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This dissertation, directed and approved by the candidate's committee, has been accepted by the College of Graduate and Professional Studies of Abilene Christian University in partial fulfillment of the requirements for the degree

Doctor of Education in Organizational Leadership

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A Study of the Association of Teacher Efficacy and
Students' Achievement in a North Texas School District

A dissertation submitted in partial satisfaction
of the requirements for the degree of
Doctor of Education in Organizational Leadership

by

Ruth E. Schackmann

August 2021

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Abstract

The field of education places great importance on measurable student achievement and the role of teaching competencies for maximizing success. Whereas much focus has been given to professional development and improving teachers' skills, this quantitative study examined whether teachers' self-efficacy and judgment of their skills and capabilities were significantly associated with improving student achievement in third grade reading. This dissertation involved a study of teacher self-efficacy using a sample group of third grade English/Language Arts teachers from one Texas urban school district. Targeted teachers were invited to complete a valid and reliable teacher efficacy survey, the Tschannen-Moran and Woolfolk Hoy Teachers' Sense of Efficacy Scale. The results of each teacher's self-efficacy score were correlated with their students' reading scores on two assessments: the Measures of Academic Progress and the Fountas and Pinnell Oral Reading Assessment. The study results indicated there was not a statistically significant association between teacher self-efficacy and the reading scores of their students. The results were unexpected because the outcomes were different than those reported in the literature. The COVID-19 pandemic created challenges. One was that student reading scores were from the 2018–19 school year; the teacher self-efficacy scores were collected during 2020–21. The 2019–20 and 2020–21 school years were disrupted by the pandemic, and students were asked to complete the two assessments virtually from their homes with no supervision. Many students did not complete the assessments, including many minority and at-risk students. The research design did not allow an exploration of how teachers' overall emotional and professional feelings of efficacy may have been different because of the pandemic.

Keywords: general education, normed assessment, reading tests, standards-based assessment, students' academic growth, and teacher efficacy

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Chapter 1: Introduction

The Texas Education Agency (TEA) and the state legislature upgraded the state's accountability standards to an A-F accountability rating rather than a traditional achievement only model after a decade of limited student academic progress. Educators and administrators have used the new system by tracking both achievement performance and students' academic growth with monitoring and continuous measurement (TEA, 2019a). The TEA has used students' progress from one year to another in conjunction with other data to determine a school district's accountability rating. The TEA then has generated a score based on each school's classification (TEA, 2018c, 2019a, 2020c).

Administrators have wanted to create schools with high accountability scores as an indication that the students they serve received high quality education (Bird et al., 2013; TEA, 2020a, 2020b). Numerous newspapers and online resources have reported that communities are less sure of low-rated schools and more confident in schools with the best or improved accountability ratings; there was evidence that some families have withdrawn their children from low performing schools (Ayala, 2017; Piedad, 2018; Raise Your Hand Texas, 2020).

Because improving test results and higher accountability ratings has coincided with increased public trust, educators have worked to increase students' academic growth with better-prepared teachers, better-implemented instruction, and a community-shared vision (Nicolae, 2014; Tomlinson & Murphy, 2015). One method to reach these goals was to foster teacher efficacy because research has shown that confident teachers were critical to improving education (Bedir, 2015; Çaycı, 2011). A crucial component of shifting a district into a high-quality education system with a resulting high accountability rating required gaining insight into how effective teachers believed they were in the classroom.

Statement of the Problem

Based on current accountability results, efforts in curriculum building and pedagogy to improve instruction have not proven sufficient to ensure that every student achieved academic expectations (TEA, 2020). For one North Texas district, the B rating was important because student achievement had not progressed to an A rating despite continuous district efforts (Piedad, 2018; TEA, 2020a, 2020b, 2020c). The administrators' goal was to influence a learning environment of students' academic growth including supporting teacher efficacy as a valuable tool while working to improve students' academic growth (De Neve et al., 2015; Dixon et al., 2014; Goddard & Kim, 2018). This research was important to the administrators of this district because if the hypothesis that there is an association between high teachers' efficacy and reading fluency, teacher efficacy training could be provided (Bandura, 2006; Hattie, 2012, Tschannen-Moran & Woolfolk Hoy, 2001).

The district was rated by the TEA's accountability report as a B overall, with a B in *Student Achievement*, a B in *School Progress*, and a B in *Closing the Gaps* (TEA, 2020a, 2020b, 2020c). The report used Student Achievement to demonstrate how students performed in the annual end of the year test. School Progress was defined as the growth over time that students demonstrated compared to other demographically similar schools. How well the district served different populations determined the Closing the Gaps designation. Each component was important to the overall rating, but Student Achievement and School Progress made up 70% of the total rating (TEA, 2020a, 2020b, 2020c).

The *Meets Grade Level or Above* and *Masters Grade Level* sections of the Student Achievement section in elementary schools, particularly the third grade reading scores, were of particular importance to the rating. In the past two years, only 44% of the district's third grade students had performed in reading at grade level expectations or above (TEA, 2020c). Significant

to this research was the lack of growth between the “approaches” and “meets” sections, -3%, and 0% growth (TEA, 2020c). The state education agency marked 0% growth as a decrease in the accountability system, so the lack of growth was important. Table 1 presents reading scores for third grade students on the state assessment in the district that was be the site of the research study.

Table 1

STAAR Achievement for Grade 3 Reading Test

Grade 3 reading levels	2018	2019	Change
At Approaches Grade Level or Above	79%	76%	-3%
At Meets Grade Level or Above	44%	44%	0%
At Masters Grade Level	25%	27%	2%

Note. Adapted from TEA, Texas Academic Performance Report 2017–2018 (TEA, 2020a, 2020b, 2020c).

District administrators did not use the State of Texas Assessments of Academic Readiness (STAAR) tests previous to 2018 because the shift to the accountability system included new standards, new test parameters, and new reporting requirements (TEA, 2018a, 2019a). Because of the changes, educators did not compare scores from year to year before 2018 (TEA, 2019a).

Purpose Statement

The purpose of this study was to determine whether there was a statistically significant association between the range of teachers’ self-reported efficacy and third grade students’ reading scores on two reading tests: Primary Reading Measures of Academic Progress (MAP) and the Fountas & Pinnell Oral Reading Assessment reading scores. To determine whether teacher efficacy or any other factors affected students’ scores was not the purpose of this study.

Though two events may occur close to each other in time, this does not imply that either event caused or affected the other (George Mason University, 2020).

Research Questions

- RQ1: Was there a statistically significant association between the scores of third grade teachers in the high range on Tschannen-Moran and Woolfolk Hoy Teachers' Sense of Efficacy Scale (TSES), and the achievement of their third grade students' reading scores on the Primary Reading Measures of Academic Progress (MAP) assessment?
 - H_a: There would be a statistically significant association between the teachers' score on the TSES and the third grade students' Primary Reading MAP assessment achievement scores.
 - H₀: There would not be a statistically significant association between the third grade teachers' scores on the TSES and the third grade students' Primary Reading MAP assessment achievement.
- RQ2: Was there a statistically significant association between the scores of third grade teachers in the high range on the Tschannen-Moran and Woolfolk Hoy Teachers' Sense of Efficacy Scale (TSES) and their achievement third grade students on the Fountas & Pinnell Oral Reading assessment?
 - H_a: There would be a statistically significant association between the teachers' score on the TSES and third grade students' reading assessment achievement scores on the Fountas & Pinnell Oral Reading assessment.
 - H₀: There would not be a statistically significant association between the teachers' scores on the TSES self-efficacy survey and the third grade students' Fountas & Pinnell Oral Reading assessment achievement.

- RQ3: Was there a statistically significant association between the scores of third grade teachers in the low range on Tschannen-Moran and Woolfolk Hoy Teachers' Sense of Efficacy Scale (TSES), and the achievement of their third grade students' reading scores on the Primary Reading Measures of Academic Progress (MAP) assessment?
 - H_a: There would be a statistically significant association between the teachers' scores on the TSES and the third grade students' Primary Reading MAP reading assessment achievement scores.
 - H₀: There would not be a statistically significant association between the third grade teachers' scores on the TSES self-efficacy survey and the third grade students' Primary Reading MAP reading assessment achievement.
- RQ4: Was there a statistically significant association between the scores of third grade teachers in the low range on Tschannen-Moran and Woolfolk Hoy Teachers' Sense of Efficacy Scale (TSES) and their achievement third grade students on the Fountas & Pinnell Oral Reading assessment?
 - H_a: There would be a statistically significant association between the teachers' score on the TSES and third grade students' reading assessment achievement scores on the Fountas & Pinnell Oral Reading assessment.
 - H₀: There would not be a statistically significant association between the teachers' scores on the TSES self-efficacy survey and the third grade students' Fountas & Pinnell Oral Reading assessment achievement.

Definition of Key Terms

The following terms are used throughout the study and will be relevant to the reader's understanding of the topic.

Accountability. For schools to meet accountability standards, they have been required to adhere to a set of federal, state, and local policies that mandated education systems to support assessments and show progress. Accountability has included the schools' ability to track and compare students' achievement from year-to-year (Parker Boudett et al., 2013). Accountability systems have been required to have three components:

- clearly defined and well-articulated standards,
- accurate, reliable, consistent measurement tools, and
- workable plans to use for schools, and students when improvement is needed (Technology.com, 2019).

Achievement (student achievement). Student achievement has been defined as the amount of educational material or content students learn or master during a defined period (Edglossary, 2019a; Parker Boudett et al., 2013). The time has been determined to be a school year or the length of an academic course. Teachers have measured achievement with criteria-referenced testing tools (Parker Boudett et al., 2013).

Fountas & Pinnell oral reading assessments. Teachers have used the Fountas & Pinnell Benchmark Assessment System (BAS) to document students' normed reading levels (Heinemann Publishing, 2020d). Educators monitored students' academic growth throughout the year and inputted the data into the Online Data Management System (ODMS) for easy accesses and multiple data layers (*F&P Text Level Gradient*, 2020; Heinemann Publishing, 2020a, 2020b, 2020c)

General education. General education has been described as a relative classification of study or academic courses for all students who do not have either a special education or advanced or gifted and talented designation (Merriam-Webster, 2020). Most students have been labeled within the general education category, and they also may have been classified into other

educational categories.

Homogeneity. Boone (2016) defined homogeneity of a tested trait as the combination of a test question's range of difficulty and the success of student's responses to that question. These were the only two elements of an internally valid measure (Boone, 2016). Using Rasch Units instead of adding demographically weighted measures in the response scale, the Measures of Academic Progress (MAP) test planners used homogeneity and counted every student equally. As a valid measure of students over time, MAP was more useful to this study.

Interventions. Interventions were planned instructional strategies teachers directed toward meeting the needs of a struggling student. Educators monitored the students' progress to support their academic growth and development (Lee, 2019).

Measures of academic progress (MAP). MAP was a computer-adaptive assessment that reported students' ability to understand and use specific skills after instruction. The resulting reports identified areas of students' strengths or needs, how students processed information, and what skills students were ready to learn (Northwest Evaluation Association [NWEA], 2016, 2017c; Wu, 2017). By using national norms tables, student performance was scored by Rasch units which reflected their mastery of skills throughout an instructional calendar year. Each question's difficulty registered incremental growth rather than the ability of a subject or skills (NWEA, 2015b).

Norm-referenced tests (normed / nationally normed). Normed tests have been designed to measure test takers on a relative scale, in relationship to the goal, task, or learning tested, and how others taking the same test performed (Parker Boudett et al., 2013). They were not designed to measure if a student has accomplished or mastered a specific standard or criteria (Edglossary, 2019a).

Professional learning community (PLC). A professional learning community has been

described as group of educators who understand the criteria students must master and agree on the methods and expected outcomes. Through collaboration, the PLC has demonstrated ongoing efforts to assess, adjust, and improve instruction for students' benefit (DuFour, 2015).

Rasch units. Boone (2016) contended that unlike a standards-based accountability raw scores on a scale with unknown spacing, the normed Rasch Unit based tests reflected homogeneity, the combination of the difficulty of a test question, and the student's response to that question. The range of answers was scored on a scale, 0–100. Researchers have used the Rasch scale to compare unidirectionality students' scores to their previous scores, so student's scores could be measured over time consistently (Boone, 2016). Boone noted that Rasch scores recorded how much of the trait has been mastered since the raw score is the sufficient statistic for the Rasch measure (Boone, 2016).

Standardized test(s). Standardized exams have been designed so that all test takers answered the same questions or groups of questions which teachers administered in some "standardized" format. The exams have produced understandable results and have provided scores in a consistent, reliable manner so that the test taker's relative performance may be assessed (Edglossary, 2019b).

Students' academic growth. Evidence of positive progress toward students' achievement goals in measured steps has been used to document students' academic growth. Students might or might not have fulfilled achievement goals; however, the evidence documented improvement over time (Marzano et al., 2012; Marzano et al., 2017; NWEA, 2015a, 2018b).

Teacher efficacy. Educators have defined efficacy as a teacher's confidence to handle personal and professional challenges (Tschannen-Moran & Woolfolk Hoy, 2001). Whereas this concept was based on an individual's conviction, efficacy relied on teachers spending substantial

effort pursuing their goals and persisting in the face of adversity, and their perception of their own instructional effectiveness. (Woolfolk Hoy, 2020). Researchers have proven efficacy as a factor in increasing students' academic growth scores (Hattie, 2012).

Tschannen-Moran and Woolfolk Hoy Teachers' Sense of Efficacy Scale (TSES). The TSES was created by a cadre of researchers and educators because they thought they could make an adaptive, valid, and reliable teacher efficacy survey. Tschannen-Moran and Woolfolk Hoy (2001) reviewed eight previous surveys and the resulting studies to find the questions with the strongest correlation to environmental factors within teachers' locus of control and resulting confidence. They were successful and researchers have used the instrument to predict an association between teachers' confidence and students' academic growth (Tschannen-Moran & Woolfolk Hoy, 2001). However, Lau (2015) wrote that "correlational studies are similar to comparative studies in that they take on an objectivist view where the variables can be defined, measured, and analyzed for the presence of hypothesized relations" (p. 1), and researchers did not make any assumption of causality.

Chapter 2: Literature Review

In 2018, the Texas legislature recognized the lack of students' academic improvement and implemented a new accountability standard, the A–F rating (TEA, 2019a). To meet the new accountability system's expectations, educators counted incremental growth as significant as achievement on the yearly test, STAAR score (TEA, 2018c, 2019a, 2020c). The agency published results that showed that fewer than 75% of students read on-grade level (TEA, 2020c). Districts worked on various ways to meet student needs while also monitoring growth within the new accountability system (TEA, 2018c). Because there was an association between the efficacious teacher's work and their instructional systems supports in the literature, districts produced professional development that were designed to increase teacher confidence. These efforts were useful for districts that intended to improve instructional implementation (Bandura, 2006; Tschannen-Moran & Woolfolk Hoy, 2001) and supported districts' attempts to improved students' reading fluency (Tschannen-Moran & Johnson, 2011).

