking</td>
<td>Higher Level Thinking</td>
</tr>
<tr>
<td>Lower Level Confidence</td>
<td>More Confidence</td>
</tr>
<tr>
<td>Less Creativity</td>
<td>More Creativity</td>
</tr>
<tr>
<td>Low Level of Cooperation</td>
<td>More Cooperation</td>
</tr>
<tr>
<td>Lower Transference of Knowledge</td>
<td>More Transference of Knowledge</td>
</tr>
</tbody>
</table>

Table 12 indicates that in the 1st two weeks, I introduced the crosscutting concepts. In the second week, we do daily practice for 10 minutes a day. Week three, the students start making multiple connections. Week four, students start to find problems and solutions. Week five, students start to make multiple connections with science content. The bottom left of the table indicates where the students started and the bottom right indicates what was observed at the end of the research period.
Chapter 5: Discussion and Conclusions

This research sought to understand how the crosscutting concepts, taught in a specific way, Critical Thinking First (CTF), improved student learning in 5th grade science content. Throughout the research period, and especially in analyzing my data, several themes which align with the newest review of cognitive science research, (National Academies of Science, 2018) were prevalent. The most common theme contributing to student learning that likely led to higher achievement scores and evident in student comments was awareness students had about their own learning, that is, their metacognition increased. Students answered in their surveys and in conversation in class that using the crosscutting concepts helped make them think, think deeper, infer or helped them make more connections. In addition, through these same data sources, growth in confidence was seen throughout the period of research. Other themes that emerged from both the surveys and the field notes were collaboration, transfer of knowledge, and enjoyment in learning. These findings are supported by the early work of Jerome Bruner in his classic, The Process of Education (1963), that identified important connections between intrinsic motivation, competence and confidence.

Furthermore, the success of the CTF model rested on the documented intervention components researched in this study. However, success also relies on the teacher’s ability to prompt students at appropriate times to illicit higher thinking. Further attention could be paid to the relative importance of the CTF curriculum and the skillful questioning strategies of the teacher during its implementation.

Lastly, the innovation challenged the traditional way of teaching content by front loading practice with crosscutting concepts. This reduced the amount of time for science
content but promoted student persistence, motivation, and confidence with science learning, and resulted in accelerated learning. The implementation of this process relies on administrative support, specifically leadership in the district having the willingness to take the risk to sacrifice the instructional time during science, to teaching thinking,

**Metacognition**

Throughout the research several aspects of critical thinking were observed. In the survey given at the end of the research period, students mentioned that using the crosscutting concepts made them think deeper and pushed them to make connections. Students also wrote that the crosscutting concepts; (1) made them think outside the box, (2) made them think about how things work, (3) made them break things down and they require concentration. They felt that the crosscutting concepts required them to infer and think about what another person said before speaking. In observations in the classroom setting, it was clear that students were thinking as they were asked to think out loud when providing an answer or connection to other crosscutting concepts or other students’ thoughts. This behavior was repeated when students were working on projects or curriculum together and one could hear their discussions as they worked through problem solving. On the post-survey, students, in reflecting on their own learning, indicated that the crosscutting concepts made them think more.

**Confidence**

Student confidence grew in many ways as seen in the answers given in the pre-survey and compared to the post-survey. Student confidence went from 0 on the post-survey in all areas of confidence but by the post-survey, student rated themselves on average at 7.3. The frequency matrix reveals similar data. It was apparent that students
grew over time to having a much more confident level of finding and utilizing the crosscutting concepts.

**Collaboration**

Studies routinely indicate that collaboration is one of the requirements for students to develop critical thinking skills (White and Braddy, 2017). Adding to these studies, I found that when using the crosscutting concepts, students must collaborate in order to grow, according to the CTF model. With this in mind, students were required to work together, either interacting with each other in the whole classroom or in smaller groups, working on the crosscutting concepts. In the students’ post-survey, students indicated that they liked sharing with others, sharing ideas and working together. Through collaboration, students helped other students grow. Students would help other students with background information or vocabulary, showing others how to make connections, and showing one another that struggle is part of learning for everyone. In another study, it would be helpful to include questions about collaboration and how collaboration helped or didn’t help them learn.

**Transfer of Knowledge**

As students started to better understand how to use the crosscutting concepts and as they grew in confidence in using them, students more freely used the vocabulary in everyday conversations with the peers. Probably the most overt evidence in transfer of knowledge was in field notes collected during classroom observations. As students were working together on science content or conducting an engineering project I heard them often used vocabulary directly or indirectly associated with the crosscutting concepts. A good example of this was when students were working on building a car and tractor. The
discussion students had during this project revealed strong evidence of transfer of knowledge. The students mentioned the words function, count, stable, and energy source. All of these words are either mentioned in crosscutting concepts or very similar words. On the post-survey, some students wrote that they use the crosscutting concepts in real life and not just in science or that they use them all the time. At one point, students came in from recess and explained what crosscutting concepts they saw outside. For example, they mentioned the pattern the Canada geese make when flying, the amount of energy it takes them to migrate, the sound energy as they communicate with each other and that the wings were a structure that allowed them to fly. Finally, the district-wide assessments gave strong insights into how much students were transferring their knowledge. Reading the students’ notes that they wrote on scrap paper while taking the district-wide assessment, revealed that they directly or indirectly used words associated with the crosscutting concepts. When trying to figure out the appropriate answers to the questions given, students were using the crosscutting concepts to help them make better connections to find the right answer and weed out the wrong answers. An example of this use being the time they were working on a question about a frog’s tongue, and student wrote about the fact that the tongue is a system with a function, that the frog’s tongue helps them get energy by catching flies, and the more they eat they eat the bigger they will get (cause and effect). These different kinds of evidence provide a strong case that students had certainly been able to transfer their knowledge of the crosscutting concepts to real life situations.
Enjoyment

An interesting and unexpected outcome found in analyzing the research data was the level of enjoyment students had learning and using the crosscutting concepts. In the post-survey selecting one (not at all) through 10 (very much), students were asked how much they like using the crosscutting concepts. Students chose on average 7.2. When asked what they liked about learning the crosscutting concepts, some students answered sharing with others, sharing ideas, working together. In class observations, students would repeatedly ask to work on the crosscutting concepts. Many students would ask to go first, and they would complain when they were not called on. In addition, students’ hands and arms would wave in the air while making noises to get attention. Students’ excitement to use the crosscutting concepts and the disappointment when asked to move on is certainly an indicator of their enjoyment in using the crosscutting concepts. The high level of confidence might have affected the amount of transfer of knowledge, the amount of enjoyment the student’s experiences might have affected the amount of transference as well (Table 12).

Creativity

Another notable outcome found during the research period was the amount of creativity that was seen through classroom observations and could be found in student writing. Students would come up with very creative connections to other students in the classroom when working as a whole class and in small groups. In addition, they wrote creative connections when writing notes during the district-wide assessments. Looking forward, I will keep a matrix indicating the amount of creativity students displayed.
Figure 4. Outcomes of the Research. The larger and darker the print, the more frequency the behavior was observed.

In figure 4, the bolded words were seen at higher frequencies while the non-bolded words were observations seen at lower frequencies by the end of the research period.

**Summary**

Due to this research, my confidence has grown tremendously, and I feel reassured that my method of expanding my students’ critical thinking skills (CFT) contributed to my students’ science learning and higher standardized test score. At the start of my research, I was not exactly sure what contributed to my students’ measured success. However, now I truly understand the value of research, reflecting on the time I had finally gathered all my research and started to really notice how they were writing, what they were communicating, and especially the language they were using to solve problems and connecting with the worlds around them.
What I Would Do in The Future

In future classes, I will look more deeply into student thinking. I will ask questions such as how they feel about collaboration; If they thought collaboration helped them learn; Did they like collaborating?; and finally, How did it help them learn?. Likewise, I would either create a matrix to measure the amount of creativity, write down observable creativity being done by students and include questions on the survey asking students if using the crosscutting concepts helps them be creative, requires them to be creative and/or rating themselves one to 10, one being not at all to 10 being all the time, how much the crosscutting concepts allows them to be creative.
References/Cited Works


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DOI:10.2298/PSI1202099C


Appendix A
Frequency Matrix

Date: _______  Time Spent on C.C. Today: ________  # of Students _________

<table>
<thead>
<tr>
<th>MATR IX</th>
<th>General Observation</th>
<th>Cause and Effect</th>
<th>Energy and Matter</th>
<th>Structure and Function</th>
<th>Scale, Proportion, Quantity</th>
<th>Systems and Models</th>
<th>Stability and Change</th>
<th># of times made multiple connections</th>
<th># of times student solved a problem</th>
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Appendix B
Survey Questions

1. In your own words, tell me what you like/dislike about using crosscutting concepts. Please explain your answer.

2. In your own words, tell me if you think using crosscutting concepts makes you think more or think in more detail about something. Please explain your answer. Give an example from class or from your experience outside of class.

3. In your own words, tell me if you think using crosscutting concepts helps you figure out how one thing can effect another thing. Please explain your answer.

4. In your own words, tell me if you think using crosscutting concepts helps you figure out solutions to problems. Please explain your answer.

5. In your own words, tell me if you think you have improved on using crosscutting concepts in science. Please explain your answer.

6. From 1 to 10 with 1 meaning not at all confident and 10 being very confident. How confident are you at finding one crosscutting concept in this picture?
7. From 1 to 10 with 1 meaning not at all confident and 10 being very confident. How confident are you to finding one crosscutting concept and then “linking” it to another crosscutting concept?
1  2  3  4  5  6  7  8  9  10

8. From 1 to 10 with 1 meaning not at all confident and 10 being very confident. How confident are you at finding crosscutting concepts during a science experiment or when learning something new in science class?
1  2  3  4  5  6  7  8  9  10

9. From 1 to 10 with 1 meaning not at all likely and 10 being very likely. How likely would you use crosscutting concepts to solve a problem you might find?
1  2  3  4  5  6  7  8  9  10

10. From 1 to 10 with 1 meaning a lot of anxiety and 10 being no anxiety.
How much anxiety do you feel when having to use crosscutting concepts?
1 2 3 4 5 6 7 8 9 10

11. From 1 to 10 with 1 meaning not at all and 10 being very much.
How much do you like using crosscutting concepts?
1 2 3 4 5 6 7 8 9 10

12. From 1 to 10 with 1 meaning not at all confident and 10 being very confident.
How confident are you finding a solution to a problem you might see in the picture?
1 2 3 4 5 6 7 8 9 10

13. From 1 to 10 with 1 meaning not at all and 10 being very much.
How much do you think using crosscutting concepts makes you think more about what is shown or discussed?
1 2 3 4 5 6 7 8 9 10
BRIDGING THE INSTRUCTIONAL GAPS BETWEEN READING INTERVENTION AND CORE READING INSTRUCTION IN THE ELEMENTARY SCHOOL:

AN ACTION RESEARCH STUDY

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A Dissertation Submitted to The Graduate School at the University of Missouri – St. Louis for fulfillment of the requirements for the degree of Doctor of Education with an emphasis in Educational Practice

August 2019

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Chapter 1: Introduction

Background and Rationale

I have been an educator in the public-school system for over 20 years, with all of my work at the elementary school level. During this time, I served in the roles of classroom teacher (primary and intermediate), instructional coach and literacy specialist; as well as served on district and school committees including professional development, curriculum, leadership teams, data teams, and MTSS teams (Multi-Tiered Systems of Support). Having the opportunity to work in these different roles has given me a distinctive perspective on the effects systems have on elementary students. Specifically, it has provided me the opportunity to view individual and groups of students’ history of academic performance. I have participated in three reading and two writing curriculum adoptions as a teacher, instructional coach, and currently as a literacy specialist, affording me the opportunity to observe curriculum and program implementation from multiple perspectives.

Being a life-long learner, serving in multiple building-level roles and district committees such as building leadership, data, MTSS/Assist teams, professional development, coaching, and curriculum committees, I read broadly on many topics including many content areas with a focus on literacy, student and adult learning, child development, families, social/emotional/behavior supports, culturally responsive teaching, and social justice. What I have found is there is an abundance of scientific research and evidenced-based practices that are easily accessible to educators; however, they typically do not get implemented in classrooms. This may be due to the fact that as an elementary teacher, being generalists who teach all subjects and isolated in their
individual classrooms, it can be overwhelming to effectively tie all the pieces together to change instructional practices to meet students’ unique social, emotional, behavioral, and academic needs.

In 2004, *Response to Intervention* (RTI) was written into U.S. law with the reauthorization of the *Individuals with Disabilities Education Act* (IDEA). The RTI framework calls for specific actions to take place in order to reduce the number of students being identified for special education. An RTI framework supports quality instruction for all students and that schools have a process in place when students are not meeting grade level expectations. The RTI model, now more commonly referred to as Multi-Tiered Systems of Supports (MTSS), calls for school-wide benchmarking, progress monitoring of students not meeting benchmarks, high quality core instruction that addresses the needs of all students (Tier 1), supplemental intervention (Tier 2), intensive intervention (Tier 3), and a building-level problem solving team. Through participating in this process as a building instructional coach and literacy specialist, I have gained a deep understanding of the challenges facing our most struggling learners and their teachers.

Prior to the 2016-2017 school year, the study site used the *Making Meaning* reading program, *Lucy Calkins Writing Units of Study*, and the *Fountas and Pinnell Benchmark Assessment System* as instructional resources for literacy instruction. The adoption of the *Common Core State Standards* (2010) and eventually the *Missouri Learning Standards* (2016) had teachers searching for additional resources to meet the new demands. The 2016-2017 school year brought several new changes to Littlefarm Elementary School including new state standards (*Missouri Learning Standards*), a new principal, a new reading curriculum, a new reading program (Lucy Calkins *Reading Units*...
of Study (RUoS), a new data warehousing system (EduClimber), and a new assessment system (FastBridge). As a result, there were many opportunities for professional learning and development to support teachers’ steep learning curve with all of these changes.

After attending several professional development workshops for the new reading program (RUoS), I began to wonder about the students I work with (at-risk students requiring Tier 3 reading support not yet identified as having a learning disability), as well as the struggling readers receiving Tier 2 supports in the classroom and their ability to access core instruction. The two settings, core reading and small group instruction and Tier 3 reading intervention look and sound very different. This study addresses these differences by studying students who participate in Tier 3 reading intervention and their ability to access core reading instruction.

The combination of a new assessment system, a data warehouse, and system changes provided a unique growth opportunity for primary grade teachers (kindergarten through second grade). Primary teachers were now able to view standardized student performance data they were unable to access with the previous benchmarking system. The FastBridge assessments provided teachers with a measure of broad reading (and math) as well as instructional recommendations for skill support. Since intermediate grade teachers (third through fifth grade) were used to standardized state assessments, as well as administering local monthly predictive standardized reading and math assessments, the learning curve was not as steep for them. The expectation was that reading (and math) data would be reviewed with the building problem-solving team, instructional implications discussed, and implementation of new core reading practices if eighty percent of the students in a grade level were not meeting grade level benchmarks.
on the early reading screeners (and early math) and the adaptive aReading (and aMath) tests. With a new building and district expectation established for reviewing reading and math data, primary teachers began to consider the new source of data that was available as they planned for and implemented instruction in their classrooms.

The many changes in our district combined with knowledge of the gap between reading research and classroom practices, the newly released results from the 2017 NAEP (National Assessment of Educational Progress) Reading Report Card illuminating the fact that only 37% of fourth graders and 36% of the nation’s eighth graders performed at the proficient or advanced level, our primary students’ poor performance on the early reading screeners caused me to pause and reflect upon my role as the building literacy specialist. This perfect storm of events had me asking different questions, focused my professional reading, and prompted deep reflection in order to improve my practice.

**Study Site**

The study site, Littlefarm Elementary School, used a Multi-Tiered System of Supports (MTSS) that included a process for universal screening for all students in kindergarten through fifth grade in the areas of reading, math, and social/emotional/behavioral (SEB). The academic screenings occurred three times per year and the SEB screenings two times. The leadership team, including the principal, assistant principal, instructional specialists\(^1\), school psychologist, school counselor), worked with classroom teachers and reviewed screening data; identified students at risk, and planned interventions when necessary alongside each grade level team. Parents were notified if their student was identified as needing Tier 2 or Tier 3 reading or math

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\(^1\) The title of instructional specialist is used for all specialists at the study school: literacy, math, and SEB.
support. Students were progress monitored weekly if they were receiving a Tier 3 individualized and intensive intervention or bi-weekly if they were receiving a supplemental and targeted Tier 2 intervention using a curriculum-based measure (CBM) progress monitoring probe.

