THE EFFECTS OF DATA-DRIVEN INSTRUCTIONAL LEADERSHIP ON STUDENT ACHIEVEMENT

by

Hayward Mark Chandler

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

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ABSTRACT

Instructional leadership is key in reaching educational goals for students. Data-driven instructional leadership leveraged to improve teachers' instructional practices provides opportunities for teachers to reflect, collaborate, and improve instructional practice. Data-driven leadership has been studied, but achievement results have not been a common topic. It is of value to understand the aspects of school leadership with causal nexus to student outcomes and what actions by leaders are associated with positive student outcomes. This study examined the achievement scores of four groups of schools (N= 81) in the state of New Mexico. The treatment groups leveraged data-driven practices, while the control groups did not use formalized data-driven practices. A causal-comparative design with a *t*-test analysis was conducted on the differences of achievement scores based on the Partnership for Assessment of Readiness for College and Career assessment. Results of independent samples *t*-tests did not reveal a statistically significant difference between data-driven groups and nondata-driven groups on neither reading nor math achievement outcomes. However, the mean averages of data-driven groups were higher than the nondata-driven groups on both academic measures.

Keywords: instructional leadership, data, achievement, collaboration, leadership, instructional practices

Dedication

This manuscript is dedicated to my Lord and Savior, Jesus Christ. His love, calling on my life, and constant presence have both provided the foundation for this work and paved the path to the completion of it. To my parents (Boyce and Sue) who provided me with a childhood experience which taught me spiritual, moral, and work ethic lessons that have stood the test of time. To my brother, Sanford - without his support, encouragement, example, influence, and love I might never had sought to pursue any higher educational goals. To my children, Kelsi, Elijah, and Lucas who have endured lost time from their dad as he got another degree, who constantly provided me with laughter, inspiration, reflection, and joy. Their incredible strength, intelligence, and love never ceased to amaze me. Bethany, Jacob, and Karissia have provided ongoing positive encouragement to and interest in my progress and success. George Bickert, my friend, my brother, my heart is full, and you understand. To my beautiful (Nizhoni) wife, Char, this would not be possible without her. The long hours of reading, sorting data, editing, giving feedback, discussing, and listening are only the tip of the iceberg in describing her demonstrated sacrifice. Her patience, understanding, encouragement, support, and love made this dream a reality. I can never repay her. I love you Babe!

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Table of Contents

List of Tables

List of Figures

List of Abbreviations

Academic Culture (AC)

Common Core State Standards (CCSS)

Data-Driven Instructional Leadership (DDIL)

Elementary and Secondary Education Act (ESEA)

Every Student Succeeds Act (ESSA)

New Mexico Public Education Department (NMPED)

No Child Left Behind (NCLB)

Partnership for the Assessment of Readiness for College and Career (PARCC)

Principals Pursuing Excellence Program (PPE)

CHAPTER ONE: INTRODUCTION

Overview

Educational leaders have for decades needed a better understanding of the "paths" (Heck, 2014, p. 653) through which leadership has an established indirect role on student outcomes. This has made the interactions and frameworks of leadership become more important to the field of education (Hattie, 2009). Chapter One provides a background of instructional leadership and the role of using data-driven approaches in educational leadership and instruction. These constructs were examined from a social learning framework of leadership and instructional change. This is followed by a problem statement, a purpose statement, the significance of the study, the research questions, and relevant definitions.

Background

The American educational system struggles with the task of providing students a quality education. Schools are expected to prepare students by passing on the values of democracy and providing each student with an appropriate and equitable education, which in turn will help to protect the competitive edge of America and work to eliminate poverty (Christensen, Horn, & Johnson, 2011). How to accomplish these goals has been the point of much study and debate both within the field of education itself and within the arena of American culture and politics. In 1983 the National Commission on Education released *A Nation at Risk* (Ravitch, 2016). According to Ravitch this report suggested that if American schools strengthened the curriculum, raised graduation requirements, and increased the amount of time in school, they could raise both student achievement and the national economy. Ravitch argued that this did not hold true then nor does it today. Ravitch suggested that the greater threat to American society is inattention to economic, social, and racial inequality. Hacker and Pierson (2017) hold similar views,

purporting that the decline of federal support for education is a major concern. Education is different than other sectors of government or business. Education possesses the unique aspiration to produce not a specific predictable product, but rather seeks to develop individuals "to be thoughtful citizens, competent parents, faithful friends, capable workers, generous neighbors and lifelong learners" (Munro, 2014, p. 115). Within the context of this responsibility, educational leaders have a call to foster the best possible outcomes for students and develop the quality of teachers' instructional practices in the process of school improvement.

Historical Context

Under the Johnson Administration, Congress passed the Elementary and Secondary Education Act (ESEA) in 1965 (Gamson, McDermott, & Reed, 2015). This legislation effectively elevated the federal government's role in educational matters to a new level. Though the states maintained the function of educational administration, the federal government established a vested interest in and financial commitment to the educational institution. The aim was to provide educational access to those who needed it most and hopefully address the issue of poverty through better educational access for students (Gamson, McDermott, & Reed, 2015).

Compliance with the Civil Rights Act resulted in the release of the1966 *Coleman Report* (Dickinson, 2016*)*. This report suggested that factors beyond the jurisdiction of the educational system such as family composition, economic status, and race were more responsible for the academic success of a student than any other single factor (Hanushek, 2016). This report bolstered the use of research in education as well as the use of data in the evaluation of educational outcomes and policy concerns. This construct has persisted since that time and is responsible for linking data to educational policy even today (Hanushek, 2016).

Over time, changes in society, culture, and global economic matters have resulted in the reauthorization of this federal mandate a few times from 1965-2015. However, no significant changes in educational policy or practice were readily observable in federal policy until the G. W. Bush administration introduced the No Child Left Behind (NCLB) Legislation, which Congress passed in 2001. This brought about a new era of accountability to school districts (Saultz, White, Mceachin, Fusarelli, & Fusarelli, 2017) and has heightened focus on what happens in schools and classrooms across the nation (Young, Winn, & Reedy, 2017). Public reporting of standardized high-stakes testing, as well as teacher evaluations based on those test results were mandated by NCLB and have become the norm for the educational landscape during most of the last two decades (Steinberg & Donaldson, 2016).

Even so, little attention was given to educational leadership under federal policies, while public reporting, teacher accountability and evaluations, school progress, and other factors were scrutinized. However, in 2015 under the Obama administration, the most recent reauthorization of the Elementary and Secondary Education Act (ESSA) was signed into law. This version of the law places a greater emphasis on the role of building-level educational leaders and the influence they have on teacher quality and student outcomes (Young et al., 2017).

Through the years, federal policies have had various political and social goals, but improved student achievement has been a common thread. Since 2001 the focus on student achievement has become the priority of these policies (Militello, Jackson, & Wang, 2013).

Beyond the influences outside the control of the school, such as socioeconomic status and family conditions, the teacher has been widely accepted as the single-most important factor associated with student achievement (Hitt & Tucker, 2016). A meta-analysis conducted by Hattie (2009) provided evidence that the most significant influences on student academic

outcomes were the actions and behaviors of the teacher. A body of evidence supports the idea that regarding the improvement of student achievement, one cannot ignore the role of the teacher and the quality of instruction s/he delivers (Goddard, Goddard, Kim, & Miller, 2015; Goddard, Hoy, & Hoy, 2000; Hattie, 2009; Santoyo, Peiser, & Lemove, 2012).