Texas school leaders examined the growing achievement problem that faced their students by reviewing educational literature regarding improving student achievement and growth. Researchers published an increasing number of studies, reports, and data that a prolonged lack of success among general education students was a significant concern (Ayala, 2017; Chávez et al., 2018). Specifically, research studies about teacher self-efficacy were critical elements schools used to develop professional development to improve instruction and learning. The goal was to meet each student's needs and implement interventions that improve assessment results (Kafele, 2016; Terada, 2016; Tomlinson, 2017a, 2017b). Education literature researchers indicated that efforts to assess and improve teachers' self-efficacy was important in improving students' academic growth (Dixon et al., 2014).

Researchers reported that teachers who felt most confident made significant instructional

improvements, maintained ongoing monitoring, supported accountability, and built public confidence (Çaycı, 2011; De Neve et al., 2015; Dixon et al., 2014). Teachers who felt less capable did not implement effective instructional practices to intervene for at risk students (Dubas & Toledo, 2016; Kafele, 2016; Saunders, 2013).

Literature Search Methods

Public-school administrators and teachers have wanted to provide students with excellent educations, but they faced challenges overcoming students' low academic performance. The goal of the literature review was to explain what researchers have determined about teacher efficacy and the associated with students' academic growth (Saunders, 2013). I had access to the library resources at Abilene Christian University including rigorous, peer-reviewed research and results from a wide variety of journals and education studies. Google Scholar online extension articles were used to extend research as needed.

The following keywords were used to find information for the literature review:
accountability, diversity, fluency, instructional interventions, best practices, curriculum and technology strategies, general education, growth versus targeted achievement, individualized instruction, growth goals, leadership and differentiated instruction, normed assessment, personalization, reading tests, standards-based instruction and assessment, students' academic growth, and teacher efficacy.

Literature from educators, researchers, and writers explained transformative education elements, such as collaboration and shared goals when the campus creates intervention systems, were essential to improving instruction (Herrmann, 2019). Many studies documented results associating teacher efficacy with increased differentiation (Koehler, 2010) and other instructional interventions, so the search was expanded to include ideas such as effectiveness and equity for all levels of social, economic, and learning development (Dixon et al., 2014; Kafele, 2016;

Marzano et al., 2017).

Conceptual Framework

My formulation of a theoretical framework began with Senge (1990), the author of *The Fifth Discipline*. He wrote about four elements and one metacognitive strategy that leaders used to make significant organizational changes. Later, he revised his text to include the work of educators in *The Fifth Discipline. The Art and Practice of the Learning Organization* (Senge, 2006). Throughout education literature, researchers echoed his core ideas and developed applications that guided educators' efforts to improve instruction.

In his seminal work, Senge (1990) explained that leaders must deepen an organization's vision, increase their sphere of influence, build a shared vision, and dialogue with team members to ignite positive thinking. Once they put these components in place, they were able to integrate *systems-thinking* and make all the elements flow together (Senge, 1990). He explained this complex idea with real-world examples of other authors' and researchers' work throughout education literature, for instance, systems-thinking connected to the work of prominent education writers, Dixon et al. (2014), Tomlinson and Moon (2013), and Hattie (2012). They wrote about a teachers' classroom influence and perseverance to face challenges and the vision that lead to an organization's improvement.

Senge (1990) wrote about each member's duty to self-discipline, to focus ideas, to develop patience, and to see reality objectively. Senge (1990) believed that organizations understood their world place and affect change when they challenged their "ingrained assumptions and generalizations" (p. 2). Hattie (2012) wrote that educators must realize that teachers are among the most potent educational influences. Hattie (2012) believed that educators' perceptions and actions matter because educators were responsible for creating change. Their intentional actions improve students' opportunities. Rodriguez (2013) equated

teachers' perceptions of their impact and their efficacy as valuable to their classroom effect in a slightly different direction when she wrote that a teacher's competence impacted their qualification to teach.

Tomlinson and Moon (2013) wrote that schools needed to transform opportunities for underrepresented students by using their influence to produce high-quality schools with administrators who understood and supported teachers who faced challenges in every context. In the past few years, academic diversity has increased dramatically, and heterogeneous grouping practices have affected teaching and learning (Gomez-Zepeda et al., 2017). However, equitable educational opportunities are integral to democratic ideals. Equitable education reflects Senge's (1990) writings about the role of shared vision and how by guiding others, everyone committed to substantial change.

To Senge (1990), team building and the capacity of members to "think together" was vital to the growth of the vision and critical to overcoming the challenges of organizational change (p. 2). Teachers must be aware of what each student knew and grasped before they taught content (Hattie, 2012). Dixon et al. (2014) wrote that teachers were responsible for every student's optimum educational experiences. Teachers differentiate and respond to students' needs by understanding the challenges students face (Dixon et al., 2014). They wrote that schools benefit students and the community when administrators support teachers' growth in knowledge and skills and provide a place and method for their talents to flourish. As a result, teachers persevere, face challenges, commit to taking action, and follow through with educating each child (Dixon et al., 2014).

In a 2006 update, Senge wrote *The Fifth Discipline: The Art and Practice of the Learning Organization*. He added a focus for educators and explained how school leaders used critical- and systems-thinking to analyze how the transformational elements interacted with one another

to produce improvements in the complex system. Educators interpreted information and drew conclusions based on their best analysis. They reflected on their experiences and adjusted their goals in the process. Educators used critical- and systems-thinking to analyze how the transformational elements interacted with one another to produce improvements in the complex system. They identified and clarified various points of view which led to solving problems in a system. The systems effective teachers used are multidimensional (Senge, 2006). When students joined a class, effective teachers create egalitarian educations that moved students through learning, assessing, retesting, monitoring, and provide challenges and successes (Senge, 2006).

In the updated text, Senge (2006) contended that educational leaders who desired organizational change integrated systems-thinking in schools and implemented management components of *The Fifth Discipline* (Senge, 1990). They (a) clarified their vision, (b) saw things realistically, (c) acted, (d) shared an idea of the future with stakeholders, and (e) fostered authentic dialogue while using systems that align all the parts into a workable whole. Other educators, including Siry et al. (2016), likened their efforts to Senge's open dialogue with teachers and affected every student's education profoundly. They reported the result of their efforts as greatly beneficial to educational stakeholders, so these examples highlighted teachers' responsibility and capacity to persevere, challenge, and influence every aspect of education (Kafele, 2016). With intentionality, leaders promoted the best instructional environment for students and educators (Senge, 2006). Finally, they identified and qualified teacher efficacy as a potent element between students, teachers, and the community. Their research associated how confident teachers feel and the effect educators' attitudes has on students' academic outcomes (Woolfolk Hoy, 2001).

Personal Mastery

Senge (2006) wrote that personal mastery is vital to organizational change; change started

when each individual applied self-discipline and dedication. Hattie (2012) wrote that teachers implemented personal and professional discipline and perseverance, critical elements for teachers who mastered their personal growth to overcome the instructional challenges students faced. Dixon et al. (2014) connected to Senge's (2006) ideas when they wrote that when teachers understood how much diversity and mixed ability classes affect education. Educators understood the challenges, changed their actions, and developed new best practices (Herrmann, 2019; Kafele, 2016; Marzano et al., 2017). As the basis of teacher instructional efficacy, educational writers connected teachers' best practices to a community commitment used consistently (Senge, 2006).

Educators who transformed learning environments acted on creative ideas and implemented instructional developments (Ball & Forzani, 2013; Shanahan, 2013). They analyzed static mental models, refined old ideas, and elaborated new and worthwhile ideas (Senge, 2006). They were open and responsive to unique and diverse input and incorporate ideas from the group (Herrmann, 2019). They asked for and implemented feedback and used their experience and failures to build long-term innovation (Herrmann, 2019). They changed incrementally and radically to improve and maximize their efforts (Ball & Forzani, 2013; Shanahan, 2013). Rattan et al. (2015) wrote, teachers' efforts "reliably benefit students and therefore merit greater attention" (p. 721). The collective research on teacher efficacy provided evidence that educators' mental constructs matter (Saunders, 2013). When an educator had a closed mindset about students' abilities, intelligence, and willingness to work, they missed the opportunity to affect that student positively (Rattan et al., 2015). However, if teachers comprehended and separated their rigidity from the challenges they faced, they thought positively and looked for new outcomes despite any adverse circumstances (Bandura, 2006; Rattan et al., 2015).

Mental Models

Senge (2006) wrote that educational leadership recognized that mental models were important in organizational change. When they faced with how well their actions met and overcame challenges, they discovered that rigid perceptions affected the outcome of circumstances. Hattie (2012) echoed that teachers' and students' mind frames determined their capacity to grow and develop. Bandura's Teacher Self-Efficacy Scale (TSES; 1993) and Tschannen-Moran and Woolfolk Hoy TSES (2006) asked teachers to gauge their belief about whether they can improve students' educational opportunities. By addressing teachers' perceptions, mind frames, and mental models, researchers believed change was necessary and possible (Altintas & Ozdemir, 2015; Saunders, 2013). Saunders added that students' growth mindset had a positive relationship to their reading fluency, so teachers who understand the implication of motivating students can affect students' reading growth might have a positive association with their growth. Teacher efficacy was associated with improved reading scores.

Teacher Efficacy Measure

While teacher efficacy was proven to be effective in supporting students academically, it had been difficult for researchers to find a valid, replicable instrument to measure teachers' perceptions of how effective they were in students' education. Bandura created his Teacher Self-Efficacy Instrument in the early 1980s; however, no validity or reliability results were available to researchers (Tschannen-Moran & Woolfolk Hoy, 2001).

To construct a valid version of Bandura's TSES, Woolfolk Hoy and Burke Sperob (2005) separated the professional attributes from individual attributes and investigated the instrument in three phases. They determined the factors of teacher self-efficacy and the relationship to Bandura's construct. They did a multi-train-multi-method analysis to determine if different sources were different from other constructs. They observed high- and low-efficacy teachers and

their classroom behaviors (Woolfolk Hoy & Burke Sperob, 2005). First, the researchers reported by using the Statistical Package of the Social Sciences (SPSS) factor solution and principal factoring (Field, 2013; Woolfolk Hoy & Burke Sperob, 2005). They determined that the individual items should be included in the factor structure. Second, they used trait tests for teacher efficacy, verbal ability, and flexibility and discriminated teacher efficacy from other constructs (Woolfolk Hoy & Burke Sperob, 2005). Third, they selected teachers with high and low personal efficacy and teacher efficacy and observed the teachers interacting with students. When students refused or failed to respond with correct answers, teachers who persisted were able to overcome students' hesitation or reteach missing skills. The researchers determined that the results of the three investigations validated Bandura's TSES. They found the significance of a teacher's belief that their interventions and innovations affected students' learning and mattered (Woolfolk Hoy & Burke Sperob, 2005).

Tschannen-Moran and Woolfolk Hoy (2001) started their research with the premise that research into teacher-efficacy scales had not been aligned with validity standards. They created the Ohio State Teacher Self-Efficacy Scale (OSTES) and tested it for reliability and validity. The research team started with the Bandura TSES and through three studies reduced the instrument items to discover which statements teachers felt they affected most (Tschannen-Moran & Woolfolk Hoy, 2001). The items with less-favorable outcomes were discarded until the instrument was 18-items long. They reported that the shorter instrument was useful in determining novice, experienced, and master teachers' teacher efficacy. In a later study, Woolfolk Hoy and Burke Sperob wrote, "in the current study, based on the average score for the entire 30-item scale, the alpha coefficients of reliability were 0.94, 0.95, and 0.92 across the three administrations. Reliability was 0.94" (2005, p. 7).

Tschannen-Moran and Woolfolk Hoy Teachers' Sense of Efficacy Scale (TSES)

Tschannen-Moran and Woolfolk Hoy (2001) published their study into constructing and validating a survey to measure teachers' self-efficacy. They stated that because many teacher efficacy surveys had significant measurement problems, they created a new, adaptive, and dynamic TSES to measure how confident teachers felt handling the challenges most teachers face. Tschannen-Moran and Woolfolk Hoy (2001) measured how well teachers thought they would do in the future with their adaptive and comprehensive measurement tool.

Tschannen-Moran and Woolfolk Hoy (2001) argued that researchers in the early 1970s and 1980s were stuck with two-factor teacher efficacy surveys. The first factor was how much influence teachers felt they had over external environmental factors, such as students' home environments or their family's poverty levels. The influence of these outside factors was compared to the influence of second-factor elements teachers controlled. For example, they explained how teachers demonstrated inner confidence in their ability to put in work and effort toward mastering their instructional craft or innovating their teaching discipline. It was significant when Tschannen-Moran and Woolfolk Hoy (2001) reported that teacher efficacy definitions vary by the researchers they studied. They wrote that to put the studies they were sharing on an equal footing they adopted the concept that two elements would be measured: what any teacher did versus what outcome one teacher was confident to accomplish.

Tschannen-Moran and Woolfolk Hoy (2001) set up three studies to formulate a dynamic, adaptive, comprehensive measure of teacher efficacy. The teacher efficacy instruments they had access to had overlapping constructs, but some were too discipline-specific or far too general for teaching specific disciplines. Tschannen-Moran and Woolfolk Hoy (2001) set up a conference of teachers, researchers, and graduate students to talk about the instrument and the resulting data. In the first study, they found the same two-factor structure.

After creating TSES, Tschannen-Moran and Woolfolk Hoy (2001) had created a long and short instrument, 24 and 12 items respectively that were a reasonable length and useful tools. They wrote and reformulated a broad range of questions about generally applicable teaching practices, but the resulting instrument was not too specific to render it useless. The reliability was 0.94 for the long instrument and 0.90 for the short form.

The analysis of various teacher efficacy instruments was broad and unbiased. Tschannen-Moran and Woolfolk Hoy (2001) examined eight survey instruments dated back to the mid-1970s to the early 2000s. They reported each instrument, constructs, and validity fairly. They explained the theories behind each instrument. For example, Guskey (2020) used the attribution theory and four factors for success and failure. There was a strong correlation (0.72–0.81) between the teacher assuming responsibility and their perceived efficacy. Bandura's (1993) TSES was based on social cognitive theory and the "beliefs in one's capacity to organize and execute the course of action required to produce given attainment" (p. 3).

The strength of these studies was that they sampled a wide variety of teacher efficacy instruments. Tschannen-Moran and Woolfolk Hoy (2001) used a broad range of theories to test the survey constructs, and they reported the results. When the OSTES was proven valid, they had an instrument that was not too broad nor too narrow, so it was useful to measure teachers' confidence as they face personal and generalized teaching situations.