Over the past three years, Littlefarm Elementary School has seen an increase in parents seeking outside evaluations to determine if their children may have a learning disability, especially in the areas of reading and writing. Another interesting phenomenon was the number of parents seeking additional support and tutoring outside the regular school day. Many were tapping classroom teachers for help or seeking tutoring services from outside the school setting. Oftentimes these students do not present themselves as needing a Tier 3 intervention (falling below the 10th percentile) according to universal screening measures and district report card data.

Tier 1 core reading instruction was guided by the *Missouri Learning Standards* and used the components of the Balanced Literacy Framework i.e. reading workshop, shared reading, writing workshop, interactive writing, shared writing, interactive read aloud, and word study. The resources used were Lucy Calkins’ *Reading Units of Study* (RUoS) for kindergarten through fifth grade for reading workshop and *Phonemic Awareness: The Skills That They Need to Help Them Succeed* by Michael Heggerty in kindergarten through second grade to teach phonemic awareness. In September 2018 the district purchased the newly published *Phonics Units of Study* by Lucy Calkins at Teachers College for kindergarten and first grade to address the skill deficits identified in the data over many years. The second grade *Phonics Units of Study* were not available therefore second grade teachers used units four and five from the first grade *Phonics*
Units of Study which was recommended by the authors at Teachers College, University of Columbia.

One thing I have heard in a variety of settings over the course of my career is confusion in understanding the different between a curriculum and a commercially produced program. While the district curriculum addressed foundational skills, the core reading program (RUoS) did not have a heavy focus on developing these critical early reading skills. RUoS assumes the balanced literacy approach is in place with additional opportunities for early reading skill development outside of reading workshop. What I have observed in the primary grades, particularly in kindergarten and first grade, is a lack of time committed to foundational skill development through the balanced literacy components of shared reading, shared writing, interactive writing, and word study. The focus has been on implementing the reading workshop mini lesson and guided reading groups.

Most often students receiving Tier 2 supplemental in-class support received Fountas and Pinnell’s Leveled Literacy Intervention. Other programs/activities used to support students needing a supplemental intervention were activities from the Florida Center for Reading Research, Making Great Readers, Six Minute Solutions, Reading Plus or small groups during independent reading focused on the content of the mini-lesson or strategy groups.

Prior to the 2018-2019 school year, the study site primarily used Systematic Instruction in Phonological Awareness, Phonics, and Sight Words (SIPPS) with students receiving Tier 3 intervention. In some cases, Phonics for Readers was used when students did not respond to SIPPS, and LLI was used when students displayed broad
reading difficulties primarily in the area of comprehension. In the summer of 2018, the district purchased Wilson *Fundations* levels K, 1, and 2 for Tier 3 reading intervention for kindergarten through third grade students.

The strategies, routines, and language used in core reading instruction and reading intervention differ causing a gap between the two instructional environments. Knowing that struggling readers are engaged in multiple programs, learning different strategies, hearing different language, and using a variety of routines and practices at the varying levels of support, the goal of this study was to explore how to bridge the gap between core reading instruction and intervention for students receiving Tier 3 intervention.

**Statement of Purpose**

The purpose of this study was to research the question, ‘would struggling readers’ rate of improvement (words read per minute), when compared to growth norms on universal screening measures, increase if the language, practices and routines of core reading instruction *and* intervention were bridged when the classroom teacher and literacy specialist worked side-by-side to ensure consistency between the two instructional settings?’ The potential impact of this study was twofold. If bridging the instructional gaps between core reading instruction and reading intervention were effective, students would display aggressive growth on screening measures to close the gap between struggling readers and their grade level peers. Second, teachers would be better equipped to work with struggling readers.

The district began using EduClimber, a data warehousing system, in the fall of 2016. This new system provided the opportunity to look at growth norms to compare a student’s performance relative to other students in terms of the amount of growth they
made on individual measures. Rather than focusing on a student’s single score, teachers could now look at their growth percentile which is derived from the difference between two scores. Growth was defined as flat, modest, typical, and aggressive. Flat growth was growing at a rate greater than 0-14% of same-grade peers nationally, modest growth 15-39%, typical growth 40-75%, and aggressive growth defined as growing more than 76-99% of same-grade peers nationally. Historically, students who received reading intervention displayed modest growth, only growing more than 15-39% of same-aged peers nationally, to typical growth, growing more than 40-75% of same-aged peers nationally. Research has found that aggressive growth, growing more than 75% of their same-aged peers nationally, is what it takes to close the gap (Appendix C). It was the focus of this study to determine if this intervention would yield aggressive growth for struggling readers.

Another goal of this study was to determine what components and instructional practices from core reading instruction and intervention positively impacted struggling readers. This goal was achieved by participating in a second grade class’ core phonics and reading workshops allowing for on-the-spot collaboration with the classroom teacher, observation of students during core instruction, and working with struggling readers during core instruction. Components that were investigated were routines and activities from intervention and core reading programs and strategies taught in intervention and core reading. Also investigated was the practice of the literacy specialist pushing into core instruction in order to participate in the lesson and confer with students during the active engagement component of the mini lesson and independent reading.
Research Questions

The overarching research question was, “How do struggling readers respond to instruction when the language, practices, and routines from reading intervention and core reading instruction are bridged?”

Other questions explored:

1. How equipped and supported do teachers feel in meeting the needs of struggling readers?

2. How do teachers describe the effectiveness of the literacy specialist pushing into core reading instruction?

3. What is the impact on students’ rate of improvement using a growth norm comparison when core reading and intervention language, practices, and routines are bridged with students receiving Tier 3 reading intervention?

4. What are the key components to bridging core reading instruction and intervention?
Chapter 2: Review of Literature

The balance needed in practitioner action research is to read enough initially to ground the proposed study yet understand that “an ongoing search for relevant literature is part of the process as the analysis takes the researcher into areas previously unforeseen” (Herr & Anderson, 2015, p.89). The scope of research and literature reviewed for this study was broad due to the complexity of teaching reading and the challenge of supporting struggling readers. This review starts with the overarching topic of the Response to Intervention (RTI) process and becomes more nuanced. The review is divided into the following sections: RTI, Qualities of Effective Core Reading Instructions - Tier 1, Qualities of Effective Reading Intervention - Tier 3, The Role of the Literacy Specialist, Struggling Readers, and How the Brain Learns to Read. The review concludes with a call to better equip pre-service and classroom teachers on how to teach reading given the historical trend in the United States of underachievement in reading.

Response to Intervention

In 2004, the concept of Response to Intervention (RTI) was born out of concern for the number of students being referred and identified for special education services. The Individuals with Disabilities Education Act was reauthorized and RTI was written into U.S. law (Bean & Lillenstien, 2012). The fundamental principles of RTI include the implementation of guaranteed, quality core reading instruction for all students, early identification of students who are struggling through the use of school-wide screening, implementation of scientifically valid or evidence-based interventions, progress monitoring of students receiving an intervention, and team data review to determine if interventions are effective and can cease or if the intensity of the intervention needs to
increase. RTI is often referred to as a tiered model of instruction, with multiple systems of support. Tier 1 includes the “core” reading instruction and programming that all students receive, Tier 2 includes students who need targeted or supplemental instruction in addition to core instruction; whereas, Tier 3 is an individualized intervention program for students requiring the most intensive supports in order to meet grade level expectations (Bean & Lillenstein, 2012). As cited in Nevills & Wolfe (2009), “Author Kotulak (1997), so beautifully puts it, the genes are the building blocks of human development, but the environment is the on-the-job foreman” (p. 13). Therein lies the urgency to create school environments that provide students high quality instruction with varying levels of support to ensure they receive the instruction they need and deserve.

*Figure 1.* Three Tiers of Instructional Support. This figure (Simmons, 2019) illustrates the three tiers of instruction associated with Response to Intervention (RTI).
Qualities of effective core reading instruction - Tier 1. The foundation of an effective RTI process is the implementation of quality core (Tier 1) reading instruction, the instruction that all students receive. This instruction is considered preventive and should include evidence-based practices (Jones, Yssel, & Grant, 2012). These practices need to be implemented in everyday instruction (Berkeley et al., 2009).

In 2000, the National Reading Panel released a report titled “Teaching Children to Read: An Evidence-Based Assessment of the Scientific Research Literature on Reading and Its Implications for Reading Instruction.” The report named five essential components for reading instruction, phonemic awareness, phonics, fluency, vocabulary, and comprehension. The report had a tremendous impact on reading research, instruction, and policy and is still relevant today (Cervetti & Hiebert, 2015).

Key components of core literacy instruction recommended from the National Reading Panel include systematic phonemic awareness and phonics instruction, fluency, vocabulary and comprehension. The findings from this report have been utilized in curriculum design and reading program authorship. Some curricular programs use the language loosely calling their program “research based” because it contains theoretical components of research. The problem that arises is that there are instructional practices that are more effective than others referred to as “evidence based.” Evidence-Based practices are ones in which “researchers use specific methods to study an instructional approach to see if it works on a large scale…This evidence is backed by research, and it is much more trustworthy” (Chard, n.d.).

In 2009, due to continued poor performance of students in the United States (US), in the areas of literacy and math, “the state school chiefs and governors that comprise
Council of Chief State School Officers (CCSSO) and the National Governors Association (NGA) Center coordinated a state-led effort to develop the Common Core State Standards/English Language Arts and Literacy (CCSS/ELA; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010). The CCSS define the knowledge and skills students should gain throughout their K-12 education in order to graduate high school prepared to succeed in entry-level careers, introductory academic college courses, and workforce training programs” (CCSS/ELA; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010).

An important component of quality Tier 1 reading instruction is differentiation. The term differentiation refers to teachers planning varied approaches to lessons, classwork, and assessments in order for students to maximize learning (Tomlinson, 2003). The belief is that all kids do not learn and display learning in the same way and in the same timeframe. It honors each students’ learning needs. According to Tomlinson (2009) there are four principles of differentiated instruction that are informed by theory and research 1) students differ as learners 2) teachers must study their students to teach them well 3) effective teachers teach up and 4) responding to student readiness, interest, and learning profile enhances student success. In my experience, in order for an RTI process to be effective to ensure all students achieve grade level benchmarks, early intervention and highly responsive, differentiated reading instruction needs to be in place. In a classroom, this would include a balance of explicit whole group instruction, small group and differentiated instruction, and time for students to work independently.
Qualities of effective reading intervention - Tier 3. Scientists have found that most children will learn to read adequately, however, approximately 40 percent of children will not and will need explicit instruction if they are to become proficient readers (Moates, 2007). When students are identified early, and scientifically based reading research programs are used with fidelity, they have a much greater chance of becoming a proficient reader (Moates, 2007). Some of these early-identified students are going to require a supplemental intervention (Tier 2) beyond the core reading instruction (Tier 1). Students receiving a Tier 2 intervention work in small groups (3-6 students) on a specified skill for a short period of time. Students are progress monitored, data is reviewed, and decisions are made to maintain, revise or drop the intervention based on multiple pieces of data. Revisions may include a change in group size, frequency and duration of programming, or an increase in the intensity where a student may require a Tier 3 intervention. A lack of positive response to Tier 2 instruction is an indicator that the student may be at risk of having a reading disability (Catts, Bielsen, Bridges, Liu, & Bontempo, 2015).

Early identification and intervention are fundamental to prevent reading failure. In 2015, a study was conducted to determine if universal screening tests administered to kindergarteners accurately identified students at risk. The results of this study indicated that a screening battery administered to kindergarteners that included letter-naming fluency, phonological awareness, rapid naming or non-word repetition accurately identified good and poor readers at the end of first grade (Catts et al., 2015).

Effective Tier 3 reading intervention starts with a problem-solving process that includes universal screening, data-based decision-making, progress monitoring, and
appropriately designed interventions. The reauthorization of the Individuals with Disability in Education Act (IDEA) in 2004 was an attempt to reduce the number of students referred for special education, especially overrepresented culturally and linguistically diverse students, and students having difficulties due to inadequate instruction (Walker-Dalhouse et al., 2009). The premises behind the use of an RTI-type model were that many students might not need special education if they receive quality core instruction with multiple tiered systems of support, with sufficient intensity, as soon as students showed signs of struggling.

Research indicates that most early reading difficulties can be prevented if appropriately targeted and intensified instructional interventions are put into place (Scanlon, Anderson, & Sweeney, 2017). Research has shown that if students continue to struggle to read by third grade, they are not likely to be a skilled reader in high school. In fact, some states predict their future need for prisons based on fourth grade reading failure rates (Nevilles & Wolfe, 2009). The human brain is malleable—it has a remarkable ability to change and grow, especially in young children. It responds well to remediation reinforcing the need to intervene early (Nevills & Wolfe, 2009). Shaywitz (2003) conducted a study using fMRI to study boys and girls who were struggling to learn to read. They took brain images before and after a yearlong experimental reading program was implemented. What they found was that the brain has an amazing ability to repair itself. The children’s reading improved, and they indeed became accurate and fluent readers, concluding that early intervention using an effective reading program allowed the students to catch up to their classmates (Shaywitz, 2003). The human brain has the remarkable capability of rewiring itself with the right therapy and instruction (Shaywitz,
Researchers call the brain’s ability to sculpt itself based on experiences, neuroplasticity. Research from the field of neuroscience tells us that the human brain has the remarkable ability to respond to environmental input, which allows it to grow connections, develop and formulate skills and procedures, and learn concepts. In addition to building neural connections, the brain also prunes, or gets rid of, connections that are no longer needed or being reinforced (Nevilles & Wolfe, 2009).

An effective intervention is one that is: a) aligned with the core curriculum, b) based on a student’s performance on screening and diagnostic testing, c) targeted to a particular skill or set of skills, d) includes short term, explicit instruction, e) where progress is monitored frequently and where changes to programming made (responsiveness) based on student performance (Lipson & Wixson, 2012). Struggling readers require additional time for reading instruction. There is evidence to support that an additional 30 minutes per day, five days per week of reading instruction for students in K-2, and 50 minutes per day for older students can be effective (Lipson & Wixson, 2012).

A highly controversial topic within RTI and intervention is the idea of fidelity. Some practitioners fear following scripted intervention programs with fidelity will take away a teacher’s professional decision making. Others contend that research-based intervention programs are written and designed with specific techniques and “instructional moves” that must be adhered to in order to have the intended success. Literacy professional need to acknowledge both aspects of fidelity, making decisions in the best interest of the student based on on-going performance data, qualitative data, as well attending to the key aspects of the intervention to ensure success.
The Role of the Literacy Specialist

The role and title of the reading specialist has been evolving and changing since the early 1950’s (ILA Research Brief The Multiple Roles of School-Based Specialized Literacy Professionals, 2015). Today, classrooms are more diverse with a vast array of student needs and skill levels residing in a single classroom. This shift requires new ways of thinking and organizing schools; teachers, instruction, and learning to ensure students are reaching proficient levels of reading.

The 2017 ILA (International Literacy Association) Standards define three distinct roles of specialized literacy professionals with clearly defined standards of practice.

- **Reading/literacy specialists**: work with students who are experiencing difficulties with reading or writing at all levels (pre-K-12)
- **Literacy coaches**: improve classroom instruction by supporting teacher learning
- **Literacy coordinators/supervisors**: develop, lead, and/or evaluate school or district literacy programs

Whether one serves in a literacy specialist role, coach, or coordinator, there are several skills necessary to effectively fulfill any specialized literacy professional role (Bean & Kern, 2017). Literacy professionals need to be able to gain the trust of teachers, principals, and administrators. Without trust, little will change in terms of improving literacy outcomes. Establishing a working relationship with the principal is vitally important because he/she has the power to make things happen, or halt improvement efforts. Specialized literacy professionals need to stay current with reading research and have an understanding of how adults learn. They must be able to effectively collaborate with groups and individuals and scaffold supports in order to create an environment of
learning for teachers and students. Finally, literacy professionals must be flexible. There are times the literacy professional may be asked to fulfill other roles under the umbrella of a specialized literacy professional in order to meet student, building, or district needs (Bean & Kern, 2017). Literacy professionals are leaders in their field who have great potential to make positive change in the lives of teachers and students.

**Struggling Readers**

Research indicates that struggling readers receiving supplemental reading instruction can make significant gains, although approximately 2%-6% of early readers do not appear to respond to research-based interventions. Promising effects were also noted for students who did not respond positively to Tier 2 interventions. When students were provided an additional Tier 3 intensive intervention significant progress was made (Austin, Vaughn, & McClelland, 2017).