Second only to the impact teachers have on student outcomes is the influence of principals on student learning (Louis, Leithwood, Wahlstrom, Anderson, Michlin, & Mascall, 2010). While these effects have been called indirect by Dumay, Booen, and Van Damme (2013), they are important to student achievement and teacher effectiveness. By promoting efficacy (both individual and collective), placing focus on instructional practices, and collaboration, leaders are able to influence teachers' improved instructional practices resulting in positive student outcomes (Goddard et al., 2015).

In order to transform the interactions between teachers and students into positive and productive educational outcomes, leaders must find ways to leverage data to influence the key aspects associated with the teaching and learning process (Datnow & Hubbard, 2016). In fact, the use of data is now an expectation and a practice that is utilized in both reform and accountability efforts (Levin & Datnow, 2012). As a result of the heightened accountability efforts from the federal government under No Child Left Behind (NCLB) and the Race to the Top Program, the use of data for reporting, teacher evaluations, and accountability has grown exponentially. Ravitch (2016) suggested that the American school system has more data than any other system in the world, and perhaps more confusion about how to best educate students.

Given these changes in politics, policy, and social expectations, the role of leadership exists in a fluid and complex domain. This has shifted the focus and work of the educational leader, as well as the research. Leaders have moved from primarily management tasks to the role

of leading for instruction and achievement (Gordon, Taylor-Backor, & Croteau, 2017; Sheng, Wolff, Kilmer, & Yager, 2017).

Social Context

It is valuable to recognize the social context in which the educational system operates. This social context is the fabric of American life, which has been influenced by a diverse compilation of cultures, languages, traditions, and beliefs. Yet, schools are largely designed for middle class students and inequitable for the unique needs of students from families of lower socioeconomic status (Koppelman, 2017). In fact, since the release of the *Coleman Report* over 50 years ago, the achievement gap between ethnic subgroups has been closed only slightly, while the gap between socioeconomic groups has widened (Hacker & Pierson, 2017).

Holding that "Public education is a foundation stone to democracy," Ravitch (2016, p. XLIII) argued that the citizens of our society are responsible for making sure that all children receive a good education that includes both equity and excellence. Providing a democratic and common educational experience were ideals arising from former leaders such as Mann and Dewey. These goals still influence today's educational system (Gutek, 2011) and are important for educators to embrace and embody.

Educational professionals are given the task by federal mandates and social contracts to deliver an equitable education to a mosaic of students under the current pressures of societal conditions. They are expected to do this through the use of data to demonstrate improvements in student outcomes. Much of the data that educators utilize are used only for accountability and evaluation purposes and are not intentionally used as a driver to improve instruction (Shen et al., 2010). Educators desiring to make improvement in student outcomes need to leverage the use of

data along with daily effective practices in order to improve the quality of their instruction (Slavin, Cheung, Holmes, Madden, & Chamberlain, 2013).

Principals play a key role in facilitating data use among teachers (Datnow & Hubbard, 2016). Principals leveraging the use of data as a leadership approach for improving school performance has been identified by some researchers as the most promising way to help move schools forward on a large scale (Sun, Johnson, & Przybylski, 2016). One use of data by principals is observation and feedback. According to Ing (2013), the intentional use of observation and feedback with a focus on instructional improvement showed a positive significant relationship to the instructional climate of a school and assisted in generating positive student outcomes. Marsh and Farrell (2015) provided support for the idea that while administrators have observational data, more often than not they lack the acumen to use or leverage these data to make substantive changes to instructional practices of teachers.

Other studies provided support for the positive outcomes of using data to drive instructional decisions, which resulted in increased gains in achievement by up to an extra month on standardized assessments (van Geel et al., 2016). Yet Park and Datnow (2016) claimed that still little is known from the literature about how educators specifically use data for instructional decisions.

In relation to instructional leadership, Wang, Bowers, and Fikis (2017) found that over the past 50 years research on educational leadership seems to have been influenced by shifts in politics and societal values. This has resulted in a diversity of topics in educational research yet concerns about teaching and instructional leadership remained in the top five categorical issues that have been studied. Amid these changes in the social context many support the shift in the role of leadership to a position that can be leveraged to develop teachers through feedback,

reflection, and mentoring (Kraft, Gilmour, & Society for Research on Educational Effectiveness, 2016).

Theoretical Context

Using the theoretical framework based on Bandura's social cognitive theory (Goddard et al., 2015), and aspects of Vygotsky's sociocultural theory (Marsh & Farrell, 2015), this study examined the influence that data-driven practices of leadership have on teacher performance as evidenced in school outcomes. The social constructs of how adults learn from interaction, social environment, and modeling to build and redefine behaviors associated with learning are key aspects of the framework. These constructs can be seen in efforts by Santoyo, Peiser, and Lemove (2012) and Glover (2017) and deserve a purposeful examination of their effectiveness in other contexts. An important construct in this study is the relationship between principals and teachers. This type of learning in a collaborative environment within the context of the natural and social world and based on human relationships (Gutek, 201, p. 359) illustrates what Dewey advocated for and envisioned.

Likewise, the theoretical context of this study assumes that human behavior does not occur in a vacuum and relational interactions provide individuals or groups to solve problems collaboratively. Bambrick-Santoyo (2018) summed up the core idea for this construct by stating, "What really makes education effective is well-leveraged leadership that ensures great teaching to guarantee great learning" (p. 6). The outcome of this study should be viewed through the lens of the aforementioned theoretical framework and how interactions and relationships of leaders and teachers demonstrating data-driven instructional practices in a collaborative manner might affect improvements in instructional practices leading to positive student outcomes.

Problem Statement

Given that principals' roles in student educational outcomes are second only to the influence of teachers' actions and attitudes for student achievement (Louis et al., 2010; Brown, 2015) studying the influence of leaders' behaviors upon student achievement is important. The idea that principals' use of data in leading schools is the most prominent way to help move schools forward creates the need to understand how these data are used and how it might be better utilized by leaders (Sun et al., 2016). Exactly what data are used and how the data are used remains a challenge to educators. An aphorism about this idea is that schools are data rich and information poor. Administrators face the challenge of leveraging data to improve instruction and educational outcomes for students. This approach stands in stark contrast to the construct of using data to evaluate teachers and categorizing students and schools by their standings on accountability reports.

In a policy report, Gill, Borden, and Hallgren (2014) presented a conceptual framework for data-driven practices. As one of the three constructs, these authors included the use of data to inform instructional decisions. Like other findings in the literature, this stops well short of measuring the effects of a specific model of leadership using data-driven principles that improve the quality of instruction and instructional outcomes.

Evidence suggests that feedback conversations provide opportunities to utilize observational data to improve teacher instruction (Mihaly et al., 2018). However, there is little research that leaders can reference to develop skills that would enhance the ability to provide teachers with feedback that improves either quality of teacher instruction or student outcomes.

While the literature provides support for the use of data and strong leadership, it falls short of providing strong empirical evidence to a nexus of these factors with student or school

outcomes. It is of value to provide leaders with evidence of leadership practices that use data to foster positive student or overall school outcomes. The problem is that there is a need to identify an effective way in which principals can leverage data from observational and assessment sources to improve teachers' instructional practices and consequently student educational outcomes.