The studies showed none of the weaknesses that researchers had associated with other teacher efficacy studies because the educators found correlations in the reliability and validity values. Tschannen-Moran and Woolfolk Hoy (2001) minimized their bias by reporting the construction and outcomes of teacher efficacy surveys and studies fairly. They followed study protocols for the three levels of investigation they used to validate their instrument. An advantage of this correlation study was that a large amount of information was collected in a

reasonable amount of time for all participants; however, no manipulation of variables occurred as would be expected in experimental research (Form Plus Blog, 2020). In this study, the TSES was used to determine that there was an association between teachers' efficacy surveys and their students' scores on the Primary Reading MAP assessment and the Fountas & Pinnell Oral Reading Assessments. Tschannen-Moran and Johnson (2011) wrote that for literacy instruction the socio-economic situation of struggling students was not related to their fluency scores. Any association was useful for this project but did not indicate causality.

Master Teachers Use Systems-Thinking

Rodriquez (2013) wrote that teachers' perspective was the "most important lens into the classroom" because master teachers (most efficient) recognized their perception as unique (p. 77). They used their understanding and insight to leverage teachers' innovations to shift learner's classroom system to the students' advantages. They thought about their view and their practice as necessary and practical.

By using systems-thinking, teachers saw learning as complex and systematic rather than linear time-constricted progression. By juggling multiple elements of differentiation and innovation, master teachers used systems-thinking to be responsive and dynamic (Rodriquez, 2013). Educators acknowledged all elements and managed the effect these influences have. Master teachers took it personally that they understood, adapted, and changed (Hattie, 2012; Rodriquez, 2013). For example, Rodriquez (2013) argued that if leaders created and organized teacher training to include systems-thinking in professional development teachers understood how important they were to the learning system. The teacher-centric view was like Hattie's (2012) idea that teachers affected all the classroom's educational elements.

Rodriquez (2013) interviewed 20 master teachers and published excerpts from those interviews. She tied students' improved outcomes to the essential points, skills and

organizational techniques, the teachers used to manage dynamic challenges. No one method was better than another, but Rodriquez pointed out that teachers responded to students on the fly by implementing systems wherein they accepted students' best responses and made tactical decisions to move positively.

An example of a master teacher using systems-thinking was Caitlin, who trusted her experience and wisdom about students as she taught them (Rodriquez, 2013). She believed her judgments were correct and acted accordingly. Another example was Bob, who pushed his students to give emotional responses, but he needed to do more (Rodriquez, 2013). Though Bob's method might not work for every teacher, Rodriquez (2013) wrote that these students responded because they thought he had their best interests at the core of his teaching. Bob reported that he was an excellent teacher because students overcame their hesitancy with his help and encouragement, and they performed higher than ever.

Rodriquez (2013) used every example to substantiate her claims that master teachers were systems-thinkers who use their tools and situations to help every student. Master teachers developed emotional intelligence skills (Rodriquez, 2013). They leveraged these skills and responded to learners with sustainable actions by making decisions, following through, and adapting. Rodriquez (2013) analyzed the results of her research as supporting the interaction of teachers' efforts and the development of systems-thinking. She wrote that teachers responded to learners. Instead of following a linear progression, systems-thinkers responded to learners' choices, processed the situations, and used their skills to leverage the system to be the most efficient.

Rodriquez (2013) explained that public school was a defined system that educators observed, monitored, and engineered to have predictable results. She outlined the history of education reform and how educators used systems-thinking to discover the link between teachers

and students and how leaders implemented a system-wide change and innovated their processes to meet students' needs. Rodriguez strengthened her argument by outlining the attributes teachers saw and understood their responses to learners. In her text, she used master teacher testimonies to connect her systems-thinking examples to personal stories that validated the core skills of teaching.

Any bias Rodriguez exhibited was in her treatment of the most popular education directives that used linear perspectives instead of systems-thinking. For example, end of course exams, teacher-centric lecture lesson plans, and unwillingness to shift direction were examples of linear perspective. She saw systems-thinking as more responsive because not only should teachers adapt and change, but learners can also accept the information, process it, and use it to fulfill their needs. This information addressed teacher efficacy because master teachers saw problems, understood the components, and used their systems-thinking to fix them. They reorganized and reapplied lessons based on learner feedback to the point that they pushed students past their habitual responses to affirmative action. She believed that teachers processed information and looked for outcomes that affected students' learning.

Goals and Standards

Communication is paramount to transform an educational setting. Educators articulate their vision and experiences in various contexts and judge how well the stakeholders receive their message (Kafele, 2016). The current educational landscape focuses on goals and standards as the expected accountability minimums (TEA, 2018c). Legislators, community leaders, parents, and the public set minimum expectations for national and state standards, like No Child Left Behind (NCLB), Every Students Succeeds Act (ESSA), and the Texas Essential Knowledge and Skills (TEKS) state standards (Ayala, 2017; ESSA, 2019; Klein, 2015; TEA, 2015, 2019b). To help students understand what the community expects students to master, educators used

goals and standards to guide typical lesson plan instruction. In some lessons, teachers labeled learning objectives as direct instruction opportunities and shared these expectations with students (Kafele, 2016).

Goals and Teacher Efficacy

To improve teacher efficacy, educators set goals to find measurable growth and results, but standards were insufficient to provide professional development discourse. Teachers' roles shifted substantially in differentiated instruction because the focus was on students' abilities, not on teachers' professional identity (Barni et al., 2019). However, to improve teacher efficacy, researchers suggested that teachers review their teaching practices as a differentiation component to find and utilize different instructional strategies to equalize opportunities and participation for special education and gifted students (Kafele, 2016; Lourenco et al., 2015; Marzano et al., 2017).

Multiple studies reported that teachers used different teaching strategies to create egalitarian education systems that move students through learning, assessing, retesting, monitoring, and provide challenges and successes. Effective teachers implement systems that were multidimensional and promoted inclusion. For instance, researchers proved that gifted students benefited from singular attention (Levent, 2011; Levy, 2008). However, to cover the full range of increasing diversity, teachers systematized differentiations to manage a complicated process with nearly endless options (Coubergs et al., 2017; Valiandes, 2015).

Teachers tried to improve curriculum efficiency and aligned the proper implementation of planned lessons, but not every educator was a trained, efficient teacher (Lourenco et al., 2015). The reported benefits include identifying every learner level, individualizing with differentiation, extending opportunities to every level of learner, and making school a supportive environment (Rytivaara & Vehkakoski, 2015).

Historically, education adapted to acute conditions. Researchers included the role of

teacher efficacy in their efforts to improve students' opportunities to learn and grow (Hattie, 2012). Teachers built confidence in their instruction when they had clear intentions and high expectations, engaged in feedback, and took time for reflection. Teachers provided an environment where at-risk students felt supported and safe by planning routines, clear tasks, and engaging content (Kafele, 2016; Marzano et al., 2017). Teachers who believed they influenced every student's education changed the learning environment (Hattie, 2012). For example, for students whose reading fluency scores stagnated or regressed, teachers monitored students' progress and found workable solutions to improve instruction. Tschannen-Moran and Johnson (2011) wrote that for literacy instruction the socio-economic situation of struggling students was not related to their fluency scores. While no one foresaw every complexity, effective teachers designed systems that look from an objective goal-focused vantage point, ask questions, pooled teams' experience, and looked for complex solutions from fresh perspectives.

Personal Example of Teacher Efficacy

Hamman (2014) wrote a dissertation about her South African classroom, and the research aligned with similar differentiated instruction educational studies. She noticed the increasing school diversity increased the gap between what students knew and the expectations of mastery. Using differentiation, she adjusted the curriculum to meet the variety of students' needs.

Two important findings in her research were (a) her efficacy meeting the challenges of differentiated classrooms and (b) her students' benefit as a result. First, the writer referred to her case study as "my class," the work was "my teaching practice," and "my students." She saw her actions as valuable and productive. Her first-hand knowledge of the research supported teacher efficacy research. Second, the study she reported added to pedagogical literature because she used ethical research practices. When she recorded results to reflect that students' state achievement scores improved and showed growth, she protected students' names by substituting

a personal information code. Hamman's (2014) dissertation was an example of differentiation used effectively and increased teacher self-efficacy. Her students showed growth, and she increased self-efficacy because her students understood what they needed, she saw their needs met, and she felt better about what they accomplished.

Effective Teachers Build Students' Metacognitive Understanding

Researchers associated differentiation and increasing students' understanding of the students' academic success. Kafele (2016) referred to the students as gaining control of the information throughout instruction. One study written by Dunlosky et al. (2013) reported that the information students got about how they learned and what significance their efforts made in how well they learned and maintained the information was statistically significant to their academic development. Students who chose the method they used to study based on how well it helped them had higher scores for retention and showed a more exceptional ability to use the information they had learned after the initial assessment.

Differentiation: The Ethical Choice

Individualizing instruction is an educational pedagogy that engages students and increases student growth and achievement by increasing personal success (Koehler, 2010; Lawrence-Brown & Sapon-Shevin, 2015). Differentiation began with an aligned curriculum and a calendar for assessments to gauge students' mastery (Wiggins & McTighe, 2012). Researchers wrote that accommodations and best practices met all students' needs (Kafele, 2016; Marzano et al., 2017). Hattie (2012) wrote,

Teachers need to be aware of what every student in their class was thinking and what they know, be able to construct meaning and meaningful experiences in light of this knowledge of the students and have proficient knowledge and understanding of their content so that they can provide meaningful and appropriate feedback such that each

student moves progressively through the curriculum levels. (p. 22)

Because effective teachers implemented these accommodations, students practiced acquired skills and learned new material with support from educators and peers (Ready, 2013; Wiggins & McTighe, 2012). Students use their time and effort in a low-affective environment; they take risks, fail, learn, and grow because they feel safe. Researchers reported increased students' growth after these efforts (Ready, 2013; Wiggins & McTighe, 2012).

To provide what students required to succeed, knowledgeable teachers used critical instructional components and resolved the gaps made by increasing academic diversity in schools (Koehler, 2010). The researchers reported that students had many reasons for being further from the expected academic skills of mid-line general education, such as poverty, higher than average mobility, unrealized potential, undiagnosed learning disabilities, and the lack of parental education (ESSA, 2018; Saunders, 2013; TEA, 2019b). When teachers participated in interventions, their students enjoyed more significant success despite their socio-economic statuses, parents' education backgrounds, and other issues (Saunders, 2013; Valiandes, 2015). For at-risk students, researchers and educators have studied the causes of lower-than-expected reading fluency and how educators can affect reading instruction (Saunders, 2013). Literature is available for researchers and educators regarding the best practices for teaching reading instruction that they can use to address the myriad of reading difficulties (Roskos & Neuman, 2014; Valiandes, 2015). Saunders (2013) addressed how teacher efficacy and challenging fixed mindsets can affect students' motivation. Valiandes (2015) wrote that effective teachers who implemented differentiated instruction "can lead to equal opportunities for improvement" and "the optimization of the quality and effectiveness of teaching" (p. 1). While effective teachers have a strong effect on students' learning, this researcher's project is measuring teacher efficacy, teachers' belief that they impact students' outcomes.

In some schools, teachers used texts like the *Teach Like a Champion* classroom management system to build cultures of mutual respect and equitable treatment of all students (Lemov, 2015). For some districts, new teacher training, administrators gave every novice teacher the book, *The Classroom Management Book: The Effective Teacher* (Wong et al., 2014), and they paired instructional direction from a master-teacher or an instructional coach to be a hands-on, experienced help (Wong et al., 2014). Rather than let teachers feel overwhelmed if they tried to apply all the ideas, administrators encouraged teachers to try various methods, reevaluate, and reapply what worked well (Wong et al., 2014). With experience and skill, savvy teachers chose the best routines for their classes, the application of systems made manageable processes out of endless options (Coubergs et al., 2017; Valiandes, 2015).

Teacher Efficacy and Reading Fluency Assessment

Researchers with projects wherein educators using student assessment data reported that these actions were useful for solving student achievement gaps regardless of socio-economic concerns or students at-risk of falling behind (Ball & O'Connor, 2016; Moyer et al., 2012, Roskos & Neuman, 2014). Related to the reading tests to be used in this research project, educators found that adaptive testing was instrumental in accessing differentiated instruction for all levels of readers (Lourenco et al., 2015). For individual education instruction, teachers used assistive technology (Lourenco et al., 2015). Researchers wrote that they associated the problem of practice with educational strategies and assistive technology components and how effective teachers reviewed their practices to produce equal opportunities and participation of their students (Lourenco et al., 2015).

Lourenco et al. (2015) stated, “the main goal of assistive technology, associated with the applicability of appropriate strategies, is to maximize the skills of each student by teaching and to help him/her to develop it as much and as quickly as he/she can” (p. 891). Armbruster et al.

(2001) found in their study of oral reading that student-specific repeated and monitored oral reading utilized in computer adaptive testing improved reading fluency and overall reading achievement. Likewise, computer-adaptive tests and educational best practices, including various teaching strategies and assistive technologies, showed promise as accommodations that increase students' opportunities for development (Ciccarelli, 2017; Lourenco et al., 2015, Saunders, 2013; Valiandes, 2015).

The Primary Reading MAP assessment is administered nationally on thousands of campuses with millions of validated results (NWEA, 2017). The testing instrument has not changed significantly in 25 years (Thum, 2015), and NWEA's research division has reported the validity regularly; the significance of the reported results has been peer-reviewed (January & Ardoin, 2015; NWEA, 2017a). Evaluating assessment results and the resulting instructional changes focus on the depth and complexity between student groups, add to the benefits of understanding and application, and boost students' achievement (Levent, 2011). Teachers use different teaching strategies, including individual education students. The researchers presented how the groundwork for all students' policies and practices started with educators using assistive technology (Lourenco et al., 2015). Researchers reported that educators, teachers, and administrators looked for classrooms that supported every student's academic growth as critical for improved instructional opportunities despite economic or cultural differences (Bines & Lei, 2011; Lourenco et al., 2015; Rogat & Adams-Wiggins, 2015; Sekulowicz & Sekulowicz, 2015).

Teachers Efficacy in Building Reading Fluency

Reading, fluency, and student proficiency experts suggested that accommodated lessons for any student who fell behind might be a useful answer to declining test scores (Gelzheiser et al., 2019). Rather than use a conventional standardized test, a general outcome measure, as an end of term exam, schools that implemented adaptive assessment tools reported increased

student motivation, achievement, and prolonged effects of positive interaction between teachers and students (Ball & O'Connor, 2016; Faber et al., 2017). Even though low socio-economic and at-risk students reading scores have been studied (Roskos & Neuman, 2014; Valiandes, 2015), researchers have not specified one type of reliable technology to study or one population to examine; however, positive results is repeatable on a large scale (Altintas & Ozdemir, 2015).

Ball and O'Connor (2016) documented how difficult it was for schools to "streamline a system of assessment measures that allow for efficient problem identification, problem analysis, eligibility determination, and program evaluation" (p. 195). Other researchers reported that adaptive testing had been instrumental in helping educators decide a course of action for every student (January & Ardoin, 2015; Merino & Beckman, 2010). Following correct administration protocols, the results were accessible, and the normed results estimated students' instructional needs based on their responses (Ball & O'Connor, 2016). Teachers analyze the scores within 24 hours instead of the three to six-week window typical with traditional tests thus results are timely and useful for on-going monitoring of students' success or need for intervention.