Students struggle to read for a variety of reasons. Some reading difficulties are caused by environmental factors such as poverty and motivation (Rasinski, 2017), unqualified staff working with struggling readers, and ineffective beginning reading instruction (Allington, 2013). Other times reading difficulties are caused by biological factors which cause the student to have neurological deficits (Shaywitz, 2003). When biological reading difficulties are neurologically based, the term used is dyslexia. This brain disorder affects a person’s ability to read and write words. It is a disruption in the neural pathways for reading, a localized weakness within a specific component of the language system. The disruption occurs in the area of the brain where the sounds of language are put together to form words and where words are broken down into their elemental sounds (Shaywitz, 2003). According to the *International Dyslexia Association*
(2012), as much as 15-20% of the population as a whole may suffer from some symptoms of dyslexia. Other biological factors that cause reading difficulties are problems with visual or auditory processing, and more often, problems in the oral language/reading pathway described by Nevills & Wolfe (2009) as a “glitch” in the system” (neural pathway for reading). As Shaywitz (2003) states “Most likely as the result of a genetically programmed error, the neural system necessary for phonologic analysis is somehow mis-wired, and a child is left with a phonologic impairment that interferes with spoken and written language” (p. 68). Dyslexia can also be acquired as a result of trauma, tumor, or stroke.

Sometimes reading difficulties are due to environmental factors such as poor reading instruction in school, socioeconomic status, ethnicity, being an English language learner, and coming from a disadvantaged language environment during early language development (Shaywitz, 2003; Nevills & Wolfe, 2009). The system for processing sounds and language in these readers is intact, but their brain creates alternate neural pathways with regions in the right hemisphere, not as suited for reading, versus using the usual language structures in the left hemisphere (most suitable for language). These readers appear to rely on memory to read which may work until about second grade when the length and complexity of words increases.

While there are many factors schools cannot affect, when reading deficits are identified, schools do have control of the instruction provided. Schools must provide multiple tiered systems of support for reading instruction. Once students are identified through a screening process as not responding to Tier 1 or Tier 2 interventions, diagnostic tests should be administered to determine areas of strength and deficits in the five critical
areas of reading instruction (phonemic awareness, phonics, fluency, comprehension, and vocabulary). Once weaknesses are identified, a problem-solving team consisting of teachers, literacy specialists, school psychologist, counselor, and parents, can work together to develop an individualized targeted intervention plan.

In a 2004 study, Valencia and Buly randomly selected 108 students from a typical Northwestern school district who had scored below proficiency on a state test. Students were given additional reading tests in the areas of word identification, fluency, and comprehension. Six profiles of struggling readers were developed from their research.

- Automatic Word Callers - 18% of the sample
- Struggling Word Callers - 15% of the sample
- Word Stumblers - 17% of the sample
- Slow Comprehenders - 24% of the sample
- Slow Word Callers - 17% of the sample
- Disabled Readers - 9% of the sample

The study showed that 83% percent of the students struggled with word identification and/or fluency. However, in a 2014 study conducted by Conradi, Amendum, & Walkowaik, identified five reading profiles and three specific areas of need, accurate decoding, automaticity of decoding, and comprehension. Differently than Valencia and Buly, they found that 63.3% of the third-grade students whose data was examined struggled to comprehend text (Conradi, Amendum, & Walkowaik, 2016). Their recommendation was to use a differentiated approach, versus a one size fits all approach or providing intervention in all areas of reading (phonemic awareness, phonics, fluency, comprehension, and vocabulary). They suggest that literacy specialists target each
student’s specific need(s) and provide brief, systematic interventions in order to accelerate students’ progress (Conradi, Amendum, & Walkowaik, 2016).

Similar studies of struggling readers in middle school and high school show that students in the upper grades continue to display word level processing deficits (Rasinski, 2017). All kids, especially students struggling to learn to read, need a strong core curriculum that includes instruction in foundational skills in the primary years, (kindergarten through second grade) in order to decrease the number of students who continue to struggle in the upper grades. This includes instruction in phonemic awareness, phonics, and word work. When students are able to decode words with minimal effort (automaticity) they are then able to use their cognitive energy to comprehend, the ultimate goal of reading (Rasinski, 2017). Identifying a student’s strengths and weaknesses in order to plan for targeted intervention is key to decreasing the number of struggling readers. Indeed, this is no easy task as teaching reading is a very complex process (Rasinski, 2017; Valencia & Buly, 2004).

**How the Brain Learns to Read**

Working with struggling readers to close the achievement gap is a difficult task. A task in which the provider of the intervention needs to understand the complexities of how children learn to read. The human brain is not hardwired to read, as it is to speak, hence language does not have to be taught. A child simply needs to be exposed to their mother tongue (Shaywitz, 2003). Knowing this is important for teachers, but especially important for specialists providing reading intervention. The brain has structures built specifically for language, whereas reading is an unnatural act with no specific structure or pathway naturally built for the task. The human brain has had to adapt and co-opt
structures in order to translate print to meaning. Due to the complexity of the English language, the task of learning to read in English presents even greater challenges. Learning to read is a long gradual process starting in infancy with basic competency not reached until middle childhood (Nevills & Wolf, 2009). The result, every child must learn to read at the conscious level (Shaywitz, 2003).

Reading and writing use the same brain structures as spoken language, relying on brain circuits already in place for language (Shaywitz, 2003). The process, or reading pathway, begins with the brain recognizing the visual pattern of the word. Next, the letters of the word are translated noticing how a word looks, sounds, and what it means (Nevills & Wolfe, 2009). The final phase of processing text follows the same pathway as spoken language, comprehending the words, processing syntax, and if reading aloud, this information goes to the motor cortex for the production of speech (Nevills & Wolfe, 2009).

When a non-impaired person reads there is activity in both the frontal and the posterior regions in the left hemisphere of the brain. Good readers show strong activation in the back of the brain with lesser activation in the front. Conversely, dyslexic/disabled readers have under activation in the back area (decoding) and over activation in the frontal regions (comprehension of words and processing of syntax). It could be said that the impaired reader uses a less efficient pathway to decode words therefore using more cognitive energy to decode individual words and having less cognitive energy or space for comprehension (Nevills & Wolfe, 2009 & Shaywitz, 2003). This is shown in the DTI (diffusion tensor image) in figure 2. The blue pathway is the architecture of the brain pathway of a dyslexic man and is overlaid with the pathway of a person with a more
typical brain architecture (in gold). This image demonstrates that the dyslexic man has more extensive right brain connections which is a less efficient pathway for reading.

Figure 2. Diffusion Tensor Image (Leonard & Ekhert, 2008).

Learning to read is a conscious process that has to be learned. With lots of practice, decoding becomes a seamless automatic activity without conscious awareness (Nevills & Wolf, 2009). The goal is to move from word analysis to automaticity (identifying a word instantaneously). Automatic decoding frees up cognitive space and energy for the more complex processes of comprehension. It is important for teachers, especially teachers who work with struggling readers, to have an understanding of how the brain processes language and reading. Systematic reading instruction is needed in order to build efficient neural pathways for reading. A literacy specialist’s knowledge of the brain’s reading pathway and the systematic nature of learning to reading is crucial for struggling readers in particular.

Summary of Literature Review

The focus of this study is to bridge the gap between core reading instruction and reading intervention. A significant review of literature was conducted with very little found directly exploring or discussing how the two worlds of core reading and intervention instruction can be bridged. Independently, a wealth of information was found on the subtopics of this review; Response to Intervention (RTI), effective core
reading instruction, the role of the literacy specialist, effective reading intervention, struggling readers, and how the brain learns to read.

A theme that was noted throughout the review was a gap between scientific reading research and classroom instruction (Kilpatrick, 2016). Another theme and articulated in the newly released Knowledge and Practice Standards for Teachers of Reading (2018) and originally developed by the International Dyslexia Association (IDA) in 2010, is that teacher preparation programs, licensure, and professional development does not adequately prepare or instruct individuals with the level of rigor and rich content needed to effectively teach reading.

According to Lipson & Wixson (2012) effective intervention should be aligned to the core curriculum, based on a student’s performance on screening and diagnostic testing, and targeted to a particular skill or set of skills. It was the hypothesis of this study that if the literacy specialist and classroom teacher worked side by side to determine what instructional practices, language, and routines could be shared, or bridged, between the two instructional environments that struggling readers’ rate of improvement would increase at an aggressive rate to close the gap between them and their peers. Literacy specialists have a deep understanding of how children learn to read and the unique needs of struggling readers, including students with the neurologically based condition of dyslexia. The instructional intervention practice that was studied added an additional layer of intervention to students and on-the-spot collaboration between the classroom teacher and specialist by providing push-in time. Given the current trends in reading performance nationally and the heightened awareness of dyslexia, this innovative approach to supporting struggling readers was created.
Chapter 3: Methodology

Research Design

The approach used for this study was Practitioner Action Research, which closely resembles qualitative research (Herr & Anderson, 2015). This model of research is one in which the researcher moves through a series of cycles of planning, acting, observing, and reflecting, Figure 3, (Carr & Kemmis, 1986). It is a form of research in which the researcher identifies a problem of practice and follows a process to systematically solve the problem. The methodology used with this approach has aspects of fluidity and responsiveness as well as traditional research conventions.

Given that this study was Practitioner Action Research, I needed to pay particularly close attention to my relationship to the setting and participants. Herr and Anderson (2015) refer to this unique characteristic of action research as positionality. I was a member of the staff and served in a teacher leader role. While I was not in an evaluative role, due to the fact that I was a literacy specialist and a member of the leadership team I needed to be very conscious of how closely I was situated to the study. The issue of bias needed to be addressed due to my knowledge of past and current history of the site and staff members. I had to acknowledge the fact that I had been a member of the faculty for eleven years and this could cause me to have hidden biases, assumptions, and impressions to which I was unaware. Biases, assumptions, and impressions were critically examined through the research journal.

In order to ensure validity of the study several methods were used. First, the notes taken during the reading block in my research notebook were always available to Mrs. Smith, the study teacher. This method is referred to as member checking. Second,
this study took place during one full semester and I was in the study classroom five
days per week for 30-minute sessions every day that I was not in meetings. This allowed
for prolonged time in the environment. Lastly, peer debriefing was used to validate the
study. Peer debriefing “involves locating a person (peer debriefer) who reviews and asks
questions about the qualitative study so that the account will resonate with people other
than the researcher” (Creswell, 2014). A limitation of this study is that it took place at
only one of the five elementary schools in the district. Another limitation was the length
of time, or number of days, I was able to be in the classroom for phonics workshop (39)
and reading workshop (33).

![Action Research Model](image)

*Figure 3. Action Research Model (Carr & Kemmis, 1986).*

**Participants and setting.** The setting for this action research study was an
elementary school in a suburban school district in the Midwest. In the district, there was
one early childhood center, five elementary schools, two middle schools, and one high
school. According to the Missouri Department of Elementary and Secondary Education
(DESE), in 2017, there were 5,708 kindergarten through twelfth grade students enrolled in the district. Demographic data retrieved from DESE reported that 12.4% of enrolled students in the district were black while only 6.5% of Littlefarm Elementary School students were black, 77.2% of enrolled students in the district were white while 81.9% of Littlefarm Elementary Schools’ enrollment was white. Demographic data for other ethnicities such as Asian, Hispanic, Indian, multi-race, and Pacific Islander are not available on the site due to a potential small sample size for both the district and Littlefarm Elementary School. During the 2017-2018 school year, Littlefarm Elementary School had 519 students enrolled with approximately 2% of the enrolled black students receiving Tier 3 intervention as compared to 3.2% of the white students. Only one student from the “other ethnicities” category was receiving Tier 3 reading intervention.

The selection process used for choosing students for the study was a convenience sample. A convenience sample was used due to the nature of the study. The participants in the study included two second grade students from one classroom who were receiving Tier 3 reading intervention. The second-grade teacher (study teacher), Mrs. Smith, who volunteered to participate in the study. All of the classroom teachers at Littlefarm (grades K-5) and district literacy specialists were asked to participate in a survey.

**Research methods.** This action research study was conducted to gain insight into whether bridging the instructional gaps between core reading instruction and reading intervention increased the rate of improvement of students receiving Tier 3 reading intervention. Information was collected in naturalistic ways and included participant observations, teacher and literacy specialist surveys, study teacher interview, and a research notebook. The quantitative portion of the data collection included universal
screening and progress monitoring data from FastBridge (FAST-Formative Assessment System for Teachers), and the Fountas and Pinnell Benchmark Assessment System. This data was collected from every student in the district in grades kindergarten through fifth grade.

**Measures.** Qualitative data was collected via the Teacher Survey, Literacy Specialist Survey, and study teacher interview. Elementary through high school literacy specialists from across the district and K-5 classroom teachers from Littlefarm Elementary School only were asked to participate. There was a 64% response rate from the Literacy Specialist Survey and 83% on the Teacher Survey.

Quantitative data included Fountas and Pinnell Benchmark Assessment System, and universal screening and progress monitoring data from FastBridge. The FastBridge assessments included evidence-based assessments for universal screening and progress monitoring. The system generated a variety of reports including group and individual skill reports, growth, impact, progress, and benchmark reports teachers could use to interpret data and make data-driven decisions to guide their instruction.

Students in second through fifth grade took the individually administered Curriculum Based Measurement for Reading (CBMreading) and a computer-adaptive assessment called aReading. CBMreading measures two aspects of fluency; rate, the number of words read correctly in one minute, and accuracy, the percentage of total words read correctly. CBMReading was also used to monitor weekly progress. Reading fluency is defined as reasonably accurate reading, at an appropriate rate, with suitable expression, that leads to accurate and deep comprehension and motivation to read (Hasbrouck, J., & Glaser, D.R., 2012). Students read three different grade level passages
for one minute each. The same three passages were used for fall, winter, and spring benchmarking. Test administrators included the instructional specialists and teacher assistants. Test administrators marked the words a student read incorrectly, and the last word read. FAST CBMreading calculated the number of words read correctly in one minute and the accuracy rate. The median score was the student’s recorded score. What I have found is that most often struggling readers have difficulty with word identification and fluency. This makes it difficult to achieve the benchmark of reading with 95% accuracy because the fewer words read, the less errors one can make and still achieve 95% accuracy.

All students, kindergarten through fifth grade, took the universal screening assessment FAST aReading which is a measure of broad reading abilities. FAST aReading is a computer-adaptive test aligned to the Common Core State Standards (2010). The four reading domains addressed in this assessment included concepts of print, phonological/phonemic awareness, vocabulary, and comprehension. This test was administered in the classroom with the classroom teacher and was not timed.

Research has found that aggressive growth is what it takes to close gaps. “Growth percentiles represent a student’s performance relative to other students in terms of the amount of growth they have made. Instead of the focus on a student’s score on any particular assessment, the growth percentile is derived from the difference between two scores” (Appendix C). Growth percentiles are defined in the following manner: aggressive growth as growing at a rate greater than 75% of same-grade peers nationally. Typical growth is growing more than 40%-75% of grade level peers nationally, modest growth 15%-39%, and flat growth growing at rate less than 15% of grade level peers.
nationally. Growth percentiles were used to analyze each student’s growth in EduClimber.

The Fountas and Pinnell Benchmark Assessment System (2nd Edition) is a one-on-one formative and summative assessment used by the school district to determine a student’s instructional reading level. During the assessment, teachers listen to a child’s oral reading, notice and note reading behaviors, and engage in a comprehension conversation. This assessment aids teachers in planning for individualized reading instruction, whole group instruction, as well as determine a student’s easy, instructional, and hard text level. The data received from this assessment included: instructional, easy, and hard reading levels, reading rate, accuracy rate, fluency score (0-3 rubric score), miscue analysis (analysis of errors and corrections), and a comprehension score (unsatisfactory, limited, satisfactory, & excellent). The Fountas and Pinnell Benchmark Assessment includes 26 reading levels, A-Z, with each level representing specific reading skills and behaviors that a student has control over. This assessment is administered by the classroom teacher and at times, by the instructional specialist. During this study, the classroom teacher administered the fall assessment and the instructional specialist (researcher) administered the second, third, and fourth quarter assessments due to the classroom teacher being on maternity leave and having a substitute classroom teacher.

When participating and observing in Mrs. Smith’s classroom, I used a research notebook in order to record observations and notes during phonics and reading workshop. McTaggard (1991) suggested researchers include a record of improvements including changing activities and practices, changes in the language and discourse in which they describe explain, and justify their practice, changes in the social relationships, and
development in expertise throughout the study. Table 1 summarizes the data collection processes used in this study.