Purpose Statement

The purpose of this quantitative, causal-comparative study was to compare the reading and math achievement scores from the Partnership Assessment for College and Career Readiness (PARCC) between schools utilizing data-driven practices and schools not using such practices in the state of New Mexico. The independent variable is instructional leadership practices utilized by the various schools (data-driven instructional leadership and non-data-driven leadership). Instructional leadership practices are defined as the "active collaboration of principal and teacher on curriculum, instruction, and assessment" (Marks & Printy, 2003, p. 371) wherein "the principal seeks out the ideas, insights, and expertise of teachers… and works with teachers for school improvement" (Marks & Printy, 2003 p. 371). These practices effectively link summative and formative assessment results to inform instructional decisions and assist in the improvement of instruction and student achievement (Halverson et al., 2007). The dependent variable is the reading and math achievement scores from the Partnership for Assessment of Readiness for College and Careers Readiness (PARCC). The reading and math achievement scores, measured by the Partnership for Assessment of Readiness for College and Careers (PARCC) (reported as a percentage on a continuous scale from 0-100; Green & Salkind, 2017) and are maintained on the New Mexico Public Education Department's Accountability page. Reading and math achievement scores on the PARCC assessment are defined as the school average proficiency scores for reading and math reported as a percentage of 100. These scores

are a standardized measure of students' reading vocabulary, general ability to read, ability to read and draw meaning from both informational text and literature, mathematical reasoning ability, mathematical conceptualization, modeling practice, and general content knowledge of math. In this study these scores are reported as the average school level percentage proficient for grades three through eight.

The independent variable of leadership practices consisted of two groups: one group of 39 schools that participated in the New Mexico Public Education Department's Principals Pursuing Excellence Program (PPE) and the second group of 42 that did not. The PPE schools implemented leadership principles and practices focused on data-driven instructional leadership.

The Partnership for Assessment of Readiness for College and Careers (PARCC) is designed with the intention of determining whether or not students are ready for college and have the likelihood of earning at least a C on college work. PARCC has five levels of proficiency. Student scores in the top two levels (proficient and advanced) have been shown to have an 89% chance of earning a C in college level work (Nichols-Barrer, Place, Dillon, & Gill, 2016). The PARCC exam is designed to measure the Common Core State Standards with complex reading, writing, and math tasks (Gewertz, 2015). PARCC is a type of standardized assessment that yields proficiency scores defined as the level of performance needed to meet or exceed standards of a given grade level (Doorey & Polikoff, 2016).

According to Martinez (2017), New Mexico schools have a population that includes 48% of students of Hispanic ethnicity and 10.5% of students of Native American ethnicity. Additionally, Martinez (2017) stated that for 20 years New Mexico has not met the national average on standardized measures of basic academic domains. The state serves some 340,000 students in almost 900 schools, spending an average of $9,734 per child. The percentage of

students receiving free and reduced lunch is 62.5%, with an English Language Learner rate of 14.4% (Education Week, 2019).

The population of this study encompassed 336 elementary and middle schools in New Mexico that received a score on their state report card in the range from 0 to 49.9 and assigned a D or an F for the 2014 and or the 2015 school year(s). The sample for the study consisted of 81 schools drawn from the 336 (50) elementary and (31) middle schools that earned a D or F on their state report cards in the 2014 or 2015 school years. From this sample, schools that were participants of the Principals Pursuing Excellence Program formed the treatment groups as a convivence sample. The control groups were randomly selected from the remaining 297 D and F schools that did not participate in the program using simple random sampling. Demographic composition of the schools in the sample consisted of total population of 30,970 including 15,784 male students, 15,107 female students, 5,072 students of Anglo ethnicity, 343 students of African American ethnicity, 18,929 students of Hispanic ethnicity, 56 students of Asian ethnicity, and 6,094 students of Native American ethnicity. The sample represents 27,474 students belonging to economically disadvantaged families, 6,167 students identified as English Language Learners, and 4,521 students with disabilities.

While a body of research exists on data-driven leadership, few studies have examined the model of data-driven instructional leadership's effect on standardized scores or school outcomes (Datnow & Hubbard, 2016; Yoon, 2016). Research has suggested that more research needs to be completed that provides evidence of success in regard to the relationship that exists between data-driven instructional leadership practices and student outcomes (Datnow & Hubbard, 2016; Yoon, 2016).

Significance of the Study

The significance of this study to the field of education was to provide educational

leaders with evidence in relation to the approach taken to improve quality instruction and positive student outcomes. In a related study, Sun et al. (2016) stated that fostering collaborative data-based practices contributed to positive student outcomes, but the results were largely descriptive and inconsistent. The researcher examined the effects of leadership behaviors regarding data-driven practices including observation, coaching, and feedback on school achievement outcomes. This evidence will help guide educational leaders' practice, and support the importance of instructional leadership as it pertains to the quality and improvement of instruction. Slavin et al. (2013) found that the simple use of data was not enough if leaders failed to bring about effective change in teacher practices. While instructional change has been shown to happen (Sleegers, Thoonen, Oort, & Peetsma, 2014), more insight is needed as to the leadership activities that help to build school capacity for instructional change. Leaders applying this model can more efficiently and effectively leverage their time and skills to the important aspects of the teaching and learning process. Ultimately this process, as implemented by leaders, should improve student achievement and school performance.

This study sought to provide evidence of how leadership can influence student standardized achievement outcomes and the improvement of instructional practices of teachers. The aspect of improved quality of instruction is key to all aspects of the educational field (Bambrick-Santoyo et al., 2012; Hattie 2009). If leaders leverage observational data, feedback, and student data to focus on teachers' instructional practices, the teaching and learning community can reap the benefits through positive changes in instruction, which leads to improved student achievement (Foster, 2018). In alignment with the Center for Educational Research's stated theory of action, this study is intended to support the idea that the quality of instruction is the most critical aspect of the teaching and learning process. Therefore,

empowering leaders to support the development of high-quality instruction adds value to the field of educational leadership by providing leaders with a direction of focus and a given leadership framework from which to implement such an approach.

Many educators assume they are providing instruction that best meets students' needs but according to Goodwin and Webb (2014), teachers could not effectively identify research-based educational strategies. Educational research is underutilized (Hattie, 2009) and does little good for students when it is not leveraged for their good. The relationship between teachers and students is the critical point of the teaching and learning process (Hattie, 2009). Leaders must assume the role of being the teacher of teachers if the outcomes for students are truly the end goal. Otherwise, a principal becomes merely a manager and not an instructional leader (Sheng et al., 2017).

The goal of this study was to provide supporting evidence as to whether or not engaged instructional leadership based on data, research-based best practices, and relationships make any difference in teaching and learning (Marsh, Bertrand, & Huguet, 2015). Such evidence will provide opportunities for researchers to consider the more specific actions of leaders in this capacity and how they influence student outcomes.

Research Questions

The research questions for this study are:

RQ1: Is there a difference in the reading scores on the Partnership for College and Career Readiness Assessment between schools that used data-driven instructional leadership practices and those schools that did not use data-driven instructional leadership practices?

RQ2: Is there a difference in the math scores on the Partnership for College

and Career Readiness Assessment between schools that used data-driven instructional leadership practices and those schools that did not use data-driven instructional leadership practices?

Definitions

1. *Instructional Leadership*- Instructional leadership is the conceptual framework explaining the interactions between principals and teachers with respect to leadership and instructional behaviors that result in an effect on student academic outcomes (Boyce & Bowers, 2018).
2. *Data-driven Instructional Leadership Practices*- Data-driven instructional leadership practices are the behaviors that lead to the development of a professional community engaging in tasks that systematically acquire, reflect on, and use data to improve school achievement and student learning (Murnane, Sharkey, & Boudett, 2005) by providing a social system that links summative with formative data (Halverson, Grigg, Prichett, & Thomas, 2007).
3. *Educational outcomes*- Educational outcomes refers to the results of national examinations and assessments including college readiness, but not confined to these results (Day, Gu, & Sammons, 2016; Gill et al., 2014).
4. *Data*- Data refers to the formative, diagnostic, and summative assessments used for decision making including the following sources of data: standardized tests, college and career readiness exams, qualitative interviews, observations, focus groups, surveys of staff, students, parents, and community members; financial, human resource, and administrative records; student records and transcripts (Gill et al., 2014).