Reading Tests

Skilled teachers used reading fluency tests in primary grades to monitor student performance and progress, thus, predicting performance trends (January & Ardoin, 2015; Kontrovourki, 2012; Merino & Beckman, 2010; Roskos & Neuman, 2014). Researchers reported that educators considered these assessments valid student data (Heinemann, 2020e; NWEA, 2017a). The widely accepted results predicted performance on future tests (Ball & O'Connor, 2016; January & Ardoin, 2015). By dynamically adjusting with students' answers, the MAP Growth Report measures performance over time (NWEA, 2017c). The Student Progress Profile uses Rasch Unit scale score so educators can consider the scores as continuous, and analysts can

relate the results to longitudinal growth student to student rather than comparing them to a cohort or all test takers (NWEA, 2017b).

Administrating the Reading Tests. While educators accepted the reading tests as valid, they thought that administering each test was difficult. For both reading assessments, teachers worked to align the correct test to the right students while providing a proper testing environment: (a) a working computer lab or personal device to set up and use the MAP tests platform and (b) a private table or desk for the teacher to administer the Fountas & Pinnell Oral Reading Assessment. To begin testing, the proctor had to follow complicated directions with multiple steps to initiate and monitor the students' tests. With the MAP test, because the computer test was adaptive if students answer correctly, the next question was higher and more difficult. Students at the point of frustration gave up and started choosing wrong answers to quickly end the test (Eklund et al., 2017). For the Fountas & Pinnell Oral Reading Assessment, if students disengaged or if there were distractions, the test results were not accurate. When the testing finished, teachers uploading the results required adequate network connections.

Primarily, teachers administered the reading tests and arranged all the elements necessary for administering the tests correctly to ensure equanimity. Academic diversity increased because conventional student grouping was according to the school's enrollment by class, so teachers struggled to correct all factors that affected testing (Heinemann Publishing, 2020a, 2020c, 2020e; NWEA, 2017c, 2018b). For example, the type and level of tests must be assigned correctly to the students. For MAP tests, the classes must be entered well in advance (NWEA, 2018a). For the Fountas & Pinnell Oral Reading Assessment, teachers trained with experienced school leadership before administering. Next, within a designated window, on the class's scheduled day of the test, the tests were actualized and administered during the time allowed, without interruptions, following the proper procedures (Heinemann Publishing, 2020a, 2020e; NWEA, 2018a).

Teachers reported that they did not feel adequate to administer the testing without experience and guidance; thus, their efficacy was affected (Basham et al., 2010; January & Ardoin, 2015; Thum, 2015).

The Positive Outcome of Successful Administration. Finally, when the test administrations were successful, assessment records documented positive student performance with achievement and growth at every learner level (Tindal et al., 2016). Educators described how teachers, diagnosticians, and administrators interpreted results consistently using the norms as a growth report (Heinemann Publishing, 2020b, 2020e; NWEA, 2018c). The reports recorded test results for multiple years, so teachers felt confident that their analyses reflected students' academic improvement (Buchsbaum, 2013; NWEA, 2015b, 2015c).

If students presented a downward trend, the MAP Learning Continuum and the Fountas & Pinnell ODMS recorded the test scores and if a downward trend was noted the system prompted the teacher and suggested direct-teach lessons. Teachers could share the on-line data monitoring program's suggestions with parents, tutors, and add to instruction (Heinemann Publishing, 2020b, 2020e; NWEA, 2017b). Teachers used these suggestions to write intervention plans; they depended on reliable test results over time to alleviate their concerns about addressing students' needs.

If reading scores continued to decline, educators who used this system might improve students' learning and meet standards (Ball & O'Connor, 2016; Merino & Beckman, 2010; Rogat & Adams Wiggins, 2015). The research suggested that repeated and monitored oral reading improved reading fluency and overall reading achievement (Armbruster et al., 2001). Other research suggested that students improved their fluency when their teacher used corrective feedback. Various approaches, including active participation in oral reading of a connected text and 10 to 20 minutes of reading rate practice, were other suggestions (Gelzheiser et al., 2019).

Other studies focused on a more extensive variety of adaptive technologies implemented to help students reach proficiency (Hsiao & Chiou, 2017; January & Ardoin, 2015; Lourenco et al., 2015; Merino & Beckman, 2010; Morgan, 2014; Wiggins & McTighe, 2012). However, researchers cautioned against purely scripted lessons that were teacher-directed instead of focused on students' needs and interests, so they suggested rigid lessons were not the direction for students who need differentiation and adaptive technology (Begeny et al., 2012).

Rasch Scale of MAP Test Results Units

Rasch units are the scale for the MAP test scores (Thum et al., 2015). These units are integral to alleviating skewed results in favor of any demographic group for example, higher socio-economic students or students with accommodations served in general education classes “An item exhibiting difficulty higher than the ability level of the respondent will have a lower probability of being correctly answered than an item of difficulty below the ability level of the respondent” (Boone, 2016, p. 4). Because the scale continuum is consistent, there is homogeneity, every student is counted equally (NWEA, 2020; Thum et al., 2015). The Rasch scale is set on a conjoint numbering system, 0–100 scale, and uses unidimensional range of difficulty (Boone, 2016). That is to say that the number of redundant items decreases, so the scoring levels are simple and applicable over time. Because students' scores were sufficient and relatable, they fit this project because three scores in one year for a class sized sample were a valid measure without this researcher having to clean up the data for missing items or miscategorized answers (Boone, 2016; Muijs, 2011).

Homogeneity limits the set of attributes, supports a small set of samples for example students in a classroom, and while affecting no other factors, reflects the difficulty of a test items against the student's ability to answer that item. The data reflected in homogeneity fits the model rather than the model fitting the data and the intervals between the rating scale scores were

calibrated on a linear measure with standard error rates and a predicted measure versus actual measure analysis (Boone, 2016). It should be noted that researchers caution that the lower and higher ends of the scale are fraught with extremes. Because analysts must treat outlying scores as less certain, the application of Pearson's Coefficient to look for correlation or outlying scores should be excluded from data analysis (Muijs, 2011).

Teachers Act Intentionally

Researchers wrote that teachers established routines and used best practices to build classroom culture (Tomlinson, 2017a, 2017b; Wong et al., 2014). When the instructional methods followed students' expectations, they felt safe and supported. Conscientious planning, cultural customs, and practiced methods helped reduce students' stress and helped them cope with new concepts and skills while forming healthy academic discipline. For example, proficient teachers who established expected daily routines created a low affective filter, a safe place where things happen as students expected day after day (Koehler, 2010).

Shared Vision

Senge (2006) wrote that leaders must create and promote a shared vision to affect change. Because educators share the vision of high performing instruction for students, they promote a culture of inclusion and equity across the education process (Rodriguez, 2013). The combined voices and ideas of all stakeholders are vital to the growth and development of schools and students-focused programs (Kafele, 2016).

To fulfill the community vision, administrators planned time and invested resources in making a positive, progressive culture (De Neve et al., 2015; Hattie, 2012). Researchers published studies and stories explaining how a school's positive culture was integral to students' long-term success. One critical element to students' academic success was their ability to read

and process text. Literacy and reading fluency are listed by researchers as critical to long-term academic success. To transform education, educators organized to support the change.

One important element is the inclusion of small groups that are implemented to address problems that come to the forefront. As the inclusive, student-focused culture develops, the small groups and the entire organization play roles in developing and propelling the transformation (Tomlinson, 2017a, 2017b). The implications of inclusive practice and differentiation were essential because they marked a culture shift that changed students' lives. Inclusion was the pedagogy educators employed to build general education situations that supported all students to meet the goals and standards (Kafele, 2016).

Teachers and administrators implemented procedures that supported students on many levels regardless of their demographic or economic designation (Kafele, 2016). Educators used an interconnecting network of procedures and responses that they applied as needed in long-term and short-term interventions. Often educators needed to retool their mental models into new, adaptive applications (Saunders, 2013; Senge, 2006). Because the parts are interchangeable and applicable in different ways, teachers chose what part to use when needed to help students in a variety of settings (Kafele, 2016). By implementing systems-thinking, educators used the pieces to fulfill the needs of students, teachers, administrators, and community stakeholders.

Systems-Thinking

Teachers used each of these detailed elements: collaboration, collective inquiry, shared vision, team learning, and growth mindset rather than fixed mental models to transform schools and started a nation-wide educational change. They invested hours working together, building cultures, all while sharing resources and research. Teachers felt the challenges were too much to face alone, instead, through systems-thinking, administrators and educators fleshed out what had been theory to practical application that improved students' growth (Allison, 1999).

Collaboration

Collaborating with others creates a shared understanding of essential elements and principles because to accomplish a goal, everyone involved shares responsibility to work together (Herrmann, 2019; Kafele, 2016). Rather than working alone, team members work interdependently to achieve common goals. The collective group values the contribution of its members and makes necessary compromises. Groupmates build trust and relationships as they learn from one another. They understand and use the collaborative improvement process to achieve their goals (Herrmann, 2019; Kafele, 2016).

To meet students' diverse needs, faculty, staff, and administration cultivate a common understanding, common language, and inclusive actions central to all students' ethical treatment (Tomlinson, 2017a, 2017b). Implementing these elements was relevant to ongoing improvements because instructional growth and development become complicated. In American education, each decade of instructional adaptation improves the likelihood of students' best interests being addressed and fostered (Kafele, 2016). In the current education environment, Hamman (2014) wrote that leaders who build a joint mission with their teams work with everyone to find common values and convictions. They develop imaginations and qualities that keep the group together and moving forward (Hamman, 2014).

Collective Inquiry

Team members use collective inquiry as a best practice (Hattie, 2012). By examining schools and students' current situation, educators look relentlessly, question the status quo, seek new methods, and build new procedures to improve and expand their organization (Senge, 2006). They move forward and value engagement and personal experiences (Kafele, 2013). They work differently and expect results to follow. Kafele (2016) addressed the steps colleagues took to align the vision. Stakeholders judge the results of these efforts: student achievement, team

participation, ongoing action, established goals, and evidence of success (Kafele, 2016), so the first steps involved all the stakeholders in the conversation because the leadership believes everyone who has a stake should have a voice (Ayala, 2017; Piedad, 2018).

De Neve et al. (2015) wrote that collaboration is intentional with planned time, a designated place, and specific resources designated for the shared vision. When leaders guide the explanation of the vision and the group meetings, they created and followed expectations (Çaycı, 2011; De Neve et al., 2015). These group norms sustained long-term relationships that grew and developed over time and overcame challenges. Before the meetings occurred, the leadership and members planned and used processes that included designated roles, includes team-member skills, and encourages on-going learning (De Neve et al., 2015).

Educators Used the Vision to Refine and Improve Actions

To create a shared vision, the group members and stakeholders reviewed, refined, and reassessed their ideas and written statements, and made changes as needed. De Neve et al., 2015 pointed out that groups evolved their goals, visions, and mission statements through trial and error. Teachers referred to the vision and mission in conversations about the aligned instruction and standards (Tomlinson, 2017a, 2017b). By matching curriculum delivery to achieving the standards, educators selected differentiations to help students perform in line with the overall vision (Dougherty, 2012). Schools employed the whole organization and small groups to address problems that came to the forefront as the inclusive, student-focused culture develops (Tomlinson, 2017a, 2017b). The implications of inclusive practice and differentiation were essential because they marked a culture shift that changed students' lives.

Fulfilling the Shared Vision. Inclusion was the pedagogy educators employed to build general education situations that supported all students to meet the goals and standards (Kafele, 2016). To fulfill a shared vision, leaders and stakeholders planned time to learn and invest

resources in making a positive, progressive culture (De Neve et al., 2015; Hattie, 2012).

Published studies and stories explained how a positive culture is integral to students' long-term success (Dougherty, 2012; Kafele, 2016). One critical element to students' academic success is their ability to read and process text (Kafele, 2013). Literacy and reading fluency are listed as critical components to all students' academic success (Gelzheiser et al., 2019; Kafele, 2013). Examples of these efforts have been shared in books and studies about improving students' literacy.

Culture of Literacy. Leader-to-faculty and peer-to-peer collaborations created a culture of literacy including looking at formative assessments, built-in checks for understanding, and objectively graded tests all demonstrated the benefits of interventions and increased the likelihood of students' successes (Ciccarelli, 2017). When administrators granted teachers the authority to lead changes in applied pedagogies, understand others' perspectives, and employ communication, educators found significant success (Siry et al., 2016). A shared vision was critical to the organization's success (Senge, 1990). Instead of pushing educators who felt ultimately responsible past their limits, leaders supported participants. When teachers felt confident to tackle the problems inherent in individualized instruction and expected success, they were highly satisfied with the positive outcomes (Sture, 2014).

Because school culture included professional communities working together, teachers and administrators came together to plan and implement efforts concerning learner-centered disciplines (Donohoo et al., 2018). Many educators reported that they benefited from the wealth of experience and talents (Morgan, 2014; Smit & Humpert, 2012). In peer-to-peer interactions, researchers reported that teachers understood that instructional methods involved established structure, and cutting-edge technology, and the implementation of student-focused action plans (Herrmann, 2019). When teachers had an hour set aside daily to plan lessons, implement

developments, and monitor students' academic progress, they benefited from a significant professional development allotment (Kafele, 2016; Tomlinson & Murphy, 2015). By promoting equity, education's quality, and effectiveness improved (Roskos & Neuman, 2014).

Team Learning

Researchers wrote that professional learning communities (PLCs) increased educators' professional growth and culminated in three elements: critical-, long-term-, and constructive relationships (De Neve et al., 2015; Tomlinson, 2017a, 2017b). Teachers used these communities to aide their decisions and behavior changes. For example, in a Japanese study, science teachers worked in collaborative groups that created an environment that helped each other overcome high demand work environments by providing excellent examples to draw from when teachers faced challenges (Herrmann, 2019). Other researchers told of schools that used groups for like planning and professional development to serve schools' instructional purposes (Donohoo et al., 2018). Teachers accessed a wide-variety of group-wisdom to meet the needs of diverse student populations, and they adapted to students' needs (De Neve et al., 2015).

Professional Learning Communities

In education literature, researchers found a link between PLCs, teacher efficacy, and instructional differentiation (Donohoo et al., 2018; DuFour, 2015; Herrmann, 2019). Senge wrote that a practical, "shared picture" and genuine dedication to an organization's future improved with professional conversations (1990, p. 2). If this relationship was essential to the intended outcome because the bond between teachers feeling empowered to adapt and affect students connects to professional relationships and how potent their personal decisions were to their efforts, a researcher should study it. Recognizing that association between two "variables that give no information about the value of the other" should not be confused with causality and remembering that other variables could be present or absent and cause unforeseen outcomes, so

there is no inference in this relationship (Altman & Krzywinski, 2015, p. 899).

Tomlinson (2017a, 2017b) and Kafele (2016) found that teachers learn their craft when they can affect students' learning and academic growth. They suggested that leaders must ensure that personnel, money, time, and all the resources available address students' needs adequately. Educators defined internal daily collaboration as horizontal and vertical alignment with other educators (Çaycı, 2011; Dixon et al., 2014). Professional collaboration and professional development efforts were integral to the progression of the need-meeting process (DuFour, 2015; Kafele, 2016).