Table 1
Data Collection Process
August 2018 – May 2019

<table>
<thead>
<tr>
<th>Data source</th>
<th>Participants</th>
<th>Time</th>
</tr>
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<tbody>
<tr>
<td>Universal screening measure</td>
<td>2nd graders</td>
<td>1. Aug. 2018</td>
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<tr>
<td>– aReading (adaptive) (*FAST)</td>
<td></td>
<td>2. Jan. 2019</td>
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<td></td>
<td>3. May 2019</td>
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<tr>
<td>Universal screening measure</td>
<td>2nd graders</td>
<td>1. Aug. 2018</td>
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<tr>
<td></td>
<td></td>
<td>3. May 2019</td>
</tr>
<tr>
<td>FAST progress monitoring</td>
<td>2nd graders</td>
<td>Weekly Sept. 2018 – May 2019</td>
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<tr>
<td>Fountas &amp; Pinnell Benchmark Assessment</td>
<td>2nd graders</td>
<td>1. Beginning of the year</td>
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<td>System – Instructional reading level,</td>
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<td>2. End of 2nd quarter</td>
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<tr>
<td>accuracy, reading rate, fluency,</td>
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<td>3. End of the year</td>
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<td>comprehension, miscue analysis</td>
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<tr>
<td>Literacy Specialist Survey</td>
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<td>September 2018</td>
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<td>Teacher Survey</td>
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<tr>
<td>Research Notebook</td>
<td>Researcher</td>
<td>September 2018 – May 2019</td>
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<tr>
<td></td>
<td>observations</td>
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</table>
**Quantitative data analysis.** Due to the cyclical nature of action research, see Figure 3, as well as the fact that Littlefarm Elementary School was a data-rich environment, quantitative data analysis occurred throughout the study. Survey data were analyzed using descriptive statistics. The data received from benchmarking was collected and descriptive statistics were used to report pre and post test data. Students receiving Tier 3 reading intervention were progress monitored weekly with a curriculum-based measure (CBMReading) on a targeted skill based on his/her benchmarking score. Each student’s goal rate of improvement on the progress-monitoring probe was set to an ‘ambitious goal’. Progress monitoring was reviewed weekly noting the student’s rate of improvement as compared to their goal rate of improvement.

Each second-grade student’s benchmarking score on the RCBM was analyzed to determine if changes occurred in reading rate and accuracy from August 2018 to January 2019 and January 2019 to May 2019 using FAST reports, specifically noting each student’s growth rate of improvement in EduClimber. According to Aldrich (2017), struggling students need to achieve a reasonable but ambitious ‘catch up’ (progress monitoring) goal, achieving at a stronger rate than his or her peers in order to close the gap. In addition, sub-test scores (reading rate, accuracy rate, fluency score (0-3 score), miscue analysis (analysis of errors and corrections), and comprehension score (unsatisfactory, limited, satisfactory, & excellent) of the second-grade students’ Fountas and Pinnell Benchmark Assessment were analyzed. Data analysis took place on the skills targeted in intervention, not all sub-scores.

**Qualitative data analysis.** Data analysis in action research is ongoing and was the case for this study. The intent of the research notebook was to capture the activities
and language used by students and teachers during core instruction, conversations between the researcher and the classroom teacher, conversations between the researcher and other classroom teachers, descriptions of the environment created by the group including tone, feelings, atmosphere, notes regarding data collected, key findings/understandings, connections to literature, decisions, and reflections. Each day’s script was read and reflected upon in order to make meaning and determine if additions or changes were needed in the intervention and core instruction. Any changes that were made were based upon what was found in the literature on best practices in core reading and intervention instruction. Daily reflections were noted at the end of each day when applicable. The entire notebook was reread every four to six weeks in order to note student, teacher, and instructional changes over longer stretches of time. These reflections were documented in the notebook when they occurred. The use of critical friends, Mrs. Smith (the study teacher), as well as the former building principal were used to debrief the content of the notebook and make meaning for the monthly reflection.

After the study, January 2019, Mrs. Smith was interviewed to gain insight into a teacher’s perspective on the intervention being studied, bridging core reading and intervention instruction when the literacy specialist pushed into core phonics and reading workshop.

If bridging the gap between the two instructional settings of core reading instruction and reading intervention was effective, the data would have shown

1. Struggling readers displaying aggressive growth as measured by FAST screening data from fall to winter.

2. Teachers’ efficacy to meet the needs of struggling readers increase as measured by post-survey.
3. A model could be created of one way to bridge core reading instruction and reading intervention.

**Procedures.** The study took place during the first semester of the 2018-2019 school year in a suburban elementary school in the Midwest in which I served in the role of literacy specialist.

The first phase of the study included administering and collecting a survey from district literacy specialists and classroom teachers from the study site, Appendix B. Quantitative data included fall benchmark (screening) data and Fountas and Pinnell Benchmark Assessment data. Data were analyzed in order to use the information responsively during the study.

As the study unfolded, I participated and observed in a second-grade classroom during phonics and reading workshop. I recorded observations of how students were accessing core instruction, language, vocabulary, routines, strategies, and activities used by the classroom teacher in an electronic (iPad) research notebook. During this phase the goal was to identify key components to bridge core reading instruction and reading intervention. Components included language, strategies, and routines used in both settings as well as practices such as conferring with students during reading workshop, co-teaching, coaching, and on-the-spot collaboration when she was in the classroom. I intentionally incorporated language and strategies from core reading instruction into intervention whenever opportunities and fit arose. The students receiving Tier 3 reading intervention were working on print knowledge that included phonemic awareness, phonics, and fluency. Participating in phonics workshop afforded me the opportunity to observe what phonics principles the students were learning in class, how they were being
described or named, and the sequence of introduction. Because I was part of this block I was able to share knowledge and routines of effective phonemic awareness and phonics instruction. During the reading block I was able to support the struggling readers based on observations of their reading behaviors as the lesson was occurring and conferred with them during independent reading time. The content of the reading conference always included a running record on a text from their book box or a text from intervention, and whenever the opportunity arose, made explicit for students how to transfer what they were learning across the balanced literacy components of phonics and reading workshop and reading intervention. In addition to the running record, when time permitted, the conference included conversation and teaching points that supported the work of the reading mini lesson. While the focus of this study was students receiving Tier 3 reading intervention, this work benefited all readers.

The final phase of the study included an analysis of the remaining data collected during the study: pre/post-test benchmarking data comparison to growth norms from fall to spring, Fountas and Pinnell Benchmark Assessment, the study teacher interview, and research notebook. In order to broaden the scope of this research, recommendations are made identifying ways in which core reading programs can be bridged with intervention programs in hopes that bridging increases transfer and students display aggressive growth on screening measures closing the gap between them and their peers.
Chapter 4: Data Analysis

Introduction

Chapter 4 summarizes the analysis of the assessment data, teacher survey, interviews, and research notebook. Themes that emerged from the survey and interviews are discussed in relation to each research question. First, FastBridge benchmark data and the Fountas and Pinnell Benchmark Assessment were analyzed to understand where and in what ways students grew in their ability to read connected text fluently, accurately and with automaticity, and apply strategies to decode unknown words. The second step was to analyze the Teacher Survey in order to gain an understanding of their perceptions on topics related to reading instruction and intervention. The topics included the level of support classroom teachers felt from the specialists, communication and collaboration with the instructional specialists, anticipated benefits of the instructional intervention practice studied, transfer of skills between reading intervention and classroom work, understanding of the reading process and how children learn to read, and understanding of the needs of struggling readers. While report card data and a Literacy Specialist Survey were collected and analyzed, they were not included in the final summary as they did not adequately inform the overall conclusions drawn from the study.

To determine if the intervention positively impacted students’ reading rate of improvement and bridged gaps between core reading instruction and reading intervention, three types of assessment data were analyzed: universal benchmark screening, progress monitoring, and the Fountas and Pinnell Benchmark Assessment. The assessment data informed the overarching research question, *How do struggling readers respond to instruction when the language, practices, and routines from reading...*
In order to gain an understanding of how school/system structures impact teacher and student growth, the following research questions were asked, question 2, **How equipped and supported do teachers feel in meeting the needs of struggling readers?** and question 3, **How do teachers describe the effectiveness of the literacy specialist pushing into core reading instruction?** One survey administered to all K-5 classroom teachers (Teacher Survey, Appendix B), one study-teacher interview (Appendix D), and the research notebook were used to answer these questions. The main purpose of the survey was to inform research question 2, **How equipped and supported do teachers feel in meeting the needs of struggling readers?** Additionally, questions were asked in order to inform program improvement.

**The study school statistically speaking.** At the time of the study, fall semester 2018, there were twenty-three classroom teachers in the school, with four teachers at each grade level except three at fifth grade. Nineteen teachers, or an 83% return rate, participated in the Teacher Survey. Seven, 37% of the respondents, identified themselves as primary teachers (kindergarten, first, or second grade), ten, 53% of respondents, as intermediate teachers (third, fourth, or fifth grade), and two, 11% of respondents, did not indicate a grade level.

Using the MTSS protocol for identifying students with Tier 3 reading intervention, no kindergarten students were identified during the fall 2018 semester.
(Table 2). Fifty eight percent of the students receiving Tier 3 reading intervention through the school, not through Special School District, were in first and second grade and 42% of students receiving Tier 3 reading intervention were in grades three through five. Littlefarm Elementary School employed three instructional specialists who provided academic and social/emotional/behavioral intervention; however, I was the only specialist who provided only reading intervention for students in the school.

<table>
<thead>
<tr>
<th>Grade</th>
<th># of students receiving Tier 3 (pull-out intense) intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kindergarten</td>
<td>0</td>
</tr>
<tr>
<td>1st grade</td>
<td>12</td>
</tr>
<tr>
<td>2nd grade</td>
<td>6</td>
</tr>
<tr>
<td>3rd grade</td>
<td>8</td>
</tr>
<tr>
<td>4th grade</td>
<td>4</td>
</tr>
<tr>
<td>5th grade</td>
<td>1</td>
</tr>
</tbody>
</table>

**Student Growth**

**FastBridge universal screening and progress monitoring.** Since students grow at different rates and in different ways, having a variety of data was important. While neither student displayed aggressive growth on the CBMReading measure of reading rate at the winter or spring benchmarking period, both students’ accuracy scores greatly improved from fall to spring. Student one’s accuracy rate improved from 60% to 96% while student two’s accuracy improved from 64% to 86% (Table 3). On the benchmark
broad reading measure **aReading**, student one displayed aggressive growth, growing more than 83 percent of students in second grade nationally from fall to spring.

Table 3
**Reading CBM Benchmark Screening Scores**

<table>
<thead>
<tr>
<th></th>
<th>Fall</th>
<th>Rate Words/min.</th>
<th>Acc.</th>
<th>Winter CBM Nat’l %ile</th>
<th>Rate Words/min.</th>
<th>Acc.</th>
<th>Nat’l Growth %ile Fall to Winter</th>
<th>Spring CBM Nat’l %ile</th>
<th>Rate Words/min.</th>
<th>Acc.</th>
<th>Nat’l Growth %ile Fall to Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Student 1</strong></td>
<td>1st 12</td>
<td>60% 5th</td>
<td>42</td>
<td>88% 45th</td>
<td>3rd 54</td>
<td>96% 33rd</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Student 2</strong></td>
<td>3rd 14</td>
<td>64% 5th</td>
<td>40</td>
<td>70% 35th</td>
<td>2nd 50</td>
<td>86% 22nd</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Student two displayed flat growth, only growing more than nine percent of students nationally (Table 4).

Table 4
**aReading Benchmark Screening Scores**

<table>
<thead>
<tr>
<th></th>
<th>Fall aReading Nat’l %ile</th>
<th>Winter aReading Nat’l %ile</th>
<th>Nat’l Growth %ile Fall to Winter</th>
<th>Spring aReading Nat’l %ile</th>
<th>Nat’l Growth %ile Fall to Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Student 1</strong></td>
<td>1st 63rd</td>
<td>1st 2nd</td>
<td>83rd</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Student 2</strong></td>
<td>27th 37th</td>
<td>13th 4th</td>
<td>9th</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Both student’s progress was monitored weekly using CBMReading. An aggressive goal was set by the researcher; a goal that would produce gap-closing growth if achieved. The goal set was a words per minute goal, however, given that the focus of the intervention was phonics (accuracy and automaticity) and spelling, the student’s accuracy score was a better indicator of progress. Student one surpassed his end of year goal and was reading with 95% accuracy. Student two did not meet his goal and was not
reading with 95% accuracy.

**Fountas and Pinnell Benchmark Assessment.** The Fountas and Pinnell Benchmark Assessment was administered in the fall, winter, and spring. The miscue analysis for this assessment for both students can be found in Tables 5 and 6. At Littlefarm Elementary School, the procedure for documenting the fall instructional reading level is to use the previous spring’s instructional level if the student does not pass the next level up (e.g. student one’s spring instructional level was G, he did not pass level H in fall therefore the recorded fall instructional reading level remained G). Mrs. Smith administered the fall assessment. I administered the winter and spring assessments.
Intervention programming for the two students focused on phonemic awareness, phonics/word study, spelling, and fluency. For the purpose of this study, analysis of the assessment focused on the miscue analysis and fluency. Student one moved up four reading levels from fall to spring, relying heavily on the visual (graphophonic) cueing system (Figure 5). He had a large bank of known words, words he recognized automatically, but was not monitoring for meaning or semantics (i.e. reading ‘breed’ for ‘bread’ or ‘house’ for ‘houses’). Since the focus of the intervention was phonics based,
he was applying skills learned in intervention, not always accurately. He may have been working so hard to decode text that all his cognitive energy was being spent on this task versus self-monitoring. During the winter F & P administration he asked if he could point out “all the glued sounds”. ‘Glued sounds’ is a term used in the intervention program to describe word families. This anecdote displayed that the student was transferring what he was learning in intervention to reading outside of the intervention class.

For the skill of fluency, student one received a rubric score of one out of four on both passages read in the winter (Figure 4). He most often read in three to five-word phrases but continued to slow down at times reading word by word. Students were taught, and this was reinforced in connected text lessons, to ‘scoop the words into phrases’ when reading. This skill was taught similarly in the classroom. Evidence of this skill was present; however, he was not yet able to read with ‘expressive interpretation or pausing guided by the author’s meaning, nor was he able to adhere to punctuation, stress words, and read with a slow pace most of the time’. For students receiving this type of intervention, the primary goal was reading accurately in longer phrases. Prosody, or expressive reading would be a future goal.

![Fluency Scoring Key](Fluency Scoring Key.png)

*Figure 4. Fountas and Pinnell Benchmark Assessment Fluency Scoring Guide*
Table 6 shows the miscue analysis for student two.

Table 6
*Student Two Fountas and Pinnell Benchmark Assessment Miscue Analysis*

<table>
<thead>
<tr>
<th></th>
<th>Accuracy</th>
<th>Fluency Rubric score of 0,1,2,3</th>
<th>Graphic/Phonemic Similarity (V)</th>
<th>Function Similarity (S)</th>
<th>Meaning Similarity (M)</th>
<th>Multiple Sources</th>
<th>Self-Corrections</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructional</td>
<td>Discontinued test</td>
<td>Discontinued test</td>
<td>95%</td>
<td>5%</td>
<td>29%</td>
<td>29%</td>
<td>14%</td>
</tr>
<tr>
<td>Reading Level</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>(1st quarter benchmark= K)</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Winter</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructional</td>
<td>J (NF)</td>
<td>92%</td>
<td>96%</td>
<td>11%</td>
<td>48%</td>
<td>14%</td>
<td>59%</td>
</tr>
<tr>
<td>Reading Level</td>
<td>K (F)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>(2nd quarter benchmark = L)</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Error analysis from levels J,K,L combined</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Spring</strong></td>
<td>Did not pass level M</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Instructional</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading Level</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>(4th quarter benchmark = N)</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Instructional at level I from Spring of 1st grade, J was hard in Fall of 2nd grade

Student two moved up three reading levels and also relied heavily on the visual cueing system. He did, however, increase the use of the other two cueing systems, meaning (semantic) and structure (syntactic). In the fall he was self-correcting 14% of his miscues and in winter he was self-correcting 59% of miscues. Often he would say a word that started with the same first sound and then correct himself immediately. When
he got to a word he did not know automatically, he attempted to decode the word letter by letter versus looking through the whole word part by part searching for parts he knew. Throughout each assessment (book), the student talked about what he was reading. Behaviors noted included: laughed at funny parts, monitored his reading and understanding, pointed out tricky words and stated what made the words tricky, anticipated what might be coming up, and stated new learning. While thinking about the text as you read is the ultimate goal of reading, this impacted his fluency. He received a rubric score of one given he was able to read in longer phrases at times but most often he displayed word by word reading. There was evidence that he knew expressive reading was important when he reread a sentence with dialogue to change his voice (Figure 4).