5. *Instructional practices*- Instructional practices are the adjustments made by teachers to the learning environment that are designed to stimulate changes in learner knowledge. The focus of these adjustments is the presentation of material that facilitates cognitive processing that assists in student learning (Wachen, Harrison, & Cohen-Vogel, 2018).
6. *Coaching*- Coaching is a professional learning strategy interactive with the daily practice of teaching to address immediate problems of practice and target instructional practice in order to improve student learning (Foster, 2018).
7. *Collaboration*- Collaboration is a multi-dimensional construct that guides instructional policy and the formal nature of the work in which educators engage together to improve instruction (Goddard et al., 2015).
8. *Feedback*- Feedback is communication that is timely, frequent, consistent, and accurate; focuses on improving performance, fosters trust in the evaluator, outlines individual strengths and areas for improvement in a fair process that is positive and sets goals to attain (Mihaly et al., 2018).
9. *Evaluation*- Evaluation refers to the summative feedback documenting the performance of teachers - reducing tailored feedback while increasing negative aspects of climate and culture, and is overall more concerned with scores as opposed to improving instructional and pedagogical practices (Mette & Riegal, 2018, pp. 43-44).
10. *Accountability*- Accountability is the pressure based on concerns over academic outcomes for student life opportunities and societal development, and is usually demonstrated by standardized assessment scores (Brown, 2015, p. 71).

CHAPTER TWO: LITERATURE REVIEW

Overview

This study examined data-driven leadership practices in the context of social cognitive theory by comparing achievement results between schools. Chapter Two provides the theoretical framework in which the study is framed and guided, reviews related literature of leadership, instruction, data use, professional development, coaching, capacity building, observation and feedback, and academic improvement.

Theoretical Framework

This causal-comparative study draws from two social theories to form the theoretical framework from which to view the research question. Bandura's (1986) social cognitive theory, also known in the 1960s as social learning theory, was identified by Bandura, a well-known theorist of social behavior (Nelson, 2016). Vygotsky's (1978) sociocultural learning theory can be loosely connected to Bandura's work but places more focus on human social interactions and how they influence learning (Schunk, 2016). Together these theories provide a lens to explain how school culture fostered by principal leadership is likely to be responsible for any differences found in student achievement results (Leithwood & Sun, 2018). This indirect effect is vital as it centers on the interactions, influences, and relationships that an educational leader develops and maintains with teachers and instructional staff. Specific behaviors of leaders that have been linked to some of the strongest influences on student learning are participation in teacher learning, planning, and evaluating instruction (Brown, 2015). The actions taken by leaders that influence these outcomes are those actions that provide opportunities for teachers to reflect, collaborate, and improve on instructional practice. These human activities take place in a social

context. Thus, the aforementioned social theories provide the framework to better understand these functions.

Social Cognitive Theory

Bandura's (1986) social cognitive theory has been used in various studies contributing to the understanding of how people process and learn and as Nelson (2016) reported Bandura is renowned for "identification learning, human motivation, thought, and action" (p. 9). Bandura's ideas include the thought that humans are flexible and adaptable, learn from interactions with their environment, and have the capacity to change their behavior (Schunk, 2016). Specific to the current study social cognitive theory supports the idea that leaders not only have the ability to influence others by social modeling and mentoring but are also able to "self-reflect" (p. 9) resulting in improved performance actions experienced both in their own leadership efforts as well as the instructional practice of the teachers they serve. It is important to note that situational environmental factors can also influence growth and development of individuals, but Bandura believed most human behavior was a result of "observation and modeling" (Nelson, 2016, p. 10). The practice of observation, feedback, and skill practice (modeling with role play) is key in the data-driven instructional leadership practices to be examined by this study.

Bandura's (1986) social cognitive theory has elements of both enactive and vicarious cognitive learning, which are described in this section (Schunk, 2016). Social cognitive theory holds that an individual has interactions with the environment, with various behaviors, and with personal factors such as efficacy. These interactions help to form the cognitive growth and learning within individuals (Nelson, 2016; Schunk, 2016). Enactive cognition arises from the actual experiences in which an individual engages. Vicarious learning results from the observation of others or the models of behavior that others provide. Vicarious cognitive growth

is derived from the observed consequences (and the emotional stimulation they elicit) of the observed model or behavior. Bandura purported that both enactive and vicarious cognition interacts with an individual's environment and have a reciprocal effect on the individual and the environment (Schunk, 2016).

The psychological framework explaining learning in Bandura's work can be described as the bridge between behaviorism and the cognitive model of learning (Connolly, 2017). The processes associated with the theory are attention, the construction of symbols or representations of what is observed, the ability to recall and use (referred to by Bandura, [1977] as motor responses), those representations, and the application of these to guide behaviors or actions. Critical in this process is motivation or the will to do the things observed (Connolly, 2017). In his own work Bandura (1977) defined these aspects and suggested that an individual's level of response in the imitation of a specific behavior was directly related to the influence which the observed model (or exemplar) held with the individual. Applied to the current study teachers are more apt to improve or change instructional practices when they observe their leader taking an active role in observing instruction, providing feedback, participating in collaborative planning efforts focused on instructional improvement, and actually modeling the expected instructional practices during the coaching and collaborative process. This process is both a relational and social action.

Extending the nexus between social cognitive theory and the current study Wood and Bandura (1989) purported that "Mastery modeling has been widely used with good results to develop intellectual, social, and behavioral competencies" (p. 363). Wood and Bandura outlined the aspects of this construct, which are instrumental to contemporary classroom instruction. These include an effective modeling of the desired skill(s), opportunities to practice these skills

with guidance and feedback of an expert or mentor (role playing, which is a part of the data-driven model of this study), and independent exercise of the skill by the individual for a mastery experience (the individual needs to experience success with the new skill for purposes of efficacy). According to Wood and Bandura the individual developing a new skill will be more likely to leverage the new skill if the specific modeled behavior(s) align with outcomes the individual considered as preferred and positive in nature. With this idea in mind the importance of a given leader's behavior in carrying out the practices of data-driven instructional leadership is highlighted. A leader that functions as a supportive coach rather than a compliance officer can be viewed as both a necessary and productive shift in the implementation of data-driven instructional leadership. This shift in roles by the leader from that of evaluator to mentor or coach serves to foster positive changes and improvement in instructional practices (Glickman, 2002).

Mccormick and Martinko (2004) provided support for the relationship social cognitive theory has with data-driven instructional leadership. Mccormick and Martinko described social cognitive theory as a "dynamic process…of reciprocal relationships" (p. 2), which has been used widely to define a number of "human phenomenon" (p. 2) including decision making and job performance. These aspects are at the heart of changes influenced by data-driven instructional leadership. Mccormick and Martinko also indicated that social cognitive theory provides opportunities for self-regulation, motivation, action, and other critical traits which are necessary for leading changes within the framework of data-driven instructional leadership practices.

Efficacy

Self-efficacy is an important aspect of social cognitive theory. According to Schunk (2016), self-efficacy was defined by Bandura as "personal beliefs about one's capabilities to

learn or perform actions at designated levels" (p. 142). Bandura's theory addresses teacher self-efficacy as well as student self-efficacy, which can be an important link in the learning process (Schunk). Teacher self-efficacy has been the subject of a broad body of literature and research in the past, and more recently Goddard et al. (2015) studied the influence "collective efficacy" (p. 510) as reported by teachers had on student achievement. Other fields of study have also shown that efficacy is important to overall organizational success (Cai, Li & Guan, 2016). Cai, Li, and Guan found that information sharing by managers improved team efficacy and cooperation. Further, they stated that "Mutual investment in relationship fosters the highest level of knowledge sharing" (p. 675). The construct of efficacy as well as the more socially based concept of collective efficacy forms underlying assumptions of this study.