Planned Interventions

Teachers streamlined standardized lessons by establishing procedures to instruction planning. Tschannen-Moran and Woolfolk Hoy's (2001) TSES asked teachers how much they thought they affected students mastering difficult lessons. When they persevered, teachers increased the likelihood of students adding new information to their existing constructs and other instructional elements (Ohio State University, 2014). Depending on the teacher training, educators knew they could master some of these challenges (Marzano et al., 2017; Tschannen-Moran & Woolfolk Hoy, 2001).

Summary

After Texas State Board of Education changed the accountability standards, the district scored a lower-than-expected rating. The district started an evaluation and improvement plan. Because district students did not reach critical achievement expectations, the primary vision school leaders undertook was the challenge of improving students' educational opportunities. To meet accountability standards, schools monitored student growth and worked to implement improvements that helped students meet expectations (TEA, 2019a, 2019b). In general education classrooms, one possible successful practice was supporting and enhancing teacher efficacy.

Tomlinson and Moon (2013), like Senge (2006), described educators' responsibility as deliberate actions. Teachers who felt competent adapted professional practices, established trust, and in demanding and complex situations addressed problems, and found solutions to problems that educators faced daily (Çaycı, 2011; Tomlinson, 2017a, 2017b; Varghese et al., 2016).

Tomlinson (2017a, 2017b) reported that multiple elements were critical in affecting students' learning: leadership, collegial collaboration, and alignment of goals and actions. Leaders ensured that personnel, money, time, and all the resources available addressed students' needs adequately (Tomlinson, 2017a, 2017b). Professional collaboration and professional development efforts were integral to a shared vision and the need-meeting process (DuFour, 2015). Educators defined internal daily collaboration as horizontal and vertical alignment with other educators (Çaycı, 2011; Dixon et al., 2014).

Teachers examined and analyzed peer feedback, evaluations, and evidence of faculty and students' growth (Tomlinson, 2017a, 2017b). When teachers understood the benefits of individualized lessons for students, they differentiated (Rytivaara & Vehkakoski, 2015). They served their students and believed their actions to be ethical applications of their values (Lourenco et al., 2015). Teachers modified with a variety of strategies, inclusion, assistive technologies, and educational best practices; the studies indicated accommodations allowed access to appropriate procedures, so teachers felt more in control and allowed students to develop with assistance and maximized their opportunities (Ciccarelli, 2017; Lourenco et al., 2015).

Effective teachers used interventions, engaged students, increased student growth and achievement, and improved individual success (Kafele, 2016; Koehler, 2010; Lawrence-Brown & Sapon-Shevin, 2015). During an academic year, educators wrote an aligned curriculum and spaced-out learning units to prepare students for mastery tests. With tests, they assessed students'

growth and achievement (Wiggins & McTighe, 2012). When students struggled to meet growth and assessment goals, teachers intervened and implemented the best practices that reach all students (Marzano et al., 2017).

Altman and Krzywinski (2015) cautioned,

A direct causal link cannot be inferred; the association merely suggests a hypothesis, such as a common cause, but did not offer proof. Also, when many variables in complex systems are studied, spurious associations can arise. Thus, association did not imply causation. (p. 899)

To determine the association between TSES effective teachers and the outcome from a measurable skill like reading fluency, by using the Primary Reading MAP assessment and the Fountas & Pinnell Oral Reading Assessment, this study added to the literature. Without implying causality, if the results seem more than random, the variables and indicated an association. Optimistic teachers who considered themselves highly effective were with students who exhibited improved reading fluency scores, there was more to the equation than just best-practices, but no causality is assumed. The belief that teachers mattered and were critical to all students' academic improvement. Reading fluency was a measurable skill that reflected benefits beyond a strong curriculum or learning strategies. The district found benefit from this information because there was a positive association between teacher efficacy and students' academic growth.

Chapter 3: Research Method

The problem facing a North Texas school district was lower than expected achievement on the Texas Education Agency reporting of the third grade reading assessment (TEA, 2020c). Researchers considered reading fluency critical to students' academic growth and achievement (Ball & O'Connor, 2016; Kuhn et al., 2010). While monitoring the outcome for every level of students and special care for students at-risk, the district leadership was looking for organization-wide programs to improve all students' academic growth and achievement. Researchers provided evidence that teachers' confidence in their abilities to overcome challenges is a significant factor in improving every students' educations (Dixon et al., 2014; Valiandes, 2015).

The purpose of this study was to determine whether there was a statistically significant association between the range of teachers' self-reported efficacy and third grade students' reading scores on two reading tests (Cheprasov, 2018). While in experimental studies researchers manipulate the study environment or system in some way, one cannot accurately ascertain a correlation study's cause and effect relationship; I sought to find associations between variables (Cheprasov, 2018).

Research Questions

Four research questions guided the study.

- RQ1: Was there a statistically significant association between the scores of third grade teachers in the high range on Tschannen-Moran and Woolfolk Hoy Teachers' Sense of Efficacy Scale (TSES), and the achievement of their third grade students' reading scores on the Primary Reading Measures of Academic Progress (MAP) assessment?
 - H_a: There would be a statistically significant association between the teachers' score on the TSES and the third grade students' Primary Reading MAP assessment achievement scores.

- Ho: There would not be a statistically significant association between the third grade teachers' scores on the TSES and the third grade students' Primary Reading MAP assessment achievement.
- RQ2: Was there a statistically significant association between the scores of third grade teachers in the high range on the Tschannen-Moran and Woolfolk Hoy Teachers' Sense of Efficacy Scale (TSES) and their achievement third grade students on the Fountas & Pinnell Oral Reading assessment?
 - Ha: There would be a statistically significant association between the teachers' score on the TSES and third grade students' reading assessment achievement scores on the Fountas & Pinnell Oral Reading assessment.
 - Ho: There would not be a statistically significant association between the teachers' scores on the TSES self-efficacy survey and the third grade students' Fountas & Pinnell Oral Reading assessment achievement.
- RQ3: Was there a statistically significant association between the scores of third grade teachers in the low range on Tschannen-Moran and Woolfolk Hoy Teachers' Sense of Efficacy Scale (TSES), and the achievement of their third grade students' reading scores on the Primary Reading Measures of Academic Progress (MAP) assessment?
 - Ha: There would be a statistically significant association between the teachers' scores on the TSES and the third grade students' Primary Reading MAP reading assessment achievement scores.
 - Ho: There would not be a statistically significant association between the third grade teachers' scores on the TSES self-efficacy survey and the third grade students' Primary Reading MAP reading assessment achievement.
- RQ4: Was there a statistically significant association between the scores of third grade

teachers in the low range on Tschannen-Moran and Woolfolk Hoy Teachers' Sense of Efficacy Scale (TSES) and their achievement third grade students on the Fountas & Pinnell Oral Reading assessment?

- H_a: There would be a statistically significant association between the teachers' score on the TSES and third grade students' reading assessment achievement scores on the Fountas & Pinnell Oral Reading assessment.
- H₀: There would not be a statistically significant association between the teachers' scores on the TSES self-efficacy survey and the third grade students' Fountas & Pinnell Oral Reading assessment achievement.

Research Design and Method

A quantitative approach was chosen to determine if there was a statistically significant association between teachers' efficacy and the students' reading scores on two tests used in the district. An authentic experimental design was not practical because researchers cannot manipulate or randomize student or teacher populations in general education public school classrooms (Blackstone, 2018). However, researchers did identify differences between established groups that exist due to the natural process of student/teacher placement in general education (Texas Classrooms Teachers' Association, 2020).

Population

The population chosen for this study was the third grade general education classrooms in a North Texas school district. Accordingly, the TEA published a report for the 2018–2019 school year; the groups were consistent without marked demographic changes from previous years (TEA, 2020a).

Students in general education classes received the district established curriculum that teachers created based on the aligned Texas Essential Knowledge and Skills (TEKS) standards.

The demographics of these third graders were representative of general education populations in demographically similar districts (TEA, 2020a). Teachers for these grades were similar in years of experience as other teachers across the state (TEA, 2020c). Finally, educators support interventions for every student to meet their educational needs (Marzano et al., 2017; Tomlinson & Murphy, 2015).

Study Sample

In December 2019, I approached the school district's Assessments and Research Office to solicit cooperation and final approval for the proposed project formally. There had been two informal discussions with the Assessments and Research staff prior. Initially, I planned the study for sixth grade teachers and student scores from the Primary Reading MAP assessment. The Assessments and Research Office was enthusiastic about the project but requested, to better support district objectives, that the research be conducted at third grade and that Fountas & Pinnell Oral Reading Assessment scores be included in addition to Primary Reading MAP. I agreed, and completed the research prerequisites until IRB approval was obtained.

As the research launched, the Assessments and Research Office would handle all contact with district staff as per their procedures. That initial contact would work exclusively through campus principals. During the project, COVID-19 and related remote learning challenges were occurring daily. Ultimately, eight campus principals out of 24 elementary schools, opted out of the project. Next, the Assessments and Research Office decided to exclude any staff who were currently, or during 2018–2019, were administrators, instructional facilitators, coordinators, or multi-assignment teachers.

Finally, it was decided by the district that only third grade, general education, teachers of record would be studied. This decision was made when the Assessments and Research Office personnel had changed, and the primary support staff person, the one who provided all the final

results, was no longer the head office. When the district applied the established criteria, the sample size was 43 teachers. Since the 2018–2019 school year test, data were the most recent and reliable information due to COVID-19, only the criteria-meeting teachers were included. After removing those who retired, moved from the district, changed jobs, and so on, the final sample the Assessments and Research Office asked to take the project survey was 29 teachers of record. Twenty-seven (27) teachers responded, and the corresponding student data from Fountas & Pinnell Oral Reading Assessment and the Primary Reading MAP assessment were matched and delivered.

The quantitative sample was as diverse as expected based on multiple studies in a review of the literature (Armstrong, 2018; Benton & Li, 2015; Gómez-Zepeda et al., 2017; Valenzano & Wallace, 2014). To find an appropriate sample size, I used a sample calculator (Survey System, 2020). The margin of error was set at 5% with a population of 29 teachers. To gather valid results, a minimum of 28 of the 29 possible respondents was needed to complete the survey with 95% statistical significance. Lau (2017) wrote that a “general limitation of a correlational study is that it can determine the association between exposure and outcomes but cannot predict causation” (p. 1). I did not control the allocation of students or teachers’ assignments and viewed objectively the variables without affecting the outcome of the results.

Materials/Instruments

The district chose the Primary Reading MAP assessment and the Fountas & Pinnell Oral Reading Assessment because of the proven, reliable results (Heinemann, 2020b; Thum & Hauser, 2015). To assess an association between reading scores and teacher efficacy, I used Tschannen-Moran and Woolfolk Hoy Teachers’ Sense of Efficacy Scale (TSES) to discover how teachers felt about their efforts to effect students’ educations. The following sections outline how the researcher administered the TSES and how the data were collected data. Please see Appendix

A for a copy of the authors' permission to use the instrument for this research and see Appendix B for a copy of the short form survey instrument. Appendix C includes the directions for administering the survey and the item analysis.

Survey Administration

To administer the survey, I sent a link to the Tschannen-Moran and Woolfolk Hoy Teachers' Sense of Efficacy Scale (TSES) in a Google Document questionnaire to teachers the Assessment Department had identified as having taught third grade general education classes 2018–2019.

- The Assessments and Research Department sent surveys directly to the teachers.
- The window for the survey was two weeks with a few reminder emails.
- Teachers were encouraged to participate.
- There was no accommodation further than the capabilities of Google Text-to-speech available.

Though the Assessments and Research Department shielded the individual responses, teachers were allowed to ask for a compilation of response tables after the conclusion of the study.

Preparing for the Survey

Before administering the survey, the I ensured the following:

- Teachers who were currently employed by the district had access to an incognito Google site.
- They created an identifier to shield their responses.
- Teachers were able to access the form on any computers or devices, professional and private, with access to the district's Google Drive.
- There was no limit on the time of day they accessed the form.

- Within the 2-week window, teachers submitted one response, and they edited their responses when they completed the survey.

Taking the Survey

Completion time: 10–20 minutes. Note: Teachers took as long as necessary to complete the survey. However, if they left the form, it did not save their responses.

- Each teacher needed their district login as a passkey, password, or log in to access the form.
- The survey did not record respondents' emails, and their self-selected digital identification number protected their identities.
- No one was allowed to answer more than once, but the respondents edited their answers after submitting it.
- Only completed forms were accepted.

The following text was included in the survey email and to ensure consistency of implementation:

A number of statements about organizations, people, and teaching are presented below. The purpose is to gather information regarding the actual attitudes of educators concerning these statements. There are no correct or incorrect answers. We are interested only in your frank opinions. Your responses will remain confidential. INSTRUCTIONS: Please indicate your personal opinion about each statement by choosing the appropriate response for each statement.

Following Survey Administration

To analyze the survey data, I logged-in to the district created Excel file to retrieve the responses sent from the Assessments and Research Department. The responses were downloaded on a district-provided laptop. The survey responses or items associated with responses were

discussed only with the Assessments and Research Department because their help was invaluable to the project.

To find an appropriate sample size, I used a sample calculator (Survey System, 2020) and set the confidence level to 90% and a population of teachers. To gather valid results, a minimum of 27 of the 29 possible respondents were needed to complete the survey.

Survey Results

After the district's Assessments and Research Department removed all identifying information, they sent the scores with designations they determined. Survey results were compiled by coding the responses into two equally portioned respondent ranges. The mode and the median were used to organize the responses.

Teachers completed the survey within two weeks. I provided a summary of the results of the research data results upon request. I included in the survey results:

- the number of teacher respondents; and
- the ranges of responses with the standard deviation compared to all respondents.

When I gathered the data, the data points were aligned and analyzed for any association between teachers' high TSES and reading test scores and low TSES scores and reading test scores. In correlational research I measures the variables and the association between them, unlike researchers of experimental studies where the triggered variables demonstrate an expected phenomenon (Form Plus Blog, 2020). I possessed the skill set (a) to analyze the composition of the test instruments, the normed data results, the reporting systems; (b) to help teachers see students' growth over multiple test administrations; and (c) to analyze the reading test data and the data variables.

Data Collection and Analysis Procedures

The data collection was sourced from the students' reading assessments and the teachers'

self-efficacy surveys. The reading assessment data were archival sources collected previously in 2018–2019 by teachers in the normal course of their duties to assess and instruct students. The TSES data were the primary source I used to assess if there was any association between teachers' levels of confidence and students' reading scores. The Tschannen-Moran and Woolfolk Hoy TSES's Likert scale was used because the data were easier to gather and were available in a timely manner.