![Figure 5](image)

*Figure 5. Determining Easy, Instructional and Hard Level Text from the Fountas and Pinnell Benchmark Assessment Summary Form (Appendix E).*

Overall, student one displayed greater growth over the course of the school year on academic measures. He was reading accurately on the CBMReading benchmark and progress monitoring, the focus of the reading intervention. He increased his reading level on the Fountas and Pinnell assessment by four levels, versus student two who only increased three reading levels. While both students displayed engagement with lessons
and conferences, overall, student one displayed greater motivating to learn and improve his performance, while student two had a more care-free approach.

**Collective Efficacy**

Hattie 2018 described collective teacher efficacy as teachers having high expectations, working together and believing they can make a difference, and carefully observing for evidence of impact. Teacher responses from the Teacher Survey as well as interviews and the research notebook reflect a need to focus on Hattie’s finding that collective teacher efficacy is strongly correlated to student achievement with an effect size of \(d=1.57\) (Hattie, 2018).

**Teacher efficacy and sense of support.** One goal of the Teacher Survey was to answer research question number two *How equipped and supported do teachers feel in meeting the needs of struggling readers?* Only 58% of teachers reported that they strongly agree or agree they feel equipped to meet the needs of the struggling readers in their class (Table 7).
Table 7
*Teacher Survey Question 7 Results.*
*I feel equipped to meet the literacy needs of the struggling readers in my class.*

<table>
<thead>
<tr>
<th>Descriptor</th>
<th>Percentage of teachers</th>
<th># of Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly agree</td>
<td>32%</td>
<td>6 teachers</td>
</tr>
<tr>
<td>Agree</td>
<td>26%</td>
<td>5 teachers</td>
</tr>
<tr>
<td>Neutral</td>
<td>16%</td>
<td>3 teachers</td>
</tr>
<tr>
<td>Disagree</td>
<td>21%</td>
<td>4 teachers</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>5%</td>
<td>1 teacher</td>
</tr>
</tbody>
</table>
And 58% of teachers reported that they strongly agree or agree they feel supported in meeting the needs of the struggling readers in their class (Table 8).

Table 8  
*Teacher Survey Question 8 Results.  
*I feel supported in meeting the literacy needs of the struggling readers in my class.*

<table>
<thead>
<tr>
<th>Descriptor</th>
<th>Percentage of teachers</th>
<th># of Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly agree</td>
<td>21%</td>
<td>4 teachers</td>
</tr>
<tr>
<td>Agree</td>
<td>37%</td>
<td>7 teachers</td>
</tr>
<tr>
<td>Neutral</td>
<td>21%</td>
<td>4 teachers</td>
</tr>
<tr>
<td>Disagree</td>
<td>16%</td>
<td>3 teachers</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>5%</td>
<td>1 teacher</td>
</tr>
</tbody>
</table>

Question 8a gave teachers the opportunity to provide a short response to the prompt - *If not, in what ways can the literacy specialist support you in meeting the needs of the struggling readers in your class.* Fifty eight percent of respondents, 11 teachers, provided suggestions. Based on the responses, three themes emerged: provider of resources, collaboration, and communication (Table 9).
Table 9

*Teacher Survey Question 8a results, If not, in what ways can the literacy specialist support you in meeting the needs of the struggling readers in your class?*

<table>
<thead>
<tr>
<th>Ways the literacy specialist can support teachers (themes)</th>
<th>Number of times theme appeared in comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provider of resources</td>
<td>5</td>
</tr>
<tr>
<td>Collaboration</td>
<td>4</td>
</tr>
<tr>
<td>Communication</td>
<td>3</td>
</tr>
<tr>
<td>Other responses only showing up one time</td>
<td>4</td>
</tr>
</tbody>
</table>

**Provider of Resources.** A response was marked as ‘resource provider’ if the suggestion was a tangible item (i.e. provide lessons, activities, routines, programs) or if the teacher wanted something given to them without collaboration. Resource suggestions included “lessons and ideas for how I can help struggling readers”, “things to do with struggling readers and suggestions about programs that would help with Tier 2 interventions” (Teacher 6 Survey, 2018). One teacher wrote, “I need to know what their deficiencies are and particular ways to support the student within class. Such as using saying these sayings to help students read unfamiliar words or you should use this Graphic organizer. Tell the teacher what to do, and how often” (Teacher 17 Survey, 2018). One teacher shared appreciation for all the different supplemental resources that are offered/suggested (Teacher 18 Survey, 2018).

**Collaboration.** A response was marked as ‘collaboration’ if the suggestion showed evidence of the literacy specialist and teacher working together to improve learning outcomes for students (i.e. designing and planning lessons, analyzing student
INNOVATIVE TEACHING PRACTICES

data, monitoring student progress, and discussing effective practices). Three responses contained collaborative-type work.

Collaboration was a natural feature of the intervention implemented in this study. Mrs. Smith discussed in detail during the interview that having the literacy specialist in the classroom during the literacy blocks was very helpful. It was built in contact time “increasing interactions and making it easier to talk” (Study Teacher Interview, 2018). In several instances she shared the benefit of having a reflecting partner alongside her as she was teaching. While Mrs. Smith taught the lessons, I was able to participate in the delivery of the lessons. This co-teaching-type work naturally provided opportunities to bounce ideas off one another and reflect on how students were understanding and applying the lesson. Conversations included what worked well, what might need to be tweaked or changed, and what needed to be retaught.

The time frame of the study was first semester, yet I was able to keep the 30-minute second grade reading workshop independent reading time open second semester. I continued pushing into independent reading time in order to confer. There was a total of four students in the study students’ reading intervention group. Additionally, I pushed into the other two students from the intervention group’s classroom one day per week in order to continue studying push-in support during independent reading time to bridge the two learning environments. The ability to be in two additional classrooms provided opportunities to collaborate with two more teachers. Both teachers commented that they would like time to collaborate, especially at the beginning of the school year. They expressed a need to discuss how to support students receiving a tiered intervention and co-create a plan (Research Notebook, 2019).
Communication. A response was marked as ‘communication’ if it reflected any form of communication between the literacy specialist and classroom teacher. Three teachers provided suggestions for improving communication between the literacy specialist and teachers. One teacher asked for “more transparency about what happens during intervention” (Teacher 6 Survey, 2018). Another teacher felt she did not have a clear picture of what the kids were doing in intervention which made it hard for her to support the student(s) in the classroom (Teacher 15 Survey, 2018). The third teacher believed the literacy specialist “should be more direct and tell the teacher what to do (coded as resources), how often, and allow the teacher to provide feedback, so things that are working can continue and things that are not working can be modified” (Teacher 17 Survey, 2018).

Other comments from question 8a included feeling supported but needing additional training about how to support struggling readers. One teacher suggested, “allow us to use some of the programs like SIPP’s and Fundations in the classroom small groups” (Teacher 2 Survey, 2018). One response included “more small groups” (Teacher 5 Survey, 2018). Another teacher asked for “help with distribution of struggling readers becoming more evenly spaced throughout the different classrooms” (Teacher 6 Survey, 2018).

Questions 1a-1d of the Teacher Survey gave teachers an opportunity to further discuss communication and collaboration between the literacy specialists and the classroom teachers. Overall, 58% of teachers did not feel like the time for communication and collaboration was sufficient. To gain a deeper understanding of the teachers’ needs, Question 1b gave them the opportunity share how often they would like
to communicate. Eleven of the nineteen respondents, 58%, provided a suggestion (Table 10).

Table 10
Teacher Survey Question 1 Results. How frequently do you communicate or collaborate with the literacy specialist about your students receiving Tier 3 reading intervention?

<table>
<thead>
<tr>
<th>Descriptor</th>
<th>Percentage of teachers</th>
<th># of Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Weekly</td>
<td>11%</td>
<td>2 teachers</td>
</tr>
<tr>
<td>Bi-weekly</td>
<td>11%</td>
<td>2 teachers</td>
</tr>
<tr>
<td>Monthly</td>
<td>42%</td>
<td>8 teachers</td>
</tr>
<tr>
<td>Rarely/Never</td>
<td>47%</td>
<td>9 teachers</td>
</tr>
</tbody>
</table>

To understand the specific communication needs of the teachers, the survey provided an opportunity to describe the information they would like to receive from the literacy specialists and what information they would like to share with the literacy specialists. Sixteen, 84% of respondents, provided feedback to question 1c regarding the type of information that would be helpful to receive from the literacy specialist (Table 11).
Table 11
Teacher Survey Question 1c Results. What information would be helpful to receive from the literacy specialist?

<table>
<thead>
<tr>
<th>Helpful Information for Teachers to Receive from the Literacy Specialist (themes)</th>
<th>Number of times theme appeared in comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer - How and what to do to support transfer from intervention to classroom</td>
<td>7</td>
</tr>
<tr>
<td>Strategies (being taught in intervention)</td>
<td>5</td>
</tr>
<tr>
<td>Update on student progress</td>
<td>5</td>
</tr>
<tr>
<td>Understanding intervention curriculum</td>
<td>6</td>
</tr>
<tr>
<td>Teacher support</td>
<td>4</td>
</tr>
<tr>
<td>Language (being used in intervention)</td>
<td>3</td>
</tr>
<tr>
<td>Student tools i.e. charts</td>
<td>1</td>
</tr>
</tbody>
</table>

Question 1d asked teachers what types of information they would like to share with the literacy specialist (Table 12). Nine, 47% of teachers, provided examples of information they would like to share with the literacy specialist.
Mrs. Smith viewed the push in time as a built-in opportunity to communicate and collaborate. She expressed her appreciation of learning about the intervention the students were receiving because it allowed her to incorporate some of the language and strategies from the intervention program into core instruction (Study Teacher Interview, 2018). The other second grade teachers expressed this same sentiment; that they liked having the literacy specialist in their classroom because they could hear and see how the student and specialist were interacting and could use the same language when they worked with the students. They expressed an interest in learning more about the language the students were hearing in intervention because “then it’s easier for them because we’re all universally using the same language” (Research Notebook, 2019).

**Transfer**

The underlying concept guiding this study was transfer; students transferring what they learned in intervention to the classroom. The hypothesis was if the language,
activities, and routines were bridged between reading intervention and core reading instruction in the classroom, students would display aggressive growth. Question three asked teachers if they noticed students receiving Tier 3 reading intervention transferring what they were learning in intervention to the classroom. If a student was going to be pulled out of their classroom for additional instruction, one would expect to see the specialized instruction transferring to classroom work. More teachers were neutral or disagreed (53%, 10 teachers) versus agree/strongly agree (47%, 9 teachers) an alarming result (Table 13).

Table 13
Teacher Survey Question 3 Results. I see my students who receive Tier 3 reading intervention transferring what they are learning in intervention to the classroom.

<table>
<thead>
<tr>
<th>Descriptor</th>
<th>Percentage of teachers</th>
<th># of Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly agree</td>
<td>5%</td>
<td>1 teacher</td>
</tr>
<tr>
<td>Agree</td>
<td>42%</td>
<td>8 teachers</td>
</tr>
<tr>
<td>Neutral</td>
<td>42%</td>
<td>8 teachers</td>
</tr>
<tr>
<td>Disagree</td>
<td>11%</td>
<td>2 teachers</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>0%</td>
<td>0 teachers</td>
</tr>
</tbody>
</table>

Nine teachers, 47%, gave suggestions for increasing transfer from intervention to classroom work. There were four themes that emerged from the responses: understanding intervention curriculum, communication, additional student support, and collaboration (Table 14). Again, the need for communication and collaboration was reinforced when discussing transfer. If there were more intentional opportunities to
communicate and collaborate, teachers believed they would see students transferring learning to the classroom setting.

Table 14
Teacher Survey Question 3a Results. Do you have any suggestions for increasing transfer from intervention to classroom performance?

<table>
<thead>
<tr>
<th>Teacher Suggestions for Increasing Transfer (themes)</th>
<th>Number of times theme appeared in comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding Intervention Curriculum</td>
<td>4</td>
</tr>
<tr>
<td>Communication</td>
<td>3</td>
</tr>
<tr>
<td>Student In-Class Support</td>
<td>2</td>
</tr>
<tr>
<td>Collaboration</td>
<td>1</td>
</tr>
</tbody>
</table>

A New Model of Intervention

Building a bridge between instructional settings. The goal of research question 3, How do teachers describe the effectiveness of the literacy specialist pushing into core reading instruction? and question 2 of the Teacher Survey was to gain insight as to how teachers perceived the effectiveness of a literacy specialist pushing into core reading instruction. This had not been a practice at Littlefarm Elementary School therefore most teachers’ responses were anticipatory.

Eighty-four percent, 16 teachers, reported never having a literacy specialist push into their classroom and sixteen percent, 3 teachers, had a previous experience with this practice. The intent of the question was to determine what benefits teachers perceived for students and themselves as reading teachers. Sixty eight percent, 13 teachers, shared perceived benefits to students. Benefits to students included struggling readers receiving additional support, helping students transfer learning from intervention to the classroom.
setting, and support in accessing core curriculum (Table 15).

Table 15  
**Teacher Survey Question 2a Results. If no, what possible benefits would you anticipate for the students receiving Tier 3 intervention if that was part of reading intervention?**

<table>
<thead>
<tr>
<th>Benefits to Students (themes)</th>
<th>Number of times theme appeared in comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional student support</td>
<td>6</td>
</tr>
<tr>
<td>Bridging/Transfer</td>
<td>5</td>
</tr>
<tr>
<td>Accessing core curriculum</td>
<td>3</td>
</tr>
<tr>
<td>Teacher support</td>
<td>2</td>
</tr>
</tbody>
</table>

On several occasions during the interview and in conversations throughout the study, Mrs. Smith mentioned the benefit of the literacy specialist observing the students during core instruction. This allowed the specialist to determine if they were transferring what they were learning in intervention to classroom work and intervene as necessary to build a bridge between the two learning environments. The second-grade teachers expressed the same concern for transfer when I began pushing into their independent reading time. They observed their students working with me and noted that when I was not in the classroom with the student, the tools (reading mat) and strategies taught were not being used independently.

Forty seven percent, 9 teachers, shared perceived benefits to themselves as the classroom teacher (Table 16). Benefits to teachers included teacher learning, additional student support, and literacy specialist learning. Teacher learning included gaining a better understanding about how to support struggling readers and providing teachers with strategies to use in the classroom that closely relate to the concepts students are learning.
in class. While the intent of the question was teacher (adult) learning, four teachers thought a benefit to them was the literacy specialist providing additional support to the struggling readers and the teacher being able to meet with more groups. Similarly, two responses contained learning opportunities for the literacy specialist such as “seeing how it works in a real classroom” (Teacher 5 Survey, 2018) and being able to see how a particular intervention could be incorporated into the classroom (Teacher 17 Survey, 2018).

Among the benefits of having a literacy specialist in a literacy block was the opportunity to engage in professional dialogue (Study Teacher Interview, 2018). Mrs. Smith shared that she gained a greater understanding of phonics instruction when I explained why a lesson may have been written a particular way, shared research, and shared strategies and routines from intervention. Both Mrs. Smith and the other second-grade teachers felt that a benefit to them was the additional support the struggling readers received. Knowing that the struggling readers had more support freed them up to meet with other students.

Table 16
Teacher Survey Question 2b Results. If no, what possible benefits would you anticipate for you, the classroom teacher, if that was part of reading intervention?

<table>
<thead>
<tr>
<th>Benefits to Classroom Teachers (themes)</th>
<th>Number of times theme appeared in comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher Learning</td>
<td>4</td>
</tr>
<tr>
<td>Student Support</td>
<td>4</td>
</tr>
<tr>
<td>Literacy Specialist Learning</td>
<td>2</td>
</tr>
</tbody>
</table>
Teacher Knowledge

When considering the complex task of teaching children to read, it is important for teachers to have a deep understanding of the reading process and the type of instruction struggling readers need to close gaps that exist. The recent spotlight on dyslexia has caused parents to become overly concerned with their child’s reading progress and amplified the need for teachers to become informed of evidenced-based practices in the field of reading so they can effectively work with struggling readers and communicate with parents. I attended a workshop conducted by David Kilpatrick titled How to Improve Word Level Reading in Students with Dyslexia on May 3, 2019 where he expressed a concern for research informed practices not being used in classrooms and reiterated that reading problems are very preventable (Kilpatrick, 2019).

Table 17 shows results for the remaining questions on the Teacher Survey; teacher perception of their understanding of the reading process, the needs of struggling readers, and the focus of the intervention programs. While the intent of the intervention being studied was to impact student growth, another perceived benefit was adult learning. Throughout the Teacher Survey, teachers expressed a desire to learn about topics such as what students are learning in intervention, how to support students who require a Tier 2 or Tier 3 reading intervention in the classroom, effective strategies to teach students, helping students transfer what they are learning in intervention to the classroom, and how and when to incorporate intervention language and strategies into core instruction. One teacher responded that she would like to learn “How to best support the student in the classroom with Lucy Calkins and how to transfer what they are learning in group to the general ed. setting” (Teacher 1 Survey, 2018). Another example of a teacher’s desire to
learn more was “Differentiation in our curriculum or how conferring should look for those students” (Teacher 12 Survey, 2018).