The assumption is that efficacy, and specifically collective efficacy, is dependent on professional collaboration, social interactions, and enactive and vicarious learning. Specifically, how these constructs interact with the instructional leadership of the principal is important to this proposed study. Principals who foster learning environments that promote collaboration, teacher buy-in, efficacious ideas, and positive changes in instructional practices among staff members have established environments conducive for the use of data-driven practices (Leithwood & Sun, 2018). Consequently, when this type of environment has been fostered, improvement in student outcomes have occurred (Leithwood & Sun, 2018). Glover (2017) relied on social learning theory to help explain the influences that coaching, modeling, providing practice, and feedback have on changes in classroom practices that lead to improved student performance (p. 14). In a study on a related topic Dunn, Airola, Lo, and Garrison (2013) cited teacher efficacy as viewed through social cognitive theory as critical to teacher growth in both data use and collaboration for improved practices.

An important concept of social cognitive theory is that of human agency (Kim and Baylor, 2006). Within the understanding of agency, individuals leverage behaviors or actions to bring about desired outcomes (p. 578). Three aspects of this idea provide a framework for growth and development especially as it relates to the proposed study. Kim and Baylor suggested that personal agency (what is controlled by the individual learner), proxy agency (social modeling), and collective agency (collaboration; pp. 579-581) work together as social cognitive theory to facilitate growth and development of individuals and groups.

Underlying assumptions of the proposed study also include ideas from the social cognitive theory that self-efficacy is able to mediate fears of failure while supporting one's ability to strive to reach goals established from set challenges (Sleegers et al., 2014). Of more significance to the current study, these authors supported the idea that social cognitive theory provided for the development of individual learners as they responded to a life experienced collectively (pointing to collective efficacy).

Sociocultural Learning Theory

Considered by some as one of the oldest and most powerful social theories (Gillani, 2000) Vygotsky's socially based learning and development ideas help to shape the current study. These ideals provide a framework for the principles of data-driven leadership practices to take root by fostering cultures of "communication styles, personalities, cognitive abilities… out of cultural interactions" (p. 186). Additionally, Lantolf, Thorne, and Poehner (2015) paraphrased Vygotsky, stating that individuals are not separated from the social world but are rather social beings that leverage social relationships as basis for the qualities responsible for higher order cognitive activity.

Vygotsky (1978) is credited with the idea of sociocultural learning theory (Marsh & Farrell, 2015). This theory assumes that learning is a social event and happens in a social context. Individuals build learning capacity through communities of learning where they establish collaborative relationships with others and can become part of a culture of learning over time (Marsh & Farrell, 2015, p. 274).

Marsh and Farrell (2015) utilized this theory to study the mutually beneficial relationship this idea of social culture supports. The development of teachers' ability to use data is an aspect of this construct. This idea has also been studied at the university level, demonstrating that change in the course of professional practice involved aspects that were based in social contexts (Dancy, Henderson, & Turpen, (2016). The interaction with data as part of "the inter-active web of actors, artifacts, and the situation is the appropriate unit of analysis for studying practice" (Spillane, Halverson, & Diamond, 2001, p. 23). Spillane et al. (2001) provided examples of this kind of interaction comparing it to a pilot landing a plane and to students using a calculator for computation. The "complex multifaceted" (Spillane et al., 2015, p. 150) interactions and composition of instruction is important for educational leaders to keep in mind as they provide guidance and mentorship in the daily work of leading instruction in the relational context of the profession (Spillane, 2015, p. 26).

Other research supports the idea that teachers as learners within an interactive environment have an influence on instructional practices (Sleegers et al. 2014). Specifically, Sleegers et al. (2014) suggested that efficacy influenced teachers to become interested and participate in learning, which increased their willingness to pursue organizational or school goals. These goals included namely, professional development activities, which in turn influenced the quality of their instruction. This willingness to adjust behaviors has a relationship

to data-driven instructional leadership based in sociocultural learning. The influences on teacher efficacy, quality, and positive instructional changes resulting in improved student outcomes are seen as a result of the sociocultural learning lens that guides this study.

Sociocultural theory's application to this study was supported by Shabani (2016). Shabani discussed four aspects of Vygotsky's work that are suggested to be relevant to the professional development and growth of teachers. Sociocultural theory parallels Bandura's social cognitive theory in the stated four aspects of human development: (a) mediation and tools adopted by society (sociocultural), (b) the integration of mediational tools into an individual's development (ontogenetic), (c) the evolutional development of human's mental capacity across time (phylogenetic), and (d) The moment-to-moment development of language and associated learning during activity (microgenetic). These four aspects of human development were linked to types of professional development. Some of these directly relate to the current study. For example, mentoring, observation and feedback, and actionable research (i.e., data-driven decision making). Vygotsky's ideas provide useful insight in questions of "educational development and transformation" (Marginson & Dang, 2017, p. 127) based in social context.

Zone of Proximal Development

A central concept in Vygotsky's theory is the zone of proximal development (ZPD), which is defined as the "difference between a learner's actual development and his or her potential development assisted by others" (Kim & Baylor 2006, p. 577). The ZPD is the area where individuals can grow past their present level of learning. Nelson (2016) suggested that an individual can advance step-by-step to higher skill levels when working with a mentor under Vygotsky's theory. According to Nelson this can be accomplished through "observation, modeling, training, and mentoring (p. 11). Furthermore, Nelson suggested that the mentoring

relationship has mutual benefits for both the mentor and the mentee. This mentoring relationship is reflective of a data-driven leader providing guidance to instructional staff. Another nexus to data-driven instructional leadership can be seen in how Gillani (2000) demonstrated the social learning theory. Gillani described the progression of the learner from actual level of development to potential levels as fostered by the zone of proximal development. Learners in the ZPD progress from a reliance on others to being able to contribute to collaborative efforts. This results in self-reliance and finally moves to internalization of the new information or skill by the individual. This describes the process a data-driven leader would use within a mentoring relationship with a teacher in order to foster growth and development in that teacher's instructional skills. The methods outlined by Bambrick-Santoyo (2016) provide a foundation for this type of data-driven coaching and mentorship model. In *Leverage Leadership* Bambrick-Santoyo (2018) summed up the core idea for the concept of data-driven practices. He stated, "What really makes education effective is well-leveraged leadership that ensures great teaching to guarantee great learning" (p. 6). By combining the idea of the ZPD with data-driven practices, leaders can foster growth and development among teachers to improve instructional quality. In turn, better quality instruction can provide the desired results of improved student outcomes.

Theory Applied to Practice

Social cognitive theory and sociocultural theory provide the framework of the current study by demonstrating how humans interact, learn, and change based on motivation gained from the social environment and relational context in which they exist. The social interactions between principals and teachers, which lead to changes in both teacher instruction and improved student outcomes (as evidenced through the influence of data-driven instructional leadership

practices) will be viewed through the lens of social cognitive theory and sociocultural learning theory in this study.

Providing further theoretical applications for this study, Mireles-Rios and Becchio (2018) provided an examination of Bandura's theory as it relates to the proposed study. Mireles-Rios and Becchio claimed that four sources help to shape teacher performance through enhanced efficacy: (a) mastery experiences (actual experiences of success by an individual or group), (b) verbal persuasion (encouragement from supervisors and others), (c) emotional arousal (physiological responses to behaviors and or their consequences), and (d) vicarious experiences (modeling observed from others). Taken together, these sources help frame the idea of the social interactions (including feedback) that teachers and principals experience in the framework of the data-driven instructional leadership practices. The experience with coaching, role playing, planning, and collaborative discourse are especially applicable when this model is focused on teacher growth and development.