The correlative method can be used to determine the nonlinear relationship between the variables while gathering large amounts of statistical data in a short time (Form Plus Blog, 2020). Using this less-time consuming and less expensive research method with an online version of the TSES, I was able to work with the sample population quickly and follow safety protocols. The Form Plus Blog (2020) wrote that correlation research offers

shallow data gathering using different methods such as a short survey. A short survey did not require the researcher to personally administer it, allowing the researcher to work with a few people. It is an inexpensive, time-sensitive way to gather data and process and analyze information quickly. (p. 1)

Because correlative research is nonexperimental, no variables were manipulated in a scientific methodology to agree or disagree with the hypothesis (Form Plus Blog, 2020). I observed and measured the natural relationship of the variables without exerting influence on either.

Any bias in the survey questions was addressed by the Tschannen-Moran and Woolfolk Hoy (2015) research. The analysis of the data followed the prescribed-procedure to avoid any under or over representing survey responses (Form Plus Blog, 2020).

A direct causal link cannot be inferred; the association merely suggests a hypothesis, such as a common cause, but does not offer proof. Also, when many variables in complex systems are studied, spurious associations can arise. Thus, association does not imply

causation. (Altman & Krzywinski, 2015, p. 899)

Operational Definitions of Variables

The first two variables were the students' reading test scores after taking the Primary Reading MAP assessment and the Fountas & Pinnell Oral Reading Assessment over the course of the 2018–2019 school year. After the Assessments and Research Department removed all identifying data, they shared the files in SPSS with the designations they applied. All students' data were anonymous.

MAP. Teachers supervised the fall, winter, and spring testing administrations on three Primary Reading MAP assessments (NWEA, 2015b, 2017b). The Assessments and Research Department collected the Rasch Unit band score from the Student Profile Report and created anonymous markers for the students designated for the study and associated their scores with their third grade teacher (NWEA, 2018a). The scores were collected over a school year, so, the resulting growth and achievement was used to quantify the direction of students' performance.

Fountas & Pinnell Oral Reading Assessment. Teachers administered the Fountas & Pinnell Oral Reading Assessment three times annually according to the district's testing calendar. Teachers loaded the results into the district's data section of the Frontline Education database. The Assessments and Research Department added the Fountas & Pinnell Oral Reading Assessment score to a SPSS file for this project and coordinated students' identifiers with their assigned teacher.

Teacher Efficacy

TSES. The third variable was the self-reported teacher efficacy scores on TSES for the third grade teachers who participated in this study. Teachers received the TSES link in an email and answered the survey using a Likert scale. They selected a designation for themselves, and the district's Assessment and Research department sent me the results. The department paired

students' test results with the TSES reports in a SPSS file, and I accessed and analyzed the data.

TSES was a practical scale of teacher efficacy because it has been used successfully throughout education research (De Neve et al., 2015; Dixon et al., 2014; Tschannen-Moran & Woolfolk Hoy, 2001). The overall reliability and validity information was reported by Woolfolk Hoy (2020) as .94 for the long form alpha and .90 for the short form alpha.

The TSES instrument has been used in the district in 2011, 2014, and 2016; teachers were familiar with the questions and Likert scale answer options (Muijs, 2011). A cadre of teachers who rated themselves at the highest and lowest effectiveness rates were selected to compare the students' reading scores (De Neve et al., 2015; Dixon et al., 2014). When the survey responses uploaded, the Assessments and Research Department aligned the teachers' responses with the classes assigned to them and added these TSES scores into the SPSS database to collect and analyze the data (Muijs, 2011).

Pearson Product Moment

The Pearson Correlation Coefficient was used to measure the strength of association between two variables. First, the association between the Primary Reading MAP assessment scores of third grade students and their teachers' TSES scores was determined. Next, the association of the Fountas & Pinnell Oral Reading Assessment of third grade students and their teachers' TSES scores was determined. The teachers' self-reported TSES scores were not rated on the same scales as either of the reading tests; however, teachers who responded to the TSES and students who took both reading tests were in the same schools, classes, and time frame. These scores reflected a convenience sample because in this North Texas district general education classes had expected distributions of students and teachers.

Statisticians stress that researchers apply seven guidelines, "assumptions" (Laerd Statistics, 2018), to ensure Pearson's Correlation Coefficient is the right methodology. If

researchers cannot meet any of the seven guidelines, Pearson's Correlation is the wrong test. The seven assumptions are: (a) the two variables should be measured on a continuous scale, (b) the data points should be paired, (c) the cases were independently observable, (d) there should be a linear relationship between the two continuous variables, (e) the continuous variables should follow a bivariate normal distribution, (f) there should be homoscedasticity, and (g) no univariate or multivariate outliers should be ignored.

This research design met the seven assumptions:

- Each variable's data points must be on a continuous scale and measured at intervals or ratios. The Primary Reading MAP assessment and Fountas & Pinnell Oral Reading Assessments are on different scales. The TSES uses a third scale. Each scale meets the assumption.
 - For the Primary Reading MAP assessment, Thum and Houser (2015) wrote, "Since all items in a single content domain are calibrated to the same scale, different tests that may be constructed in that domain are all children of the same parent, and scores from different tests constructed from that domain can be interpreted in the same manner. (p. 4).
 - The Fountas & Pinnell Oral Reading Assessment uses the ATOS Readability Formula to determine student's reading difficulty score (Heinemann, 2020c) that Laerd Statistics considers a continuous exam performance score (Laerd Statistics, 2018).
 - Tschannen-Moran and Woolfolk Hoy (2001) stated "Items were coded such that the higher the score (closer to 6), the greater the confidence" (p. 350) and thus, they describe the TSES scale as a continuous scale.
- Each variable must have a "point" at each interval (Laerd Statistics, 2018). For this

research project, the third grade students' Primary Reading MAP assessment scale scores were associated with their teacher's TSES score. Likewise, the Fountas & Pinnell Oral Reading Assessment scale scores were associated with their teacher's TSES score.

- Because students took each test independent of the other and independent of their teacher's TSES score, the variables were independently observable.
- I determined whether a linear association appears in a scatterplot of the data points. Muijs (2011) wrote that the researcher can determine non-linear or linear association based on the direction of the plot points.
- Since there was a bivariate normal distribution, a robust relationship can be assumed; however, univariate normality is acceptable also (Laerd Statistics, 2018).
- The Laerd Statistics group (2018) advised that researchers should depend on homoscedasticity because the variances along the line of best fit remain similar, unlike heteroscedasticity, wherein the occurrence between data points is higher and more spaced out. I analyzed the plot pattern to look for homoscedasticity.
- The Laerd group explained that researchers should not ignore and must include univariate and multivariate outliers as they affect the Pearson coefficient. All scores presented were used. As per the Primary Reading MAP assessments program protocols, the computer program identifies and cuts outliers, so they are not included in the Rausch Unit scores (Thum, 2015).

While gathering adequate samples, I looked for variables at intervals or ratios.

Researchers can measure variables in different units. The units did not affect the measurement of the variable. The variables were independent; they were equal (Laerd Statistics, 2018). A

Pearson Coefficient graph did not indicate the slope of the line of best fit. It only indicated whether the variables were associated closely or not.

When determining the significance of the coefficient, researchers must adhere to the following guidelines for Coefficient, r strength of association: low is in the ranges of 0.1 to 0.5 and -0.1 to -0.5 while high is 0.5 to 1.0 and -0.5 to -1.0. To analyze the results, I used Pearson's coefficient because the variables met the requirements of the seven assumptions. A linear association is apparent if a scatterplot of variable values has a directional value. Researchers use Pearson's coefficient to demonstrate the strength of the relationship and a range of interval or ratio data points without demonstrating causation. Therefore, Pearson's coefficient was useful in this research.

Data Analysis

After I applied the high and low ranges to the TSES results, teachers' TSES scores were associated with their students' reading results compiled from the Primary Reading Measures of Academic Progress (MAP) assessment and the Fountas & Pinnell Oral Reading Assessment. For the bivariate analysis, the difference between each variable score and the mean for each variable were included. I multiplied for each case and determined if the scores were above the mean, and demonstrated a positive association, or below the mean which resulted in a negative association (Muijs, 2011). Using the SPSS program, I found the sum of the scores and a total, which were divided by the product of the standard deviation of both variables to scale it and had the Pearson r correlation coefficient (Field, 2013; Muijs, 2011). The ranges included all completed responses submitted and followed the guidelines for quantitative research (Creswell & Creswell, 2018). I used the integrated results from the SPSS program to determine the p -value and the correlation coefficient from the data and assess statistical significance (Field, 2013; Muijs, 2011).

Altman and Krzywinski (2015) wrote,

A direct causal link cannot be inferred; the association merely suggests a hypothesis, such as a common cause, but does not offer proof. Also, when many variables in complex systems are studied, spurious associations can arise. Thus, association does not imply causation. (p. 899)

I used this study to determine if there was a statistically significant association between teachers who self-report as highly effective and higher students' academic reading test growth.

Ethical Considerations

The Assessments and Research Department, administrators, and faculty monitor scores garnered in the district rather than a third party, and the teachers have access to all the reading assessments taken under the paid license logins (Heinemann Publishing, 2020f; NWEA, 2017b). Using the district's internal Assessments and Research Department, district leaders monitor students' academic growth and report to administrators throughout the year—both students' scores and teachers' access to reading reports. It is the district culture to utilize data reports and implement best practices to support students in PLCs and individual teacher's planning.

After reviewing the regulations and ethical guidelines for human participant studies, I was confident the project was covered by Chart 3: Exemptions 45 CFR 46.101(b)(1) (for Educational Settings). First, I researched the established educational setting of the third grade general education classrooms of existing elementary schools. Second, the research involved only standard educational practices: Monitoring students' academic growth and achievement was the established pedagogical expectation for all classes (ESSA, 2018; TEA, 2019b). So, this research was exempt under 45 CFR 46. 101 (b)(1) and all 45 CFR part 46 requirements, and no further review was needed.

Regarding confidentiality, the district's Assessment and Research Department protected teachers' and students' identities by removing all identifying demographics. They assigned a

marker system that related the students' reading scores to the instructors; thus, I did not need students' permissions or FERPA releases (Office for Human Research Protections, 2016). The Assessments and Research Department uploaded the reading scores for students into an Excel sheet that I used to upload TSES results for comparison and analysis.

For the Tschannen-Moran and Woolfolk Hoy Teacher Sense of Self-Efficacy (TSES), the Assessments and Research Department emailed the teachers who taught third grade in 2018–2019 without me having any access to the participants list. The invited teachers could opt-out of the survey. After the initial invitation, there was no expectation for them to participate. The Assessments and Research Department sent any scheduled reminders.

There was no conflict of interest as I have been employed as a high school English teacher within the district. While I had a small role supporting high school students, I had no influence over this study because, as a secondary school teacher, I had no authority related to any hiring or promotions. I did not work for or with the elementary school personnel. I did not prepare elementary lessons nor lead teachers or school (Carr, 2012; Dougherty, 2012; Wiggins & McTighe, 2012).

I had the resources and skills to conduct a quantitative research project and analyzed the reading test scores, TSES data, and run SPSS reports. The findings were reported in a timely, ethical, and comprehensive manner (Patton, 2015).

Assumptions

For the Primary Reading MAP assessment, the assumption was that teachers followed the testing protocols, as published by NWEA (2018a), and for the Fountas & Pinnell Oral Reading tests, teachers used the correct testing procedures and followed district reporting guidelines. It was assumed that teachers reported results accurately.

Though most educators felt more experienced in a traditional classroom, the teachers' perceptions of their ability to overcome challenges, like the serving students with virtual and asynchronous classes should not affect their responses on TSES. COVID-19 protocols and quarantine safety measures did not change their answers to questions on the teacher-efficacy survey, TSES.

Limitations

Demographic

The district serves 24,251 students. Currently, 65% qualify for Free/Reduced Lunch. The number of English Language Learners (ELL) has increased every year since 2010 from 15% to 35%. In the third grade, there were 1,881 students served by 71 teachers in classes averaging 24 students in each section. The placement of general education students is arranged by the counselors on each school campus and is not random but by convenience.

COVID-19 Pandemic

Though I intended to use the students' archived reading scores from 2018–2019 school year, the teachers' TSES surveys were gathered during the 2020–2021 school year. Because of quarantine measures, the district leadership implemented a hybrid of traditional and remote learning for all students. During the 2020–2021 school year, teachers were in their classrooms on assigned campuses while they taught students online and in person.

Teachers were on campus, but families had the option to send students to school or utilize on-line asynchronous or synchronous learning. Counselors arranged class sizes by the number of students returning to campus. The district average for an elementary general education class was 11 students per room. When population numbers changed, students might have shifted to other teachers because the district used social distancing as a safety precaution. Until the quarantine measures were lifted, teachers managed classes in an unprecedented way.

Professionalism

Overall, administrators, department heads, teachers, and community members assumed teachers used the district's resources; academic integrity and professionalism were teachers' responsibilities. To ensure a cohesive district culture, new teacher training included professional development for PLCs and developing technologies for district-wide use. These efforts supported the district's culture of systems-thinking and benefitted the integration of all instructional elements (Senge, 1990).

Students' Testing Experiences

According to researchers, reading score reports from the MAP and ODMS were subject to students' emotional responses while taking the test (Bippert & Harmon, 2017; January & Ardoin, 2015; Thum, 2015; Thum & Hauser, 2015). The writers of test training literature wrote that it is incumbent on teachers to provide the least restrictive testing environment while maintaining discipline and control over as many factors as possible (Heinemann Publishing, 2020a; NWEA, 2017; Thum & Hauser, 2015).

Delimitations

Third Grade

I selected the third grade because teachers test students formally. The students practice both the Primary Reading MAP assessment and the Fountas & Pinnell Oral Reading assessment in first and second grade, so teachers and students were experienced with both. For this project, it was valuable to have two points to associate to the teachers' TSES. The teachers uploaded the results into the district's data base, and the scores were easily accessible.

General Education

I collected the test results for 1441 students enrolled in general education, including students in the third grade who were served by special education in their Individual Education

Plans (IEP) and Limited English Proficient (LEP) accommodations within general education classes. However, 440 students who were served in special education classes or students served by English as a Second Language classes exclusively were excluded. Both the MAP researchers and the Fountas & Pinnell Oral Reading Assessment data analysis instructions discourage the inclusion of outlying scores as data points (Heinemann, 2020b; Thum & Hauser, 2015). Specifically, students whose reading scores were farther than two standard deviations from grade-level do not fit the parameters of the grade-level MAP norms (Thum & Hauser, 2015). LEP Students who were served by English Language Learning classes were tested with the Spanish MAP test rather than the Primary Reading MAP test. Their scores were excluded also as they were monitored by a different assessment.

Attendance

The district follows the TEA attendance expectation (TEA, 2018c). I included students who had attended 90% or more of their classes. To qualify for the MAP test norms, students must have 90% attendance. If they did not attend classes, teachers should slide the score scale to the appropriate grade-level their attendance total equals. For example, a school year is 181 days. According to the NWEA guidelines, if a student misses more than 10% of instruction, the teacher should align their score with the lower grade (Thum & Hauser, 2015). Rather than juggle the alignment of norms for students missing instruction, students who attended less than 90% of school days or missed a testing date in the fall or spring were excluded.