Table 17

<table>
<thead>
<tr>
<th>Teacher Survey Questions 4-6 Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly agree</td>
</tr>
<tr>
<td>---------------</td>
</tr>
<tr>
<td>Q4</td>
</tr>
<tr>
<td>I understand the focus, research and/or theory of the intervention program my students receive in intervention.</td>
</tr>
<tr>
<td>Q5</td>
</tr>
<tr>
<td>I understand the ‘reading process’ and how children learn to read.</td>
</tr>
<tr>
<td>Q6</td>
</tr>
<tr>
<td>I understand the unique needs of my struggling readers.</td>
</tr>
</tbody>
</table>

Conclusion

Chapter 4 provided a summary of what was learned from the data collected and the themes that emerged. Each case study student showed growth on different reading measures, and the results of the Teacher Survey shed light on the communication and collaboration challenges between the instructional specialists and classroom teachers and possible solutions. While I thought I understood the complexity and importance of my
work as a reading specialist, this study has given me a laser-like focus on what impacts and contributes to a student’s reading growth, or lack thereof. Chapter 5 looks at all the data sources and weaves together a model that describes what I believe are the necessary components to bridge the instructional gaps between reading intervention and core reading instruction.
Chapter 5: Discussion

Introduction

Teaching some children to read is a very complex task. While 80% of children will learn to read rather seamlessly, approximately 20% will find this to be a daunting task (Shaywitz, 2003). These are the students for whom this instructional intervention practice was designed. While humans are innately able to speak by simply being exposed to their mother tongue, reading was invented by humans more than 5,000 years ago resulting in the need to teach children to read at the conscious level (Kearns, Hancock, Hoeft, Pugh, & Frost, 2019).

The academic challenges are great in closing the gap between struggling readers and their peers. Not only do some students require intense, explicit instruction, there are many systemic challenges to overcome as well. The purpose of this study was to create an instructional intervention practice that helped students transfer what they were learning in intervention to the classroom. Oftentimes intervention curricula are skill driven, helping kids overcome phonemic awareness, phonics, automaticity, and fluency deficiencies and do not mirror the instruction they are receiving in the general education classroom or are enacted differently. Robertson, Dougherty, Ford-Connors, and Paratore, (2014) explained “ensuring that instruction provided to students throughout the day and outside of the classroom (e.g., by a reading specialist) is congruent with their classroom work helps to build motivation and transfer of skills”.

The goal of this study was to create and enact an instructional practice that would increase students’ reading rate of improvement for students who receive Tier 3 reading intervention. The practice involved the reading specialist pushing into a second-grade
classroom to provide support to students during core reading instruction in conjunction with pull-out, small group reading intervention. This practice provided an additional layer of support for struggling readers as well as the classroom teacher with the goal of bridging the instructional gap between the two settings. This chapter weaves the results of the survey, interviews, and assessment data together in order to draw conclusions about the potential effectiveness of the instructional intervention practice enacted in this study. Chapter 5 concludes with a reflection on the project and recommendations for further research.

**The study school and the MTSS process.** Littlefarm Elementary School is a K-5 suburban elementary school in St. Louis County, Missouri, that follows a Multi-tiered Systems of Support (MTSS) process. The school consists of approximately 520 students with a teaching staff of 37 teachers including classroom teachers, special area teachers, and teachers of children who receive special education services through the special school district of the corresponding county (SSD). Littlefarm used the RTI model to identify students who were at “high risk” for reading difficulties. Once a student was identified, instructional intervention supports were provided, reading progress was monitored, implementation fidelity was collected, and data were evaluated. If the data indicated that the student was not making adequate growth over time, a team meeting was held to examine the intervention plan and decide if a formal evaluation in special education was needed to determine if a reading disability was present.

Locally, most school districts used the discrepancy model versus an RTI model to identify a student with a reading disability. The discrepancy model compares a student’s intellectual ability (IQ) to academic achievement as measured by standardized tests
administered by a school psychologist to determine if a learning disability is present and special education was required. If a school is in adherence with an RTI model, approximately three to five percent of the student population would be receiving a Tier 3 intervention and approximately 10 – 15% would be receiving a Tier 2 intervention in addition to receiving the core (Tier 1) reading program in the classroom. The remaining 80% of students would not require additional support beyond the core (Tier 1) reading program. At Littlefarm, 13% (or 67 students) received a Tier 3 reading intervention and 8% (or 42 students) received a Tier 2 reading intervention in addition to the core reading program.

The concept of RTI began with a concern of the over-identification of students to receive special education services. Interestingly, although the study school used an RTI process to determine eligibility for identifying a student with a reading disability, as the data above displayed, it appears there might be an over-identification concern. A unique feature of Littlefarm was the fact that it used an RTI process to determine eligibility for special education and currently, as the data above displayed, there is an over-identification concern. While RTI has an effect size of 1.07 (Fisher, Frey, & Hattie, 2016), the essence of the original research on RTI has been lost. As RTI was being implemented, schools focused on certain components of RTI such as universal screening, progress monitoring, and setting up an RTI structure and the focus on quality instruction was lost (Kilpatrick, 2019). While the study school has a strong RTI/MTTSS process in place, it too faced the (core) instruction challenge that Kilpatrick referred to in his presentation (2019).
The Instructional Intervention Practice

Instructional coaching, in-class, and pull-out intervention for struggling readers are common practices that occur daily in schools across our country. For this study, the ideas behind these practices were combined to create a hybrid model of instructional intervention for bridging the instructional gaps that occur between reading intervention and core reading instruction. The intervention design could be thought of as a three-legged stool (Figure 6). The top, or seat, of the stool is the intervention. Each of the three legs represents the instructional practice. One leg represents the reading specialist pushing into the general education classroom for phonics and reading workshop. This allowed the literacy specialist to observe instruction unfold, hear the language being used by the classroom teacher, and share language and routines from intervention with the teacher and students. I was also able to support the struggling readers during partner and small group work as well as independent reading to help them transfer what they were learning in intervention and make connections, or bridge, the two learning environments. The second leg represents collaboration between the classroom teacher and the literacy specialist. Being in the classroom during core instruction provided built-in opportunities to collaborate and communicate. The third leg of the stool represents using the language and routines from classroom core reading instruction in the pull-out intervention when applicable.
Figure 6. Diagram of Instructional Intervention Practice (Simmons, 2019).

Having time built into my schedule to join core instruction was invaluable. The shared learning experiences with the students and their teacher deepened the collegial teacher relationship as well as the student relationship. We were learning side by side versus only separate setting experiences as before. At phonics workshop I was able to share strategies from intervention with an entire classroom such as “tap the sounds” to help students with decoding accuracy. I was able to observe and work with my students during the whole group lesson and partner/small group work. This was a great opportunity to observe how the students were accessing and participating in core instruction and whether or not the students were using strategies from intervention and if not, prompt them to do so. I used these classrooms observations to plan, tweak, and revise intervention lessons so that they were more responsive to their needs. At times, when students were working in small groups, Mrs. Smith and I could have a quick conversation about how the lesson was going, how the students were engaged with the content of the lesson, she could ask questions, I could share information about phonics or
intervention instruction or share current student performance.

The teachers and I agreed that pushing into reading workshop was the most valuable. At independent reading time I could observe the students getting themselves set up for independent reading, monitor their book box and reading material choices, observe reading behaviors, conduct conferences, and have on the spot collaborative conversations with the classroom teacher. The reading conference always started with a quick running record. I would ask the student to either pick a book from their book box or sometimes I would ask them to read a text that I had sent back with them from an intervention lesson if my goal was to check on accuracy, automaticity, or fluency. At the end of oral reading I would tell the students what strategic actions I noticed them using in order to celebrate and pick one thing I wanted to teach or reinforce (Figure 7).

Observations made during this time were also used to plan intervention lessons, and similar to phonics workshop, independent reading time were also when on-the-spot collaboration took place.

Figure 7. Reading folder each student had in their book box to support transfer between settings.
Intentional and timely use of strategies and routines from core instruction were used in intervention whenever possible. Given the focus of their intervention was phonics (accuracy and automaticity) and fluency, the strategies and routines bridged related to those skills. A few examples of strategies and language bridged were “Look through the whole word part by part” (Figure 9) to decode unknown words and “Scoop up the words in phrases” for fluency. Examples of routines used in core instruction that were brought into intervention lessons were “Make it a snap word” (Figure 8) when learning new high frequency words and “Let’s study a word” for word study. Students commented surprisingly the first time I introduced a chart in intervention, “Hey, we have that chart in our room!” affirming the importance of bridging the environments for these students who need as much repetition and consistency as possible.

Figure 8. Chart from Lucy Calkins and Colleagues Units of Study in Phonics.
Bridging the two settings; a professional journey. The opportunity to conduct action research to understand the identified problem of practice led me down a figurative road (or path) full of twists, turns and roadblocks. I began the journey by immersing myself in the literature, participating in professional development, and talking to experts in the field of reading instruction. At the time of the study, Littlefarm Elementary School was using the Lucy Calkins Reading, Writing, and Phonics Units of Study program to support the English Language Arts (ELA) curriculum. Bridging the instructional gaps between reading intervention and core reading instruction required the literacy specialist to have a deep understanding of the curriculum and the programs being used in core reading instruction in order to create an instructional model of intervention that would increase transfer and accelerate student growth.

The study began September 12, 2018. Prior to the study, I attended a week-long Primary Reading Units of Study (Homegrown) institute conducted by a staff developer from the Teachers College Reading and Writing Project in the study school district. Then on August 20-22, 2018, I traveled to New York City to attend the Teachers College
Phonics Units of Study Institute at Columbia University. During my time at the Homegrown Institute and at Columbia University, I had the opportunity to talk with two of the staff developers. One of the staff developers was the co-author of the new *Phonics Units of Study*. The staff developers listened, asked questions, and provided feedback to regarding the instructional intervention practice that was designed for this study (Research Notebook, 2019). Both staff developers emphasized the importance of students hearing the same language for the same reading strategies in both settings (Personal communication, September 23-24, 2018.)

Staff developer one stressed the importance of, “watching him across different parts of the day to see how he operates and where he engages in all literacy components.” She also believed in using areas where kids are succeeding to help them learn in areas where things are more challenging” (Personal Communication, September 23, 2018). She suggested that intervention teachers should teach kids explicitly how intervention work translates or can help them during class work (Personal communication, September 23, 2018). When asked how classroom teachers can reinforce what is being taught in intervention, she suggested that teachers should ask interventionists what strategies they are working on and which ones have helped the most (Personal communication, September 23, 2018). When I asked what the biggest challenges are for struggling readers the staff developer stated that “we need to make sure that their work in one area (intervention) helps them do the work in their class” (Personal communication, September 23, 2018).

I felt the time spent in conversation with the two staff developers validated my belief that I was on the right road/path to developing an instructional model of
intervention practice that could bridge the instructional gaps between reading intervention and core reading instruction. However, there were still many hills, valleys, and setbacks to overcome in which I had limited power to influence including school procedures, assignments, and schedules that would require system changes at Littlefarm. The biggest roadblock of all was time, as it emerged in every piece of data within the research study.

**Time: to collaborate and communicate.** A recurring theme documented in the literature and noted in the surveys, Study Teacher Interview, and conversations was a lack of communication and collaboration. The first comment staff developer two provided after reading the description of this study was, “I do find in my work with schools that sometimes there is a lack of communication between the intervention team and classroom teachers. It would be extremely helpful if intervention teachers and classroom teachers were working on the same strategies/goals with students” (Personal Communication, September 24, 2018). Pull-out intervention alone, which was the practice at Littlefarm, tends to lack integration with classroom instruction oftentimes causing a break-down in communication between teachers and specialists (Bean, 2004). Woodward & Talbert-Johnson (2009) conducted a survey regarding separated (intervention) instruction and a classroom support model. Both classroom teachers and literacy specialists noted separated instruction limited communication.

Fifty eight percent of the teacher respondents expressed a need for increased communication and collaboration between the instructional specialists and classroom teachers. This theme emerged in three different areas: 1) when asked how frequently they communicate or collaborate with literacy specialists, 2) what would increase transfer between the two instructional settings, and 3) what support they needed from the
instructional specialist in order to meet the needs of struggling readers. Teachers desired to learn more about the intervention program/curriculum (strategies, language used), receive updates on student progress and suggestions from reading specialists for how to support students requiring a Tier 2 reading intervention, and share student observations. Teachers also indicated a need for more collaborative activities including planning differentiated lessons within core curriculum together, modeling how particular strategies and language could be used with students in both settings, and planning for reading conferences with students (Teacher Survey, 2018).

Currently, there is not a formal structure in place nor time allotted for teachers and specialists to collaborate. Although the instructional specialists invite teachers to meet to discuss students, data, programming, and core curriculum, most often these types of conversations happen only at data meetings and informally during hallway conversations which are not optimal, but an overused and under-researched way that knowledge gets transferred between teachers. Both second grade teachers mentioned in a conversation that having a structure in place to collaborate would be helpful. They recalled wishing they had reached out in the fall to collaborate and plan for students needing a Tier 2 intervention. They were not sure where to start and what programming should look like (Research Notebook, 2019). One second grade teacher commented, “I want to know more of the language you are using so that when we are reading together I can say, ‘remember, she (the reading specialist) said to do this’. A key finding is that teachers want more support, communication, and collaboration, yet in practice they do not make time for it. Unfortunately, at Littlefarm, professional development, team meetings, and faculty meetings do not include time for literacy specialists and teachers to
collaborate.

Evidence of the benefit of communication between the teacher and literacy specialist during push-in time was found in the Study Teacher Interview. Mrs. Smith remarked that she liked being able to talk about what went well and what changes could be made before, during, and after the lessons (Study Teacher Interview, 2019). She also noted the benefit of the literacy specialist sharing strategies and language used in intervention. When the second-grade teachers were asked about the literacy specialist pushing into independent reading time, one second-grade teacher commented, “I liked seeing the reading mat you made. That helped me a lot when I was working the kids. It was super helpful” (Research Notebook, 2019).

When asked what changes or additions she made to her instruction from having the literacy specialist in the classroom she shared that she liked bouncing ideas off the specialist and reflecting on what the kids were doing (Study Teacher Interview, 2019). She stated that the push-in time was a built-in opportunity to communicate and collaborate on the immediate needs of the classroom. This gave her the opportunity to make changes on the spot.

During the fall semester of 2018, of the 47 students receiving a Tier 3 reading intervention who had data recorded in EduClimber, two of which were the case student students, only 13% showed aggressive growth. Four of those students were in first grade and two were in third grade. The third-grade students had received Tier 3 reading intervention for multiple years, one beginning in kindergarten and one since second grade, and were dropped from Tier 3. The two students then began receiving a Tier 2 reading intervention delivered by a classroom teacher in the spring semester of 2019.
The need for the literacy specialists and classroom teachers to work together more intentionally for these underperforming students became more evident. As discussed in chapter 4, there was overwhelming consensus that time for communication and collaboration between the classroom teachers and the literacy specialist was a challenge. The two students in this case student represent a larger problem that exists for underperforming students. This challenge, if overcome, could have a tremendous impact on struggling readers if communication and collaboration between teachers and specialists was increased.

**Time: additional time working with the literacy specialist.** The concern that students needed more time, or direct instruction from the literacy specialist, came up in the Teacher Survey, Study Teacher Interview, and teacher conversations. Teachers anticipated students would be more likely to transfer what they were learning in intervention to class work if the literacy specialist was part of core instruction to support them accessing the lessons, scaffolding lessons and work, and explicitly showing them where, when, and how to use what they were learning in intervention to the classroom.

Struggling readers have unique needs and oftentimes multiple challenges that need to be addressed. This was articulated in the Study Teacher Interview. Mrs. Smith stated that, “struggling readers need lots of repetition, repeated practice, more time, and additional feedback because it takes longer to see their improvement” (Study Teacher Interview, February 1, 2019). When Mrs. Smith was asked what changes could be made in order to see aggressive growth on the benchmarking measures, she suggested providing students additional time working with the literacy specialist in the pull-out intervention program as well as pushing into reading workshop to provide more
opportunities for feedback to the struggling readers through conferring (Study Teacher Interview, 2018). It is standard practice to allot a 30-minute intervention block. What I have discovered in practice is that the “30-minute block” is not enough due to factors such as transitioning between groups, high needs of students, and lessons requiring more than 30 minutes to implement in full. Lessons generally take one and half to two days extending the length of time that intervention is required. The grade level teachers not in the study also felt the additional time the students had with the literacy specialist during independent reading time was beneficial (Research Notebook, 2019).