According to Kim and Baylor (2009) the process of teaching and learning is a "highly social activity" (p. 576). Social interactions are critical in the process of growth and development (Kim & Baylor). Borrowing from the ideas of Kim and Baylor, the melded theoretical framework of social cognitive theory and social cultural learning views the processes of data-driven instructional leadership practices as having three prongs. The first is to "provoke cognitive conflict" (p. 578) in order to challenge the status quo and stimulate changes for instructional outcomes. Secondly, leadership should "provide information to advance a learner's knowledge" (p. 578) and "scaffolding to extend a learner's cognitive range" (p. 578). These aspects should ideally be focused on the teacher's zone of proximal development. Lastly, the leader should demonstrate empathy-based relationships with those being mentored.

Theory Advancement

This study advances the constructs of social cognitive theory and sociocultural learning theory by providing evidence that data-driven instructional leadership is influenced by the theories when applied to leadership practice. The interactions between leaders and teachers that foster human growth and development through enactive cognitive challenge, collaborative work including observation, modeling, and other vicarious experiences, and empathetic relationships of a social nature extend the application of these well-established social theories. The data-driven practices of observation, feedback, modeling, coaching, and the resulting changes in instructional practices influencing student learning are examples of changes in human behavior supported by these theories. Mastery experiences, self-efficacy, and collective efficacy work to support teacher confidence, which in turn has an influence on instructional quality and ultimately student achievement. Further, these theories gain evidence supporting how they help explain the complex multidimensional nature of educational leadership, collaboration, and practice as a human phenomenon. This could effectively extend the theory's influence and reciprocal nature in view of educational leaders' ability to act as socially based change agents leveraging teachers' ZPD to attain new levels of quality instructional practices and use of instructional strategies that are proven to yield the greatest return on instructional investment. These factors are set in the highly social context of community, institutional, and societal cultures (Hallinger, 2010).

Related Literature

The focus on educational improvement and leadership has been debated thoughtfully for some time, especially since the adoption of the No Child Left Behind (NCLB) legislation in 2001. More recently the push toward Common Core State Standards (CCSS) has fueled political discussions, debate, and divisions over issues of increased levels of accountability (Ravitch,

2016; Young et al., 2016). More recently, as one of the last actions of the Obama administration, the authorization of Every Student Succeeds Act (ESSA) was signed into law in December of 2015. This newest edition of educational reform legislation created an "ideological shift" (Horsford et al., 2017, p. 618). in the role of governmental participation in public education at the national level

This policy action returned the weight of authority in educational matters to the states, producing challenges for educators who are seeking what is best for students. This leads professionals to ask, along with Horsford et al. (2017) "what ESSA might mean for educational leaders at the local school and district levels, be they teacher-leaders, principals, superintendents, school board members, or…" (p. 618). Some (Saultz et al., 2017) have suggested that the flexibility under the Every Student Succeeds Act (ESSA) could be problematic in relation to how leaders develop and distribute quality teachers, especially in underserved populations.

Noticeable in the Every Student Succeeds Act (ESSA) is the emphasis on leadership and leadership development (Young et al., 2017). This federal policy action comes after 35 years of research on educational leadership and suggests a shift in understanding the importance that leadership holds (Young et al., 2017).

The improvement of instruction through practices of data-driven instruction and leadership is of special interest under the current high stakes testing model of assessment and accountability (Brown, 2015). How teachers use data is an important factor for attaining desired results on standardized achievement measures (Militello et al. 2013; van Geel, Keuning, Visscher, & Fox 2016; Schifter, Natarajan, Ketehut, & Kirchgessner, 2014). Leaders need to be prepared to guide teachers to improve instruction and address both individual and collective academic needs through the effective use of data (Sun et al., 2016; Yoon; Sun, 2016). A narrow

definition of data use has emerged through the political debates over accountability and evaluation versus improvement and growth models associated with school change (Faria et al. 2014). A model of data-driven instructional leadership that is comprehensive in nature and can serve as an effective model that is worthy of replication is needed to adequately address this narrow understanding. One such model is the focus of this proposed study. Within the model a shift is suggested regarding the focus of data use from that of evaluation and accountability purposes to that of improvement in the quality of instruction and teacher growth leading to improved school outcomes (Kraft & Gilmour, 2016).

This study sought to fill a gap in the literature by measuring the outcomes of such a model against others not utilizing the model. The literature speaks with a certain volume about educational leadership in various forms such as instructional leadership, transformational leadership, and other less mentioned leadership practices, as well as leadership's relationship to student achievement. However, few studies emerged in the literature specifically examining the nexus of data-driven instructional leadership and improved student achievement (Sun et al., 2016).

While there has been a great deal of research and policy change dealing with data-driven practices in education, little progress has been made at the classroom level (Dunn, Airola, Lo, & Garrison, 2013). Levin and Datnow (2012) pointed out that many previous studies have not fully examined exactly how the actions taken by principals demonstrate the role educational leaders assume when working to influence other important factors pertaining to the use of data. Slavin et al. (2013) stated, "While data-driven practices are known to have an influence on achievement little has been done to move this concept forward at the school level in a way that impacts

achievement" (p. 374). The evidence to support the effectiveness of using models that leverage the use of data-driven efforts is minimal.

Instructional leaders' role as agents to improve instruction requires that improvements be made in the quality of press provided by principals and other leaders that are assigned the responsibility to carry out this difficult task (Rigby et al., 2017). Rigby et al. pointed out that a possible problem with this routine was the lack of professional development provided to leaders by school districts, and that perhaps this is only viewed by districts as a means of compliance checking rather than as a pathway to improvement.

As a field of professional practice, education has a great deal of data with which to work. However, it is evident that much of these student data "are used more for accountability purposes—for assessing *of* rather than *for* the learning" (Shen et al., 2010, p. 450). The growing volume of data coupled with the intense focus on evaluation rather than on improving instruction and student outcomes reveal the concerning issues educational leaders and the field itself face with this (Shen et al., 2010, p. 450).

Considering the importance of data-driven instructional practices, leaders cannot ignore the construct of coaching. While Glover (2017) seems to have approached data-driven instructional coaching as not specifically originating from the principal, what the author said could have merit as a tool for principals. Analyzing a coaching model through the lens of reading interventions, Glover stated, "The data-driven instructional coaching model focuses… on the quality of instructional delivery and the application of a toolkit of research-based practices with student groups" (p. 15). From a change theory approach this researcher found the use of data-driven instructional coaching to be a positive method to improve both teacher practice and student results. Unfortunately, the role assumed by principal as the

instructional coach and within the construct of data-driven instructional coaching has not been well addressed.

Data Use by Educators

Hacker and Pierson (2017) highlighted both the importance and abundance of data in today's world. These authors pointed out that American and global economies demand the collection of volumes of data. The importance of education to the American economy is a social investment from which the government desires to reap both economic and civic rewards (pp. 64-65). The surplus of data is evident in schools as well. This brings educators to question which data are most important. Due to the time constraints educators face, data mining can be seen as a consuming activity; therefore, educational leaders and teachers must focus on the specific and correct data to leverage for student outcomes and instructional improvement. Hoover and Abrams (2013) spoke to this dilemma by suggesting that teachers view district and state assessments as aspects of instruction rather than separate from the instructional structure of their classrooms (p. 230).

Teachers tend to view data from central tendencies rather than by disaggregating by subgroups or content, which denies them the full benefit of item analysis to understand students' levels of conceptual understanding (Hoover & Abrams, 2013, p. 229). To overwhelm teachers with too much data could result in the right data being overlooked within the scope of teachers' practice. This is a threat to the improvement of quality instruction and positive student outcomes. In light of all the data educators must sift through, it is important that leaders focus on supporting "teachers being more savvy consumers of assessment data" (Hoover & Abrams, 2013, p. 229).