Enrollment

Texas recognizes students enrolled in a teacher's class on October 31st as attributed to the students' growth scores for that teacher. I utilized the same time-marker. If a student was enrolled with a teacher on October 31, 2018, their score was included in the data for that teacher. Even though students moved from one school to another, the October 31st date is the enrollment

factor regardless of whether the teacher had opportunity to teach that student or not (TEA, 2020a).

Teacher Turnover

Teachers who taught third grade during the 2018–2019 school year might not have taught the same grade during the 2020–2021 school year. The number of sample teachers were reduced because some had retired or moved to another school district. I depended on the Assessments and Research Department to identify all the teachers who served during that year and ask them to answer the TSES. Their current assignment did not be reflected in any data collected in this project.

Summary

Educators and researchers see the elements of teachers' efficacy and students' academic growth as parallel in high-quality schools. Addressing diversity, responding to students' needs, providing specific learning opportunities, investing in the collaborative process, and implementing high-quality professional development improve teachers' efficacy (Dixon et al., 2014).

Researchers determined that professional development must include developing classroom routines, addressing students' needs, aligning resources with the district's mission, and cultivating a shared understanding of elements and principles (Tomlinson, 2017a, 2017b). Also, districts interested in improving students' educational opportunities looked to the advice of large and small groups to address problems. They celebrated successes intentionally, and they built a culture that supports the differences in students' learning (Tomlinson, 2017a, 2017b). While cautious deliberation should be followed because other factors could intervene between teacher efficacy and students' reading scores, the district used these ethical, correlative observations to build new avenues of research, professional development, and decision making.

Chapter 4: Results

This research was undertaken to investigate the overarching research hypothesis that in an urban Texas school district there would be a positive and statistically significant association between third grade English language arts teachers' self-efficacy and the reading scores of their students on two standardized assessments. The fact the study was conducted during the pandemic created serious challenges. One was that whereas the student reading scores were obtained from the 2018–2019 school year, the teacher self-efficacy scores were collected during the 2020–2021 school year. The 2019–2020 and 2020–2021 school years were significantly disrupted by the pandemic, and students were asked to complete the two assessments virtually from their homes, with no supervision. Test specifications for both assessments indicate that the results of these assessments are not valid if students do not take the assessments under supervision and within a controlled environment. In addition, during the 2019–2020 and 2020–2021 school years, many students did not complete the assessments, including a high percentage of minority and at-risk students, who may have been expected to have scored lower on the assessments.

In addition, the research design did not allow an exploration of how teachers' overall emotional and professional perception efficacy may have been influenced because of the pandemic. Also, I experienced difficulty in obtaining a sufficient number of survey responses to assure statistical significance at a 95% confidence level. After consulting with the dissertation committee and receiving its approval, I reduced the confidence level to 90% and was able to obtain enough survey responses to assure statistical significance at the lower confidence level. Four research questions guided the study.

Research Questions

- RQ1: Was there a statistically significant association between the scores of third grade teachers in the high range on Tschannen-Moran and Woolfolk Hoy Teachers' Sense of

Efficacy Scale (TSES), and the achievement of their third grade students' reading scores on the Primary Reading Measures of Academic Progress (MAP) assessment?

- H_a: There would be a statistically significant association between the teachers' score on the TSES and the third grade students' Primary Reading MAP assessment achievement scores.
- H₀: There would not be a statistically significant association between the third grade teachers' scores on the TSES and the third grade students' Primary Reading MAP assessment achievement.
- RQ2: Was there a statistically significant association between the scores of third grade teachers in the high range on the Tschannen-Moran and Woolfolk Hoy Teachers' Sense of Efficacy Scale (TSES) and their achievement third grade students on the Fountas & Pinnell Oral Reading assessment?
 - H_a: There would be a statistically significant association between the teachers' score on the TSES and third grade students' reading assessment achievement scores on the Fountas & Pinnell Oral Reading assessment.
 - H₀: There would not be a statistically significant association between the teachers' scores on the TSES self-efficacy survey and the third grade students' Fountas & Pinnell Oral Reading assessment achievement.
- RQ3: Was there a statistically significant association between the scores of third grade teachers in the low range on Tschannen-Moran and Woolfolk Hoy Teachers' Sense of Efficacy Scale (TSES), and the achievement of their third grade students' reading scores on the Primary Reading Measures of Academic Progress (MAP) assessment?
 - H_a: There would be a statistically significant association between the teachers' scores on the TSES and the third grade students' Primary Reading MAP reading assessment

- achievement scores.
- H₀: There would not be a statistically significant association between the third grade teachers' scores on the TSES self-efficacy survey and the third grade students' Primary Reading MAP reading assessment achievement.
 - RQ4: Was there a statistically significant association between the scores of third grade teachers in the low range on Tschannen-Moran and Woolfolk Hoy Teachers' Sense of Efficacy Scale (TSES) and their achievement third grade students on the Fountas & Pinnell Oral Reading assessment?
 - H_a: There would be a statistically significant association between the teachers' score on the TSES and third grade students' reading assessment achievement scores on the Fountas & Pinnell Oral Reading assessment.
 - H₀: There would not be a statistically significant association between the teachers' scores on the TSES self-efficacy survey and the third grade students' Fountas & Pinnell Oral Reading assessment achievement.

Statistical Analysis

To investigate associations between teacher efficacy and improvement in students' reading skills, I conducted correlational analyses. However, before these correlations were determined, the data were tested for normality to meet the assumption required for Pearson correlation. Each variable was defined as expected if the skewness statistic was less than 2 and the kurtosis statistic was less than 7 (Hair et al., 2010), and if the Q-Q plots appeared normal.

Results

The null hypothesis was not rejected for each of the four research questions.

Table 2 presents the sample size, mean, and standard deviation for teacher efficacy, change in Fountas & Pinnell scores and change in Measures of Academic Progress scores.

Paired-samples t tests showed that third grade reading improved from fall to spring semester for both measures (Fountas & Pinnell $t(827) = 70.88, p < 10^{-16}$ and Measures of Academic Progress $t(827) = 38.20, p < 10^{-16}$).

Table 2

Descriptive Statistics of Teacher Efficacy and Reading Improvement Scores

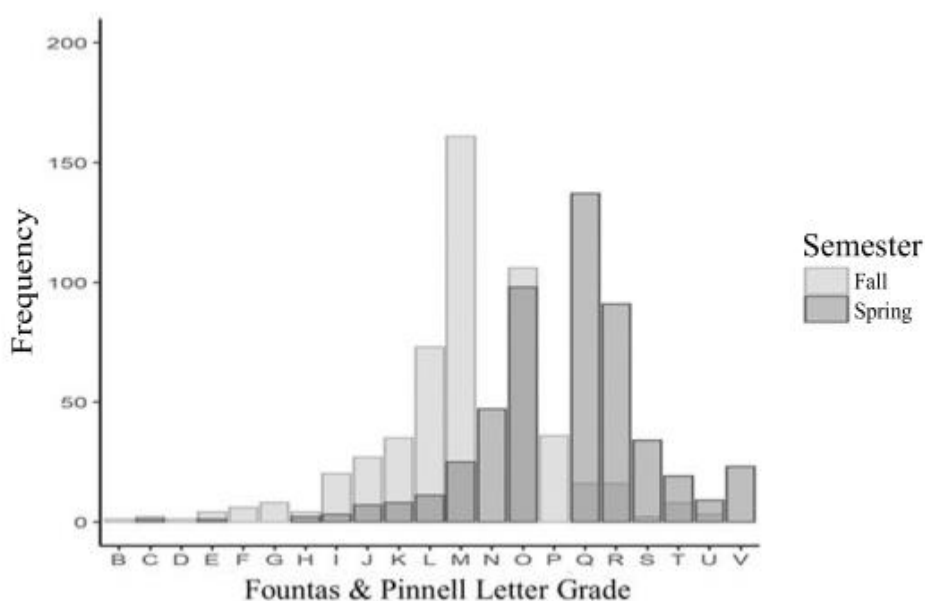
Measure	n	M	SD	Skewness	Kurtosis
Teacher Efficacy	27	47.50	5.51	1.33	1.93
Fountas & Pinnell	828	2.81	1.14	0.97	1.50
Measures of Academic Progress	828	11.71	8.82	0.27	0.56

Note. Figures 1 and 2 show the frequencies of each score for the two semesters.

In Figure 1, most students were at level M at the beginning of the year and Q by the end of the year. They made appropriate growth after a year of instruction.

Figure 1

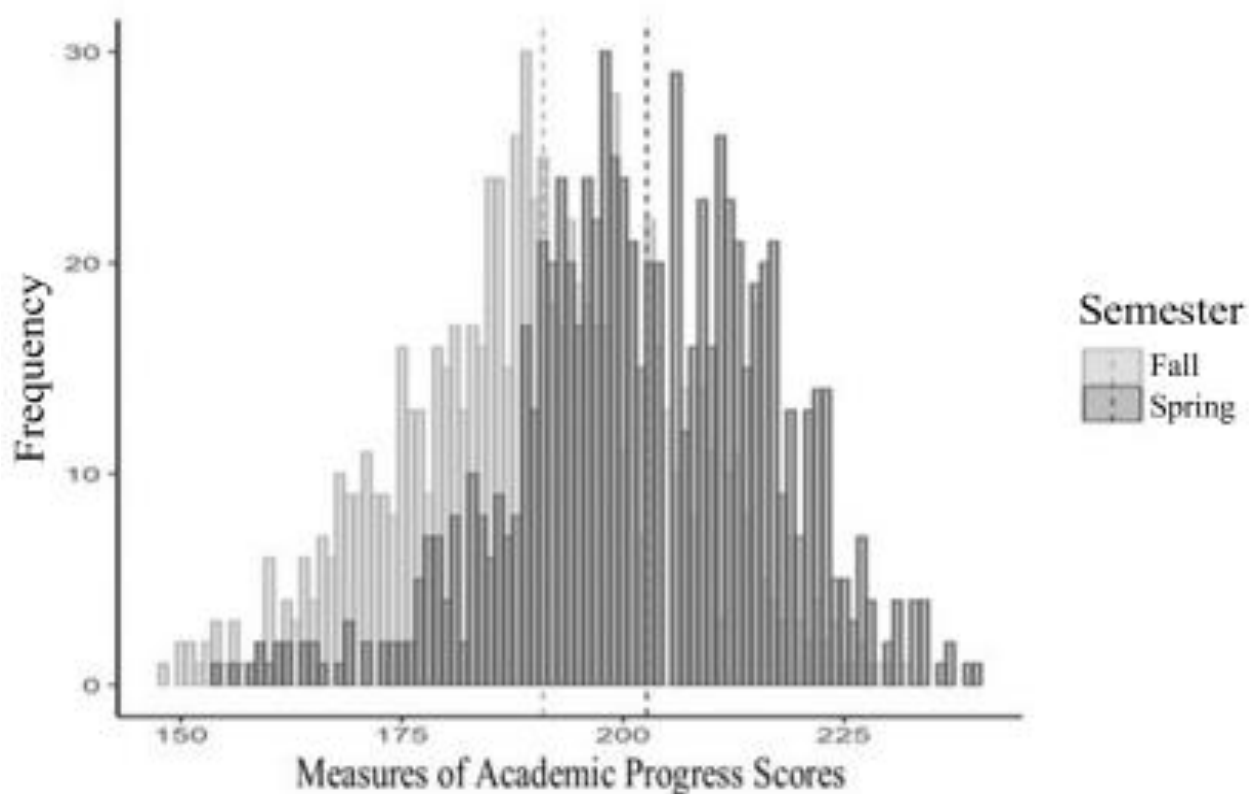
Frequency of Fountas & Pinnell Letter Scores for Each Semester



In Figure 2, third grade students whose RIT score was 175 at the beginning of the year and 195 by the end of the year are reading proficiently.

Figure 2

Frequency of Measures of Academic Progress Scores for Each Semester



Note. Vertical dashed lines represent mean scores for each semester.

Pearson correlations were conducted on all three measures because they displayed sufficient normality. The correlation between teacher efficacy and Fountas & Pinnell Oral Reading Assessment improvement was negative but nonsignificant, $r = -.04$, $p = .308$. The correlation between teacher efficacy and improvement on Measures of Academic Progress also was not statistically significant, $r = -.05$, $p = .133$.

Figures 3 and 4 display the scatter plots between teacher efficacy and the two reading variables. Figure 3 shows the relationship between teacher efficacy scores and the Fountas & Pinnell Oral Reading Assessment values.