**Time: changes to schedules.** When conducting a study such as this, it is important to dig deeper and deeper to understand the problem, causation, and possible solutions. Because neither of the two case study students showed aggressive growth on the universal screening measures, I did just that. After reviewing the research notebook, I discovered that I was in the study classroom for 39 Phonics Workshops and 34 Readers Workshops during the duration of the study. This was surprising given there were 62.5 days available for reading workshop and 52 days available for phonics workshop. The primary reasons I did not attend workshop were due to scheduling changes made by both Mrs. Smith and me. I further examined this to determine the number of days the instructional specialists missed seeing their intervention groups. EduClimber has a Fidelity Report which shows how many days and minutes an intervention was scheduled to occur and how many days and minutes the intervention actually occurred. On May 11, 2019, a Fidelity Report was reviewed for the two case study students. On this day, there had been 149 entered days. Student number one received intervention instruction 66.4% of the recorded instructional days and student number two received instruction 65.1% of
the days. Thirty sessions did not occur due to other responsibilities of the instructional specialist, which is equivalent to more than a month of school. This concern was also noted in the Teacher Survey. Question nine gave teachers the opportunity to share additional information. One teacher wrote, “I also feel that the literacy specialists are gone significantly whether it be meetings or MAP testing, which causes a huge gap for students who should be receiving intervention during that time” (Teacher 2 Survey, 2018). Table 18 shows the breakdown of session attendance. A finding from this study was that students were accurately identified and placed in appropriate interventions, but the fidelity of the intervention occurring, the number of intervention lessons that actually took place, may have impacted the growth of the students.
Table 18
*Fidelity Report, Intervention Sessions*

<table>
<thead>
<tr>
<th>Attendance detail</th>
<th>Student 1</th>
<th>Student 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present</td>
<td>99 times/ 66.4%</td>
<td>97 times/ 65.1%</td>
</tr>
<tr>
<td>Student Absent</td>
<td>1 time/ 0.7%</td>
<td>9 times/ 6%</td>
</tr>
<tr>
<td>Staff absent</td>
<td>5 times/ 3.4%</td>
<td>5 times/ 3.4%</td>
</tr>
<tr>
<td>School event (i.e. assemblies, special events, working with another teacher)</td>
<td>6 times 4%</td>
<td>1 time 0.7%</td>
</tr>
<tr>
<td>School canceled (i.e. snow days, half days)</td>
<td>7 times 4.7%</td>
<td>7 times 4.7%</td>
</tr>
<tr>
<td>Team meeting (i.e. IEPs, parent meetings, Assist meetings, Instructional Specialist meetings)</td>
<td>6 times/ 4%</td>
<td>5 times/ 3.4%</td>
</tr>
<tr>
<td>Benchmarking/data Meeting</td>
<td>21 times/ 14.1%</td>
<td>21 times/ 14.1%</td>
</tr>
<tr>
<td>Professional Learning/ conference</td>
<td>4 times/ 2.7%</td>
<td>4 times/ 2.7%</td>
</tr>
</tbody>
</table>

Another factor to consider when looking at a struggling readers’ growth is the classroom schedule. This is especially important when considering intervention attendance and their intense need for consistent instruction. A second finding of this study was the amount of time instruction does not occur in varying content areas due to school-wide special events (e.g. assemblies, emergency drills, book fairs, and buddy classroom activities) and choices made by the classroom teacher (e.g. weekly scheduled
library times, field trips, mindfulness, absenteeism, and class meetings). Phonics workshop and reading workshop were canceled several times during this study. Phonics workshop was canceled 13% of the study days and reading workshop was canceled 18% of the days. This was an important finding for me as it reinforced the need for implementation fidelity.

**Teacher Knowledge and Professional Development**

“There is no substitute for well-informed educational professionals” (Kilpatrick, slide 48, 2019). The analogy he used to make his point was that of a carpenter. He stated that you can be a skilled carpenter, but if you do not have the right carpentry tools, you cannot do the job well. Two colleagues, both administrators, served in the role as peer debriefer and analyzed the Teacher Survey in order to ensure the validity of the researcher’s analysis. One debriefer was the former principal of the school, the other the current principal of the school. Both found a discrepancy between the teacher responses on question 5, understanding the reading process and how children learn to read, question 6, understanding the needs of struggling readers, and question 7 feeling equipped to meet the needs of struggling readers based on data, conversations, and classroom observations. They both believed that the teachers rated themselves stronger than what they had heard and observed at meetings, in conversations, and in practice. Their hypothesis was based on screening data, classroom observations, and conversations, especially in the primary grades; kindergarten, first grade, and second grade.

Prior to the 2016 – 2017 school year the district used Aimsweb for its universal benchmark screening and progress monitoring assessments. When examining benchmark screening data over time, formerly Aimsweb and currently FastBridge, the peer
deb Briefers and I noticed data from the early literacy screening measures had consistently been a concern. Most students entering kindergarten at Littlefarm Elementary School were coming with requisite early literacy skills; however, data has shown that they leave kindergarten without the requisite skills for first grade (Table 19).

Table 19
Kindergarten and first grade benchmark data from fall to spring

<table>
<thead>
<tr>
<th></th>
<th>Fall 0-10&lt;sup&gt;th&lt;/sup&gt; Nat’l</th>
<th>Fall 11&lt;sup&gt;th&lt;/sup&gt; – 25&lt;sup&gt;th&lt;/sup&gt; Nat’l</th>
<th>Fall 26&lt;sup&gt;th&lt;/sup&gt; – 39&lt;sup&gt;th&lt;/sup&gt; Nat’l</th>
<th>Spring 0-10&lt;sup&gt;th&lt;/sup&gt; Nat’l</th>
<th>Spring 11&lt;sup&gt;th&lt;/sup&gt; – 25&lt;sup&gt;th&lt;/sup&gt; Nat’l</th>
<th>Spring 26&lt;sup&gt;th&lt;/sup&gt; – 39&lt;sup&gt;th&lt;/sup&gt; Nat’l</th>
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</thead>
<tbody>
<tr>
<td>KDG</td>
<td>2.6</td>
<td>10.39</td>
<td>23.38</td>
<td>17.95</td>
<td>21.79</td>
<td>12.82</td>
</tr>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt; grade</td>
<td>16.09</td>
<td>13.79</td>
<td>6.9</td>
<td>11.24</td>
<td>23.6</td>
<td>7.87</td>
</tr>
</tbody>
</table>

An illustrative example of this concern is shown in Table 19. In the fall, 36.4% of the kindergarten students showed some level of risk increasing in the spring to 52.6% of the kindergarten students displaying some level of risk. While there was disagreement among the teachers regarding the predictability of these screeners at kindergarten, more students leaving kindergarten showing signs of risk is concerning. This trend has impacted first grade. While 45.98% of the first graders showed aggressive growth on the early reading screeners in the spring, 42.7% of the first graders still continued to be at some level of risk. In an RTI model, approximately 80% of students should score above the 25<sup>th</sup> percentile. At Littlefarm Elementary School only 47.43% of the kindergarten students and 57.29% of first grade students scored above the 40<sup>th</sup> percentile or above at the spring benchmark.
Teachers, like any profession, have personal philosophies, beliefs, and theories about topics such as how children learn and the relevance of multiple and varied data. The challenge in schools is how to honor teachers’ professional beliefs, while providing relevant, job-embedded professional development so they continue to learn and improve their practice.

When examining the results of the Teacher Survey, one hundred percent of the teachers who identified themselves as primary teachers and 80% of the intermediate teachers reported they agreed or strongly agreed they understood the reading process. Seventy nine percent said they understood the unique needs of struggling readers. These data seem to conflict with teachers’ response to the question of feeling equipped to meet the needs of struggling readers. Only 58% of teachers indicated feeling equipped to meet the needs of struggling readers. As a reflective practitioner, one can understand the reading process, understand the reader’s struggle and still not know how to connect the process knowledge to the targeted problem of the reader. For example, many study site teachers can now identify a student’s area of need i.e. phonics/decoding, fluency, comprehension, vocabulary, but struggle to design an impactful classroom-level intervention. This discrepancy may indicate a need for additional resources for classroom teachers and/or a need for professional learning to improve their reading instruction.

**Key Components to Bridging Core Reading Instruction and Intervention**

I went into this study knowing that Tier 3 reading intervention needed to be closely examined because students at the study site were spending years in intervention and most often, being referred for special education. Analysis of the data collected
through surveys, teacher conversations, and assessments as well as talking with and reading literature by experts in the field has led the researcher to conclude that a change was needed at the study site to address the needs of struggling readers and to bridge the instructional gap between core reading instruction and intervention. I recommend creating a schedule that provides time for teachers and literacy specialists to collaborate through regular meetings and professional learning be implemented.

**Push-in support – supporting students.** I found the opportunity to be part of core instruction to be an invaluable experience and a necessary component to fully exploring the problem. When you consider the classroom teacher’s knowledge, understanding and experiences with reading instruction combined with my experiences as a reading specialist/coach, it was apparent that working together would be a benefit to students. Both roles provide unique perspectives, and when combined, can be very powerful. Participating in core reading instruction allowed me to observe how reading instruction was presented and observe how the students who were receiving Tier 3 reading intervention responded to and accessed instruction. It became very clear during my push-in time that the students receiving Tier 3 reading intervention required a great deal more support than one classroom teacher could provide. Oftentimes the students were off task during instruction, partner work, and independent reading. This concern was noted in the Study Teacher Interview and in conversations with the second-grade teachers.

By having the literacy specialist push into classroom reading instruction, students were not only provided additional support, they could be held accountable for partner work during lessons and increasing stamina and task-focus during lessons and
independent reading. In addition, the added opportunity for the literacy specialist to confer with students in books of their choice was powerful. The content of the conferences reinforced the days’ lesson and explicitly showed students where, when, and how to transfer what they were learning in intervention to classroom instruction. It also allowed the specialist to conduct a quick running record to gather information to be used during intervention time to support transfer between the two settings.

To make this push in instructional practice work, it would be ideal if the literacy specialist could participate in the entire reading workshop. However, given the challenges of time and schedules, participating in independent reading time would be the most likely recommendation. Another key component would be for the specialist to understand each days’ lesson in order to effectively confer with students and to bring the language and strategies from core instruction into intervention instruction. If a schedule such as this is to be put in place, literacy specialists and classroom teachers would need to discuss this time as being ‘uninterrupted instructional time”, not changing the schedule for special activities or canceling workshop, in order to be effective.

**Push-in support – supporting teachers.** Since elementary teachers tend to be ‘generalists’, needing to know and plan for multiple content areas (i.e. reading, writing, mathematics, science, and social studies) as well as balance the many student-based meetings (i.e. IEPs, parent-teacher conferences) and team-based meetings (i.e. data meetings) required of them, the time and energy they can give to each component creates a challenge they must address on a daily basis. Engaging in the instructional practice of the literacy specialist pushing into the classroom to provide support to the classroom teacher can alleviate some of the pressure classroom teachers feel. When the two teachers
become instructional ‘teammates’ working side-by-side to teach effective lessons, adjust when necessary and share language and strategies from intervention, both students and classroom teachers will reap the benefits.

**Collaboration.** The data would suggest that a more formal, intentional, and purposeful means for collaboration between the literacy specialist and classroom teacher would be impactful to students and teachers. While the push-in time provided valuable opportunities to communicate and collaborate, its greater effect was nurturing a collegial relationship between the classroom teacher and specialist. Once a trusting relationship had been built, the two teachers used their collaboration time to discuss students, including current student performance (strengths and weaknesses) and strategies and concepts addressed in upcoming core and intervention lessons. In addition, the teacher and specialist could plan for students receiving Tier 2 interventions and discuss how language and strategies from core and intervention could be implemented in each setting.

**The Bridge**

This study showed that classroom teachers need to have a solid understanding of core reading instruction and know what to do for students who struggle and need additional instruction beyond the core. It also reinforced the role that literacy specialists play in supporting struggling readers and teachers. As Woodward and Talbert-Johnson (2009) shared, “it is vital that a combination of effective separated and supportive instructional strategies be employed to address the unique learning needs of all students” (p.199).
Based on the findings of this study, the researcher recommends the following:

1) Classroom teachers and literacy specialists must work together to co-construct a ‘bridge’ so students can easily walk between the classroom and intervention settings armed with the tools needed to perform on both sides.

2) This ‘bridge’ should consist of two ‘structures’ put in place to ensure its stability and effectiveness:
   a. Regularly scheduled, dedicated meeting time for the classroom teacher and literacy specialist to collaborate and plan for reading instruction, including how to provide support for students receiving Tier 3 reading intervention.
   b. The instructional intervention practice of allowing the literacy specialist to push into the classroom during the core reading block each day.

3) Building leaders, instructional specialists, and classroom teachers should revisit reading instruction to ensure a shared understanding between all staff and determine future building-level professional development needs.

4) Implementation fidelity data must be collected and monitored to ensure that students are receiving the required minutes of the core reading program on a daily basis.

5) Implementation fidelity data for students who receive Tier 3 reading intervention must be collected and monitored to ensure that supplemental interventions (Tier 2) occur as recommended and scheduled.

6) Regular review of Tier 3 reading intervention implementation fidelity data
should be incorporated into data meetings.

7) The study school leaders (along with the instructional specialists and classroom teachers) need to examine current structures (i.e. teaching schedules) and instructional practices (i.e. supplemental intervention) in the area of reading and implement changes to benefit both students and teachers.

Conclusion

Recently, the term ‘dyslexia’ has received a lot of attention at the state and national levels causing parents to question if their child may have dyslexia if they were not meeting grade level standards for reading and writing. Given this attention, the Missouri Department of Elementary and Secondary Education’s (DESE) has initiated a task force investigation into this well-documented challenge that many children and adults face.

What started out as a national grass-roots effort to raise awareness and advocacy of dyslexia has now become a law in Missouri. On June 22, 2016 then governor Jay Nixon signed House Bill 2379 and Senate Bill 638 (Crouch, 2016). This bill required the Missouri Department of Secondary and Elementary Education (DESE) to create a legislative Task Force on Dyslexia. The task force identified six areas of study and in October 2017 released guidelines which included conducting dyslexia screenings, identified classroom supports and accommodations for students displaying dyslexia tendencies, and mandated that all teachers, K-12, attend a two-hour in-service training (DESE, 2017). The new legislation is an attempt to ensure every student receives the literacy instruction they need and deserve by clarifying for parents and educators the signs that a student may be at-risk for dyslexia and guarantees appropriate classroom supports to meet their unique needs.
In my experience, struggling readers are impacted greatly by good and poor instruction. Good or great instruction can close gaps and poor instruction, or instruction that is not intentional and thoughtful to their specific needs, can perpetuate the struggle which can impact their appreciation of school, affection towards reading, and thoughts of themselves as a learner. This study was designed with these vulnerable, underperforming students in mind. An action research model collecting both qualitative and quantitative data was used to determine if bridging the instructional gaps between intervention and core reading instruction increased students’ rate of growth. This instructional intervention increased collaboration between the classroom teacher and literacy specialist due to the addition of the practice of the literacy specialist pushing into core instruction. This joint instructional time gave both teachers first-hand experience with, and access to, one another’s curriculum.

Although I had been in the field of education my entire career and worked in different roles, I entered into this study with naivety. With the support of my principal during the duration of the study I believed that if I focused all my energy on this small set of diverse learners, I could change their learning trajectory. While I still believe I can, I did not anticipate the impact of school and system structures on their growth. This study has affirmed the importance of communication and collaboration between the classroom teacher and the literacy specialist in promoting student transfer. Communication, however, cannot be a one-way street. It has to be a partnership between the classroom teacher and literacy specialist sharing and learning from one another.

Evidence of the success of this study exists. The Teacher Survey provided hard evidence that a communication problem existed and that both teachers and instructional
specialists were wanting time to collaborate, and it began defining what the specific needs were. Next school year grade level teams and the three instructional specialists will have time built into the building calendar to meet. They will meet approximately once per month during each grade level’s plan time. Feedback from the Teacher Survey will be used to plan for the initial meetings. I predict this addition will foster transfer between the two settings.