Leaders must develop these skills and their application to everyday practice in order to

best support teachers. Marsh and Farrell (2015) indicated that although much data is available to teachers and administrators, these professionals often fail to "know how to use data in a way that leads to deep changes in instruction and improved student outcomes" (p. 270). Additionally, educators possibly "lack adequate skills and knowledge to formulate questions, select indicators, and identify solutions" (p. 270).

Yoon (2016) found that the use of data-driven practices by principals did not significantly change over three years; however, significant variations were found among schools' usage of data. Yoon stated that more experienced principals were less likely to apply data-driven practices, while instructionally focused principals and principals with less experience were more likely to use data-driven practices. This idea is supported by Hvidston, Range, McKim, and Mette (2015). Yoon (2016) also noted that teacher buy-in increased over the three years of the study, especially if the principal used data-driven practices, further stating that there was a need to understand which specific aspects of both teachers' and principals' practices led to positive student outcomes based on data or educational reform practices.

Complicating this great need is teachers' understanding of research-based instructional strategies. Goodwin and Webb (2014) found that only 16% of teachers could actually name a research-based instructional strategy. Inclusive in a principal's leadership role is the provision of a bridge to connect teachers to data, both in a formative informational fashion to enable teachers the ability to adjust instruction, and to provide a researched-based framework for the delivery of instruction through research-based instructional strategies (Marsh & Farrell, 2014). Unfortunately, as Yoon (2016) pointed out, even when principals had adequate knowledge of data to support teachers, they did not always share what they knew. Perhaps this was a result of poor efficacy of the leader's skill set around data-driven leadership practices.

Providing formative assessment has shown to be linked to the use of data to drive instruction with an effect size of 0.90 (Hattie, 2009). The use of data was also found to have an effect size of 0.67 in relation to the effects of leadership on student achievement (Leithwood & Azah, 2017).

Leaders must recognize the importance of leading teachers in the use of data to improve practice. Some research has supported the idea that how teachers frame data and the use thereof was important to the effect the data had on student learning, and teachers' competency in using data is becoming an essential skill to effectual instructional practice (Wardrip & Herman, 2018).

The concept of building trust between a principal and the teacher surfaces in the literature as an essential prerequisite factor for teacher buy-in with new instructional practices including data-driven components (Allen, Grigsby & Peters, 2015; Yoon, 2016). Allen, Grigsby, and Peters (2015) pointed out the critical influence leaders have had when providing feedback with the goal of improvement and overall success of the school community. More specifically, Datnow and Hubbard (2016) indicated that in addition to actions taken by principals their "espoused beliefs about data use are critical as well" (p. 123). Datnow and Hubbard also discussed the significance of the collaborative context in which teachers' data capacity was normally developed. A large body of research points to the lack of adequate teacher preparation to use data effectively. Specifically, teachers' capacity is lacking in reference to adjusting instruction to meet the needs of a variety of students (Datnow & Hubbard, 2016, p. 123).

Multiple issues emerge when considering teachers' use of data. Some of these issues include: (a) barriers, both organizational and personal, (b) political usage of data, (c) trust of administration, (c) professional development, (d) mentoring, and (e) system design (Datnow & Hubbard, 2016; Ingram, Louis, Seashore & Schroeder, 2004; Marsh &

Farrell, 2014;). A study by Faria, Greenberg, Meakin, Bichay, Heppen, and Society for Research on Educational Effectiveness (2014) found that barriers such as those aforementioned were associated with lower test scores, while teacher data use was associated with higher achievement results.

Principals have the opportunity to provide teachers with the tools necessary to overcome some of these barriers. An example of this was explored by Jimerson, Choate, and Dietz (2015) in a study that promoted the use of mentors to build capacity. The mentor role was filled either by the principal or some other member of the administrative team including teacher leaders.

Leaders' influences are connected to their ability to build trust among teachers and students. One specific way this has manifested itself is through what Leithwood and Sun (2018) called academic culture (AC). This culture is fostered through instructional time use, rigor and expectations (in academic domains), and relationships with students (specifically how the culture of discipline is managed). Fostering this environment is a complex task with multiple variables. The development of this type of environment is important for leaders to consider as they work to improve schools. Trust among and between staff and leadership, a strong focus on instruction, and the provision of a safe environment have shown to improve efficacy and commitment to the organization (Leithwood & Sun, 2018 p. 359).

The function of capacity building is a critical element in the successful implementation of a data-driven approach to instructional improvement (Datnow & Hubbard, 2016). Datnow and Hubbard suggested that future research should focus on programs that have been successful in implementing a capacity building approach. They encouraged this type of study, suggesting that the results could provide instructive information for the impact of such a program on both practice and policy reform related to the domain of data-driven leadership.

A central function of leadership is to enable others to act. This is accomplished through building trust, fostering collaboration, and developing competence in others (Kouzes & Posner, 2012, p. 29). In order to accomplish this task of developing competence, educational leaders must determine how to best engage teachers to foster the type of environment that will support professional growth and changed practices.

Furthermore, how teachers view an administrator's ability to facilitate conversations around capacity (fostering self-reflection) in regard to their instructional practices is an aspect considered to be key to their perceptions about leadership effectiveness (Mette, Range, Anderson, Hvidston, & Nieuwenhuizen, 2015).

Whether school leaders should use data to evaluate teachers or to develop teachers can be a troublesome issue that causes some disagreement. Pham and Heinemann (2014) raised concerns over what the purpose of teacher evaluations should be. Possible considerations were (a) Is the primary purpose of observation and data collection to make judgmental comparisons of teachers? (b) Is data collection mainly to inform the public about school and student measured progress? and, (c) Are data to be used to measure individual teacher growth and improve practice? The authors noted that systems that leverage data for the purposes of evaluating teachers for competence and systems that are designed to foster growth in teachers are simply not the same (p. 41).

While the debate over whether to use observational data to evaluate teachers or to develop teachers continues, it is important that educational leaders leverage the device of observation to glean the best outcome for students. Kraft et al. (2016) described this debate as support and grow or the "observe and write" (p. A-3) system for teacher evaluation. Further, their research indicated that 75% of principal participants favored the "support and grow"

method. Nonetheless, administrators must comply with state and district mandates during the process.

Academic Improvement

A body of research exists examining data-driven instructional leadership for using data in compliance, accountability, and evaluation practices (Marsh & Farrell, 2015; Marsh, Bertrand, & Huguet 2015; Gill, Borden, & Hallgren, 2014, Sun et al., 2016). However, the development of quality instruction that fosters school improvement requires administrators to move beyond these aspects (Brown, 2015). Dunn et al. (2013) stated that since data-driven practices have a strong influence for student outcomes, it is important that teachers get help in using data-driven practices. Leaders desiring to influence teaching and learning will need to provide avenues of data use that is directly related to instructional focus and improvement at the classroom level.

Sun et al. (2016) have tested a framework of data-driven practices for leaders that can be applied at all levels of k-12 educational settings. These authors leave to question which of the factors associated with the framework will be effective in specific environments. Sun et al. also implied that principals' use of data to directly inform instructional practices was still in the infancy stage, and that research is still needed to determine which aspects are more effective in various geographical areas. Factors Sun et al. have outlined within this framework are factors identified elsewhere in the literature, including (a) collaborative culture, (b) collective teacher efficacy and teacher trust, and (c) data-informed teaching.