Figure 3

Teacher Efficacy and Change in Fountas & Pinnell Score

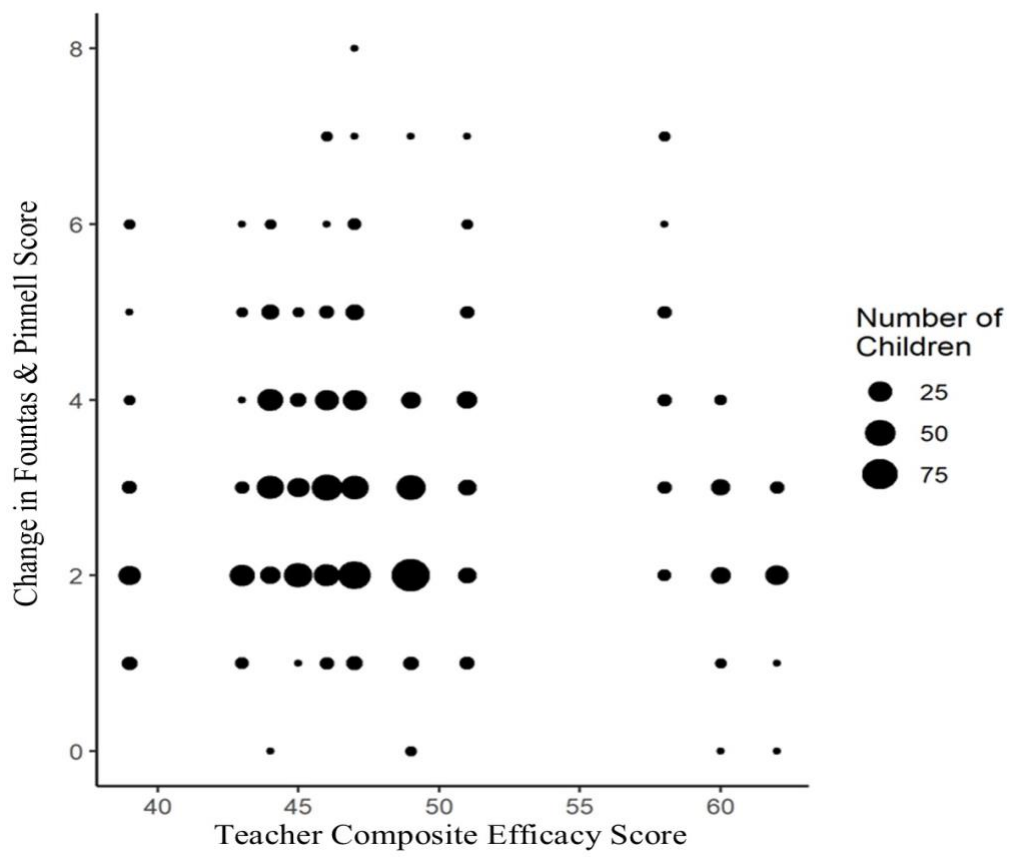
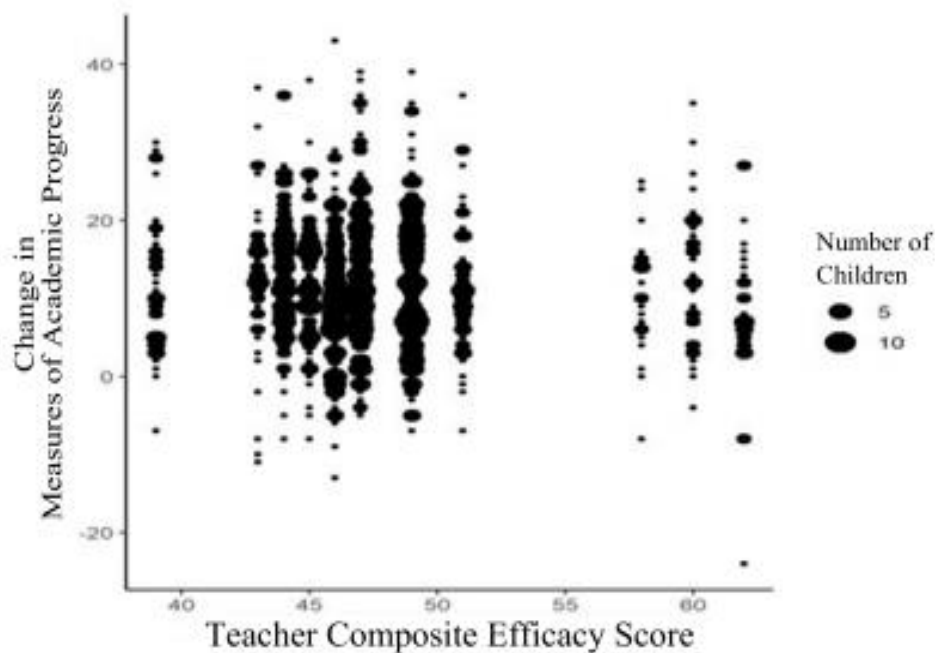


Figure 4 shows the relationship between the teacher efficacy scores and the values for the MAP reading assessment.

Figure 4

Teacher Efficacy and Change in Measures of Academic Progress Score



Summary

In this chapter, the I presented the data from this research study and reviewed analysis procedures. The purpose of this study was to determine if there was a statistically significant association between third grade teachers' self-efficacy and their students' achievement on two standardized reading assessment. The results of the study indicated that there was no statistically significant association between the variables; therefore, I did not reject the null hypothesis for each of the four research questions.

Chapter 5: Interpretations, Conclusions, and Recommendations

The results of the study contradicted a significant amount of literature which indicated that teacher self-efficacy was positively associated with improved student achievement. The null hypothesis was not rejected for each of the four research questions. The results of the study indicated that there was not a statistically significant association between third grade teachers' self-efficacy and the reading scores of their students on the two standardized assessments. I found several prominent studies which indicated that teachers who believed they were effective in the classroom were, in fact, more likely to have students who made greater educational achievement than students whose teachers questioned their effectiveness in the classroom (Bandura, 2006; Hattie, 2012; Saunders, 2013; Tschannen-Moran & Woolfolk Hoy, 2001). Hattie (2012) wrote that teachers' perceptions and actions matter and when teachers realize they, in fact, can support educational equity, they are more likely to develop students who demonstrate greater academic improvement. Rodriguez (2013) equated teachers' perceptions of their effectiveness with their competence and qualifications to teach.

Confident, skilled teachers who improve their instructional practices are able to use a wide variety of interventions to meet students' needs (Hattie, 2012; Tomlinson, 2017a, 2017b). Improved teacher confidence and sense of professional mastery were accompanied by students' success (Dixon et al., 2014; Dubas & Toledo, 2016; Kafele, 2016; Marzano et al., 2017; Terada, 2016). Several studies reported that teachers who believed themselves to be effective were more engaged in the classroom and were better able to assist students to overcome challenges (Çaycı, 2011; De Neve et al., 2015; Dixon et al., 2014).

Threats to Internal Validity

Because the results of this study contradict a large body of literature as to the association between teacher self-efficacy and improvement in student learning, I reviewed the study with a

consideration of possible threats to internal validity. Threats to internal validity of a study refer to actions or events outside of a study that affect the degree to which the dependent variable is affected by manipulation of the independent variable.

Traditional threats to internal validity have included history, maturation, testing, instruments, statistical regression to the mean, differential selection, and mortality. I included an additional threat to the internal validity of the study: the fact that the research was conducted during a pandemic that had pervasive effects on almost every aspect of the educational experience as well as life in general.

History

Researchers define the threat of history on a study's internal validity as the effect historical events can have on research populations (Ranker et al., 2015). According to Ranker et al. (2015), "observed program results may be explained by events or experiences (external) that impact the individual between program participation and follow up" (p. 6). Reis and Judd (2014) wrote that the threat of history on the internal validity of a project as external events that may affect the study. It is likely that the pandemic exerted a powerful effect on both teachers and students. It has been pointed out in a previous chapter that the teachers completed the self-efficacy surveys during the 2020–2021 school year. However, because of the pandemic, I had no choice other than to use student results on the MAP assessment and the Fountas & Pinnell assessment from the 2018–2019 school year, which was the last school year when valid assessment results were available.

Maturation

A definition of maturation follows: states of being or discrete characteristics that came about independently of the experimental treatment (Reis & Judd, 2014). Other researchers describe maturation as dependent on the growth, development, age, and mental health over time

of individuals participating in a research study (Ranker et al., 2015). I do not believe that maturation affected the internal validity of the study.

Testing

How researchers set up testing and answer any ambiguities is vital to a valid research study (Reis & Judd, 2014). Because of the pandemic, the district operated virtually for long periods of the 2019–2020 and 2020–2021 school years. Teachers completed the self-efficacy survey during the 2020–2021 school year. During the 2019–2020 and 2020–2021 school years, students were asked to complete the MAP assessment and the Fountas & Pinnell assessment virtually, working from home with no supervision. A large percent of students did not complete either assessment. Many of the students who did not complete the assessments were members of groups that historically have underperformed on similar assessments. Therefore, I believe that testing had an impact on the internal validity of the study.

Instruments

Researchers can limit the threat of instruments affecting validity by using reliable instruments and administering the tests consistently throughout the study (Ranker et al., 2015). Testing procedures and administrations should be limited in time and scope for more valid results (Ranker et al., 2015). I am confident that all instruments used in the study are valid and reliable and did not affect the internal validity of the study.

Statistical Regression to the Mean

Regressions to the mean refers to the tendency of research outcomes to move toward the mean over time (Barnett et al., 2005). Researchers can negate the threat of statistical regression to the mean by suitable statistical methods and good study design (Barnett et al., 2005). I do not believe that statistical regression to the mean affected the internal validity of the study.

Differential Selection

When researchers examine the differences between a nonequivalent comparison group versus the group exposed to an assessment, they must guard against differential selection because the difference in scores could reflect the difference between the groups rather than any effect the intervention caused (Price et al., 2021; Ranker et al., 2015) I do not believe that differential selection affected the internal validity of the study.

Mortality

Mortality affects long-running research studies because of the likelihood of subjects' life changes such as moving, significant shifts in availability, or even death (Ranker et al., 2015). The research does not believe that mortality affected the internal validity of the study.

Summary of Findings

The correlation between teacher efficacy and Fountas & Pinnell Oral Reading Assessment improvement was negative but nonsignificant. The correlation between teacher efficacy and improvement on Measures of Academic Progress also was not statistically significant. The variables were neither changed nor controlled by the others; they moved independently of each other and there was no strength in the correlation.

Interpretation of Findings

Students' reading scores improved from the fall semester to the spring semester, as seen in the two *t* tests presented at the beginning of the results section in Chapter 4, Figures 1 and 2. Students learned and developed cognitively at appropriate and expected levels.

Tschannen-Moran and Woolfolk Hoy (2006) explained that teachers believed that by teaching effectively, they affected students' learning opportunities. Holzberger et al. (2013) wrote that teachers who felt effective positively affected students' academics. Efficacy was a predictor of quality within three elements: "cognitive activation (the degree of challenge and

engagement that instruction provides students), classroom management (structure and order provided during lessons), and individual learning support (monitoring of the learning process)" (p. 1). Many researchers reported that teacher efficacy was one of the essential components of reading fluency (Roskos & Neuman, 2014; Saunders, 2013; Valiandes, 2015).

The results of the Primary Reading MAP and Fountas & Pinnell Oral Reading Assessment correlated weakly with each other, and it could be the case that they measure different aspects of reading ability. Ultimately, a significant correlation was not found, but a negative correlation is not a limitation of the study because there are many predictors of reading achievement/improvement, and there are different components/aspects of improving reading ability.

In the results, teacher efficacy and the two reading assessments were not significantly correlated in the expected direction. This finding was unexpected because many researchers have commented on the effect of teacher efficacy on students' reading scores. I was able to find few studies that questioned the effect of teacher self-efficacy on student achievement. However, Sture (2014) wrote,

Although the (research) findings affirmed those from previous research showing a positive relationship between teacher self-efficacy and instructional quality, the longitudinal analysis revealed only partial support for the view that self-efficacy is a predictor as well as] an outcome of instructional quality. (p. 14)

I believed that because of the disruption created by the pandemic, several threats to internal validity affected the study result as has been explained earlier in this chapter.

Implications of Findings

The focus of this research is on the importance of teacher efficacy. A significant amount of research suggests teacher efficacy is associated with students' improved achievement. I

believe that because of the disruption created by the pandemic in all aspects of not only education but life in general, several threats to internal validity affected the study results as was explained earlier in this chapter and may explain why the results of this study contradict most of the literature on this subject.

Limitations and Delimitations of the Study

The primary limitation of this study was that it was conducted during a once in a century pandemic, which disrupted every aspect of the educational experience and life in general and created several serious threats to the internal validity of the study that have already been discussed in this chapter. Other delimitations to the study included the small sample size, delimiting the study to one grade in one district, and delimiting the study to a quantitative only approach.

Recommendations for Future Research

Developing a thorough understanding of the association between teacher efficacy and student achievement is vital if educators want to maximize student development and growth. I see the need to conduct similar studies in the future and has three recommendations for future research.

1. Repeat the study during nonpandemic conditions.
2. Repeat the study on a larger scale and in school districts of varying student compositions and social-economic groups.
3. Add a qualitative component to the study, including semistructured teacher interviews and a teacher focus group with the expectation that a mixed method approach would produce a richer understanding of the research topic.

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Appendix A: Author Permission to Use TSES



ANITA WOOLFOLK HOY, PH.D.

PROFESSOR
PSYCHOLOGICAL STUDIES IN EDUCATION

Dear

You have my permission to use the *Teachers' Sense of Efficacy Scale* in your research. A copy the scoring instructions can be found at:

<http://u.osu.edu/hoy.17/research/instruments/>

Best wishes in your work,

A handwritten signature in cursive script that reads 'Anita Woolfolk Hoy'.

Anita Woolfolk Hoy, Ph.D.
Professor Emeritus

Appendix B: Teachers' Sense of Efficacy Scale

Teachers' Sense of Efficacy Scale¹ (short form)

Teacher Beliefs		How much can you do?								
<p>Directions: This questionnaire is designed to help us gain a better understanding of the kinds of things that create difficulties for teachers in their school activities. Please indicate your opinion about each of the statements below. Your answers are confidential.</p>		Nothing	Very Little			Some Influence		Quite A Bit		A Great Deal
1.	How much can you do to control disruptive behavior in the classroom?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2.	How much can you do to motivate students who show low interest in school work?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
3.	How much can you do to get students to believe they can do well in school work?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
4.	How much can you do to help your students value learning?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
5.	To what extent can you craft good questions for your students?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
6.	How much can you do to get children to follow classroom rules?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
7.	How much can you do to calm a student who is disruptive or noisy?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
8.	How well can you establish a classroom management system with each group of students?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
9.	How much can you use a variety of assessment strategies?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
10.	To what extent can you provide an alternative explanation or example when students are confused?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
11.	How much can you assist families in helping their children do well in school?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
12.	How well can you implement alternative strategies in your classroom?	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

Appendix C: Directions for Scoring the Teachers' Sense of Efficacy Scale

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Construct Validity

For information on the construct validity of the Teachers' Sense of Efficacy Scale, see:

Tschannen-Moran, M., & Woolfolk Hoy, A. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education, 17*, 783-805.

Factor Analysis

It is important to conduct a factor analysis to determine how your participants respond to the questions. We have consistently found three moderately correlated factors: *Efficacy in Student Engagement*, *Efficacy in Instructional Practices*, and *Efficacy in Classroom Management*, but at times the make up the scales varies slightly. With preservice teachers we recommend that the full 24-item scale (or 12-item short form) be used because the factor structure often is less distinct for these respondents.

Subscale Scores

To determine the *Efficacy in Student Engagement*, *Efficacy in Instructional Practices*, and *Efficacy in Classroom Management* subscale scores, we compute unweighted means of the items that load on each factor. Generally, these groupings are:

Long Form

<i>Efficacy in Student Engagement:</i>	Items 1, 2, 4, 6, 9, 12, 14, 22
<i>Efficacy in Instructional Strategies:</i>	Items 7, 10, 11, 17, 18, 20, 23, 24
<i>Efficacy in Classroom Management:</i>	Items 3, 5, 8, 13, 15, 16, 19, 21

Short Form

<i>Efficacy in Student Engagement:</i>	Items 2, 3, 4, 11
<i>Efficacy in Instructional Strategies:</i>	Items 5, 9, 10, 12
<i>Efficacy in Classroom Management:</i>	Items 1, 6, 7, 8

Reliabilities

In Tschannen-Moran, M., & Woolfolk Hoy, A. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education*, 17, 783-805, the following were found:

Table C1

Reliability and Validity of Teachers' Sense of Efficacy Scale

	Long Form			Short Form		
	Mean	SD	alpha	Mean	SD	alpha
TSES (OSTES)	7.1	.94	.94	7.1	.98	.90
Engagement	7.3	1.1	.87	7.2	1.2	.81
Instruction	7.3	1.1	.91	7.3	1.2	.86
Management	6.7	1.1	.90	6.7	1.2	.86

Note. Because this instrument was developed at the Ohio State University, it is sometimes referred to as the *Ohio State Teacher Efficacy Scale* (OSTES). We prefer the name, *Teachers' Sense of Efficacy Scale* (TSES).

Appendix D: IRB Approval