I believe learning can be accelerated with the use of innovative teaching practices such as the one studied, persistence, and always taking an inquiry stance when reflecting on her instruction. What I learned was to not narrowly focus on one aspect such as data or programming, but in addition, look at the rich context that surrounds and supports the students and staff working in a school setting. Using a process such as the McRel Success in Sight School Improvement Process (Figure 10), which Littlefarm Elementary School had formally used in the past, may be used to identify problems of practice and create innovative solutions. This means I will need to continue to ask questions and advocate for structures and processes that fully support the underperforming students with whom I work.
This study was designed to have the literacy specialist be a part of core instruction and I strongly believe that is a vital component given the impact quality core instruction has on student learning. The time to observe and work with students in the classroom environment gives a more complete picture of the child as a learner and unique ways to support the transfer of learning between the two settings. Going forward, the same scheduling issues will exist, but this new insight will allow me to look at the building schedule differently and ask questions I may not have asked prior to this study. While I may not be able to design the perfect schedule, I feel confident that I will be able to make small changes that could potentially have great impact given a new collaboration structure will be in place.

Literacy specialists not only provide intervention to students, they oftentimes fill other roles. At the study site, the instructional specialists are part of the leadership team and MTSS process, organize the universal screening process and test students K-5 three times per year, organize and maintain all tiered intervention, and attend a variety of

Figure 10. McRel Success in Sight School Improvement Process.
meetings and professional development. While I do not have a solution nor the authority to make major changes to the responsibilities, knowing the impact missed sessions has on student learning has caused me to make different decisions. These decisions include things such as tightening up the benchmarking/data meeting schedule and being much more judicious about attending meetings during intervention time.

The goal for all teachers is to see kids transfer and apply what they are learning to new situations and settings. That was the cornerstone of this study, to implement an intervention that would support students in building a bridge between two learning environments, the general education classroom and reading intervention. Research shows that all students can learn to read, a gap exists between research and practice, and reading problems are preventable (Kilpatrick, slide 69, 2019). Perhaps the new Dyslexia legislation will begin to close the gaps that exist between core reading instruction and intervention by bringing evidence-based practices into the classroom and creating environments that support skill transfer between the two worlds. It is vitally important, especially given the statistics on reading achievement in the United States, to teach them well!

**Recommendations for Future Study**

Opportunities for future research exist. This study was conducted at only one of five elementary schools in a school district with two case study students. Broadening the scope to include more schools and students to study the impact of the instructional intervention practice could lead to stronger evidence of its effectiveness. Another opportunity for future research exists to study the impact of lost instructional time on underperforming students. This study showed that a significant amount of classroom
Instruction and intervention instruction are lost due to special events and changes to classroom schedules and the additional duties of the literacy specialists that take them away from intervention instruction.
References

http://www.fastbridge.org/2017/01/setting-realistic-but-ambitious-goals-when-progress-monitoring/


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Kilpatrick, D. A. (2019, May). How to Improve Word-Level Reading in Students with Dyslexia. Presentation for Decoding Dyslexia Missouri, St. Louis, MO.


Tomlinson, C. A. (2016). *The differentiated classroom: Responding to the needs of all learners*. Boston: Published by Pearson Education, by special arrangement with the Association for Supervision and Curriculum Development (ASCD).


## Appendix A

### Data Table

<table>
<thead>
<tr>
<th>Data source</th>
<th>Participants</th>
<th>Time</th>
<th>Research question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universal screening measure – aReading (adaptive) (*FAST)</td>
<td>2nd grade case study students</td>
<td>August 2018 – December, 2018</td>
<td>What is the impact on students’ rate of improvement using a growth norm comparison when core reading and intervention language, practices, and routines are bridged on students receiving Tier 3 reading intervention?</td>
</tr>
<tr>
<td>Universal screening measure – ReadingCBM (*FAST)</td>
<td>2nd grade case study students</td>
<td>August 2018 – December, 2018</td>
<td>What is the impact on students’ rate of improvement using a growth norm comparison when core reading and intervention language, practices, and routines are bridged on students receiving Tier 3 reading intervention?</td>
</tr>
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<td>ReadingCBM progress monitoring</td>
<td>2nd grade case study students</td>
<td>Weekly throughout the study</td>
<td>What is the impact on students’ rate of improvement using a growth norm comparison when core reading and intervention language, practices, and routines are bridged on students receiving Tier 3 reading intervention?</td>
</tr>
<tr>
<td>Fountas &amp; Pinnell Benchmark Assessment System – Instructional reading level, accuracy, fluency and miscue analysis</td>
<td>2nd grade case study students</td>
<td>August-September 2018 – December, 2018</td>
<td>How do struggling readers respond to instruction when the language, practices, and routines from reading intervention and core reading instruction are bridged?</td>
</tr>
<tr>
<td>Teacher Survey</td>
<td>All K-5 classroom teachers in the study school</td>
<td>October 2018</td>
<td>How equipped and supported do teachers feel in meeting the needs of struggling readers? How do teachers describe the effectiveness of the literacy specialist pushing into core reading instruction?</td>
</tr>
<tr>
<td>Research Notebook</td>
<td>Researcher observations of students’ access to core instruction and language, strategies, and routines used by teacher, conversations</td>
<td>August 2018 – May 2019</td>
<td>What are the key components to bridging core reading instruction and intervention?</td>
</tr>
<tr>
<td>Study Teacher Interview</td>
<td>Study Teacher</td>
<td>December 2018</td>
<td>How do struggling readers respond to instruction when the language, practices, and routines from reading intervention and core reading instruction are bridged? How do teachers describe the effectiveness of the literacy specialist pushing into core reading instruction? What are the key components to bridging core reading instruction and intervention?</td>
</tr>
</tbody>
</table>
Appendix B

Teacher Survey
https://goo.gl/forms/2Y46iW4RY1L1gjfg1

I am a(n) – this is NOT a required question
Primary teacher (kindergarten – 2nd grade) ____
Intermediate teacher (3rd – 5th grade) ___

*1. How frequently do you communicate or collaborate with the literacy specialist about your students’ who are receiving Tier 3 reading intervention?
   Daily_____ Weekly_____ Bi-weekly _____ Monthly____ Monthly___ Rarely/Never____

1a. Do you feel like that amount of time is sufficient? YES or NO

1b. If not, please share how often would be sufficient and for what length of time

1c. What type of information would be helpful to receive from the literacy specialist to support the work you do in your classroom with the student(s) receiving Tier 3 reading intervention?

1d. What type of information would you like to share with the literacy specialist that would positively impact the rate of the student’s progress?

*2. Has the literacy specialist ever participated in your literacy block (phonemic awareness, phonics, or reading? YES or NO

2a. If no, what possible benefits would you anticipate for the students receiving Tier 3 intervention if that was part of reading intervention?

2b. If no, what possible benefits would you anticipate for you, the classroom teacher, if that was part of reading intervention?

2c. If yes, how did the students benefit from having the literacy specialist in the literacy block? Please list.

2d. If yes, what were the benefits to you, the classroom teacher? Please list.

*3. I see my students who receive Tier 3 reading intervention transferring what they are learning in intervention to the classroom.
   Strongly disagree - Disagree –Neutral- Agree - Strongly agree
3a. Do you have any suggestions for increasing transfer from intervention to classroom performance?

*4. I understand the focus and research &/or theory of the intervention program my students are receiving in the intervention setting.
   Strongly disagree - Disagree - Neutral - Agree - Strongly agree

*5. I understand the ‘reading process’ and how children learn to read.
   Strongly disagree - Disagree - Neutral - Agree - Strongly agree

*6. I understand the unique needs of struggling readers.
   Strongly disagree - Disagree - Neutral - Agree - Strongly agree

*7. I feel equipped to meet the literacy needs of the struggling readers in my class.
   Strongly disagree - Disagree - Neutral - Agree - Strongly agree

*8. I feel supported in meeting the literacy needs of the struggling readers in my class.
   Strongly disagree - Disagree - Neutral - Agree - Strongly agree

*8a. If not, in what ways can the literacy specialist support you in meeting the needs of the struggling readers in your class?

9. Please share any additional information you would like the literacy specialist to know about the reading intervention program &/or process.
Appendix C

Bell Curve - Percentile, Growth, Colors Explained

**Percentile:** This score ranks individuals within a group on a scale of 1-99, with 50 being average. A percentile rank of 75 means the student scored better than 75 percent of the other students in his or her norm group, and 25 percent scored as well or better than your student.

**EduClimber Colors:** The colors in EduClimber are based on the student’s percentile rank for that particular assessment (e.g., Spring benchmark period- aReading). For instance, in aReading, the 50th percentile for a 3rd grade student in Spring is a score of 507. If a student earns 507 points, this would be color-coded as Green, because it falls at the 50th percentile and Green represents the 40th to 75th percentiles.

**Understanding Growth Percentiles:** Growth percentiles represent a student’s performance relative to other students in terms of the amount of growth they have made. Instead of the focus on a student’s score on any particular assessment, the growth percentile is derived from the difference between two scores. Research has found that Aggressive Growth is what it takes to close gaps.

**Definitions of Growth**

- **Aggressive Growth** - growing at a rate greater than 75% of same-grade peers
- **Typical Growth** - growing at a rate greater than 40% - 75% of same-grade peers
- **Modest growth** - growing at a rate greater than 15% to 39% of same-grade peers
- **Flat Growth** - growing at a rate < 15% of same-grade peers
<table>
<thead>
<tr>
<th></th>
<th>Fall Score</th>
<th>Percentile of Fall Score (what is color coded)</th>
<th>Spring Score</th>
<th>Percentile of Spring Score (what is color coded)</th>
<th>Difference in Fall to Spring</th>
<th>National Growth Percentile Fall – Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student A</td>
<td>488</td>
<td>18\textsuperscript{a} (Yellow)</td>
<td>510</td>
<td>36\textsuperscript{a} (Lime)</td>
<td>+22 points in raw score</td>
<td>79\textsuperscript{a} percentile</td>
</tr>
<tr>
<td>Student B</td>
<td>503</td>
<td>46\textsuperscript{a} (Green)</td>
<td>511</td>
<td>38\textsuperscript{a} (Lime)</td>
<td>+8 points in raw score</td>
<td>33\textsuperscript{a} percentile</td>
</tr>
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</table>

Both students ended the year with “Lime Green” scores, with Student B scoring slightly higher than Student A. However, Student A made more progress on the assessment between Fall to Spring. Specifically, the student grew more than 79 percent of students in that grade level nationally. Though Student B had a similar Spring score and also made progress, they grew as much as only 33 percent of students in that grade level.
Appendix D

Study Teacher Interview

Mid-study Interview

- Given that the focus of the intervention is phonemic awareness/phonics/decoding, what components of the core curriculum do you think could be bridged in order to increase students’ rate of improvement (strategies, language, routines, activities, etc.)?
- Are there components from the intervention that the students are receiving that could be bridged from intervention to classroom instruction in order to increase students’ rate of improvement?
- I was mainly observing in order to understand how the two instructional settings (core and reading intervention) could be bridged if the literacy specialist was able to push into a classroom to support teachers and students receiving Tier 3 intervention as part of Tier 3 reading intervention programing. How would you, the classroom teacher, describe what that should look like? What would you see? What would you hear? What would the teacher be doing? What would the literacy specialist be doing?

Post-study Interview

- What benefits to struggling readers did you see having the literacy specialist in the classroom during phonics and reading workshop?
- What changes, shifts, or additions did you make to your instruction from having the literacy specialist in your classroom?
- What changes, shifts, or modifications could the literacy specialist make to increase student’s receiving Tier 3 reading intervention rate of growth?
- The standardized data did not show aggressive growth. Look at the snapshot of student one and student two’s data. What conclusions could you draw, qualitatively and quantitatively, regarding their performance first semester?
- After analyzing the benchmarking results and reading grades, do you believe the intervention of bridging the two instruction settings’ language and activities was effective? Not effective?
- What do you hypothesize could have possibly changed the students’ rate of growth?
Appendix E

Fountas and Pinnell Assessment Summary Form

<table>
<thead>
<tr>
<th>Title</th>
<th>System 1 or 2</th>
<th>Oral</th>
<th>Retention</th>
<th>Accuracy</th>
<th>Comprehension</th>
<th>Independent</th>
<th>Instructional</th>
<th>Hard</th>
<th>Soft</th>
<th>Fluency</th>
<th>Rate</th>
<th>Writing About Reading</th>
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</table>

*Independent Level
Levels A-K: Highest level read with 95-100% accuracy and excellent or satisfactory comprehension.
Levels L-Z: Highest level read with 90-99% accuracy and excellent or satisfactory comprehension.

**Instructional Level
Levels A-K: Highest level read with 90-99% accuracy and excellent or satisfactory comprehension or 95-100% accuracy and limited comprehension.
Levels L-Z: Highest level read with 95-99% accuracy and excellent or satisfactory comprehension or 90-99% accuracy and limited comprehension.

***Hard Level
Levels A-K: Highest level read at which accuracy is below 90% with any level of comprehension.
Levels L-Z: Highest level read at which accuracy is below 90% with any level of comprehension.

Comprehension

<table>
<thead>
<tr>
<th>Levels A-K</th>
<th>Levels L-Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5 Unsatisfactory</td>
<td>0-4 Unsatisfactory</td>
</tr>
<tr>
<td>6-7 Excellent</td>
<td>9-10 Excellent</td>
</tr>
<tr>
<td>4 Limited</td>
<td>5-6 Limited</td>
</tr>
<tr>
<td>3 Satisfactory</td>
<td>7-8 Satisfactory</td>
</tr>
</tbody>
</table>

Behaviors and Understandings to Notice, Teach, and Support (See the Continuum of Literacy Learning)
Co-Authored Conclusion

The current academic trends in the United States, according to the National Assessment of Educational Progress (NAEP) and the Pew Research Center (Fact Tank, February 2017) show that U.S. students are outperformed on international measures in the areas of math, science, and reading. This national concern, coupled with witnessing the underperformance of their students, gave them pause to question what they could do to change the course for their students. The joint effort of the researchers was to create and implement innovative instructional practices that would accelerate student learning. The potential impact of their efforts, with persistence, could influence education at the highest level, nationally.

This research has had a positive impact on the authors’ respective schools and districts. Bouchard has shared his results with the district science coordinator in hopes of planning professional development around the use of crosscutting concepts in the science setting. In addition, he will be meeting with leadership to plan future science professional development and share his Critical Thinking First results with his staff.

Simmons has shared her findings with building and district level administration in hopes of initiating conversations to problem solve around the roles and responsibilities of literacy specialists. It is her hope that districts begin looking deeper into the challenges that underperforming students face and the impact that the system in which teachers and students work plays in their achievement. While there are many factors outside of a school or teacher’s control, there are many factors that are not. Simmons’ study reinforces the importance of the classroom teacher, quality core instruction, and collaboration between teachers. Simmons hypothesizes that learning can be accelerated
when literacy specialists and classroom teachers have the opportunity to work together in
the general education classroom in addition to pull-out intervention and have periodic
structured times to meet. Simmons plans to continue implementing this instructional
intervention if, and whenever possible, as well as sharing its potential to accelerate
struggling students’ learning. Her building principal has built in time for teachers and
instructional specialists to meet periodically next school year. She looks forward to
watching the impact this has on struggling readers’ rate of growth when the two have
time to intentionally and purposefully collaborate around the needs of struggling readers
in order to bridge the instructional gaps between the two environments. There are far-
reaching negative outcomes when students leave the school system with limited reading
abilities. She acknowledges that there is a small percentage of students who have
significant cognitive impairments which prevent them from reading at the same level as
their peers, however, it is her dream to eliminate, or significantly decrease this
debilitating effect.

Bouchard and Simmons believe their endeavor had value both in the present and
in the future for their students given the positive results of their studies. Bouchard found
that students increased their ability to critically think and were far more able to problems
solve with CTF program. His students were able to apply these skills outside of the
classroom and make better connections to the world around them. In addition, students
were more equipped to solve problems across content areas.

While the two students in Simmons’ case study did not show aggressive growth
on reading rate as anticipated, she uncovered potential reasons for their
underperformance and a strong desire of teachers and literacy specialists to collaborate in
order to support transfer between the two instructional settings. The results from Simmons’ study displayed potential for very positive effects for students, and teachers. Creating consistency between the two instructional settings impacts a student’s ability to transfer learning from one setting to another. The instructional intervention practice studied would not only positively affect a student’s academic growth, but her experience pushing into core instruction leads her to believe that there is a positive effect on how students view themselves as learners. The addition of shared classroom experiences between the student, classroom teacher, and literacy specialist would deepen the teacher (literacy specialist)/student relationship. Strong, positive student/teacher relationships not only impact a student’s overall academic performance, but their view of themselves as a learner.

Our studies showed that when innovative teaching practices are implemented with the goal of accelerating students learning, students are better able to transfer knowledge across content areas and into real life. The ability to transfer knowledge from one setting to another, think critically, and problem solve allows students to more easily acquire new skills making them far more marketable in the job force. Bouchard and Simmons’ use of innovative teaching practices gives them hope that when teachers are given the professional freedom to create research informed practices, all students will reach their full potential.