Bambrick-Santoyo (2018) revisited and reintroduced the seven super-levers from his work in 2012. The first and perhaps most important of these levers is data-driven instruction. Bambrick-Santoyo holds that the principal is key to the success of school improvement. He stated that a growing body of evidence around effective schools debunked two myths about

effective leadership (p. 6). The first one is that principals are administrators and managers (like firefighters). Conversely, Bambrick-Sanyoto purported that successful effective leaders consider themselves instructional leaders and focus their attention on the teaching and learning process. Secondly, principals approach the evaluation process with teachers as sufficient, when in reality effective leaders know that "Every minute spent completing a teacher evaluation rubric is a moment not used working with a teacher to improve" (p. 6).

Granted, the evaluation process can be an important tool for the improvement of teacher quality; however, there is some a level of disagreement on this topic. According to a study conducted by Mihaly et al. (2018), feedback assisted teachers in improving instructional practices for improved student outcomes. Mihaly et al. held that a "critical stage in the evaluation cycle is the feedback conversation…after each of two or three annual formal classroom observations" (p. 1). These "feedback conversations have the potential to influence teaching practice by evaluating a teacher's instructional practices at multiple points each year, in place of the once-a-year" (p. 1) style of evaluation. No doubt this model is superior to a once-a-year model as the authors indicated; however, more time is needed working with teachers from a coaching stance if true improvement is to be made in teacher quality. It should be noted that little evidence is available to guide school level leaders in the process of providing feedback to instructional staff in a way that leads to positive student outcomes (Mihaly et al., 2018). Shen et al. (2010) supported the identified need for principals to have support in leading with data, stating that principals are on the "front line" (p. 450) to bring about change and influence improved learning.

Garet et al. (2017) reported findings that supported the idea that feedback improves instructional practices and is related to improved student achievement; however, the link between instructional leadership and improved student achievement could not be supported.

Conversely, Mitchell, Kenseler, and Tschannen (2015) suggested that a direct relationship exists between instructional leadership and student outcomes. While others have supported indirect but strong influences of instructional leadership on school outcomes, placing the construct at the forefront of attention for various stakeholders (Mitchell et al., 2015). Salisbury, Goff, and Blitz (2019) claimed that strong relationships were found between student outcomes and instructional leadership. These findings are not appropriate to be generalized and the researcher calls for extending this line of empirical research into other contexts of the domain. This finding is contrary to other findings of only indirect effects of principals on student achievement (Brown, 2016).

This study sought to add to this body of work, making connections to leadership, specifically, data-driven instructional leadership and achievement results. Like Mitchell (2015), the current study examined school level results between schools rather than individual student results. However, this study expanded into a very different context than the Mitchell (2015) study by analyzing scores from a larger sample and cross section of a state using rural, urban, and suburban school settings with a diverse demographic composition.

The decision of an educational leader about where and when to spend their time has significant implications on the level of instructional improvement they want to see among teachers (May & Supovitz, 2011, p. 350). These researchers also suggested that targeted efforts by principals can bring about significant improvements or changes in some teachers' instructional quality. Three levels of principal and teacher interactions were found: (a) 10% of

the participants had no interactions or contact with principals, (b) 68% reported some contact, and (c) 22% had reports of high amounts of contact.

The Role of Leadership

Educational leadership practices have evolved within the context of the dominant political culture and demands of each era in which the development emerged. In the 1960s and 1970s educational leadership practices were focused on the management and execution of governmental dictates. In essence, leadership practices served as compliance controls to ensure policies were followed. The progression of leadership practices into the 1980s fostered the emergence of instructional leadership (Bush & Glover, 2014), which grew out of the out the effective schools research (Kovacevic & Hallinger, 2019) developing an idea that viewed the principal as the sole source of expertise and knowledge on instruction. In the 1990s educational leadership practices centered on transformational leadership. This required the principal to foster ownership of the implementation of both external and internal initiatives through collaborative work between school stakeholders (Bush & Glover, 2014). This collaborative work has opened the door to the model of distributive leadership, which draws on "expertise" (Marks & Printy, 200, p. 371) where it is found (among teachers) and not solely in the principal's knowledge base.

In the last three decades world-wide attention from governments has placed an emphasis on the professional development of school leaders with special attention toward instruction, which had the goal of raising levels of increased achievement and instruction (Hallinger, 2003). Since 2000, leadership practices examined in the literature have emerged from concepts that draw from critical aspects of instructional leadership and transformational leadership in order to facilitate school improvement (Kovacevic & Hallinger, 2019).

Whether leaders gather observational data for evaluation purposes or for coaching teachers to improve, time constraints arise as an overarching issue for leaders to manage (Mihaly et al., 2018). According to Munro (2014), principals seem to be able to generally identify excellent teaching as well as poor teaching practices in their observations of teachers; however, the large number of teachers in the middle are more difficult to appropriately critique. This suggested inability of educational leaders to pinpoint the quality instruction of the average teacher is a concern that can be addressed through a coaching and mentoring model of support. When using a coaching and mentoring model, teachers get the opportunity to develop their professional practice around research-based practices and data-driven decisions (Foster, 2018; Johnson, 2016; Sharplin, Stahl, & Kehrwald, 2016). This approach is in contrast to the single-time evaluation process that is focused on accountability (Kraft & Gilmour, 2016).

These issues present the need for making sure principals are prepared to provide adequate guidance to teachers in regard to data-driven practices. In a related study, Miller et al. (2016) stated that leadership programs might be inadequate in preparing educational leaders for instructional leadership. Miller et al. suggested that other external programs that provide professional development might be helpful in equipping leaders with appropriate skills in instructional leadership. Miller et al. found that principals who participated in a long-term professional development program for instructional leadership demonstrated growth in their knowledge and beliefs about abilities in instructional leadership; however, they did not experience growth in actually working with teachers to improve instruction. While the professional development of educational leaders is critical, it is important that this professional development result in “substantively significant growth in the practices that” involve “them

directly in teachers' work around curriculum, instruction, and assessment" (Miller et al., 2016, p. 559).

An important factor for district and school leaders to consider is the influence of instructional coaches and professional learning communities (Marsh et al., 2015). A principal's role and interactions within these constructs can be vital to the success of a data-driven initiative; however, the principal's interaction with and involvement in the development of teachers must remain the focal point. Within that context Marsh et al. found that the relationships, dialogue, and interactions across instructional contexts may have been responsible for "deeper level changes in pedagogy" (p. 30) as they related to the use and understanding of data.

The overall value of a model that fosters school improvement through developing the quality of teacher instruction can be supported by how teachers perceive the outcome of principal feedback and whether or not it has merit, is actionable, and worthy of teacher attention. To this end, Range, Young, and Hvidston (2013) found that both new and tenured teachers considered constructive feedback from principals to be important. The researchers also found that critical aspects of what teachers valued and utilized as points of reflection on their practice included (a) trusting relationships, (b) constructive feedback, (c) reflection, and (d) areas of improvement. Range et al. (2013) suggested these findings supported the need for further research on formative supervision.

The critical aspects teachers felt were important as identified by Range et al. (2013) support the idea that instructional leaders hold influence over instruction. The task of instructional leaders is how to best implement leadership practices in order to have the best influence on student outcomes. Since many researchers agree that this influence is more indirect as opposed to direct (Dutta & Sahney, 2016; Heck & Hallenger, 2014), the interactions and

frameworks of leadership have become more important. Promoting the school culture has been identified as one such construct. Specifically, the focus on academic achievement within a positive school climate fostered by the principal is likely to be responsible for differences found in student achievement results (Leithwood & Sun, 2018). This indirect effect is vital, as it centers on the interactions, influences, and relationships that an educational leader develops and maintains with teachers and instructional staff. Together, these aspects supported effective teaching when the instructional leader had the capacity to enhance both teacher quality of effectiveness and consistency across teachers and grades (Heck & Hallenger, 2014). The quality of instruction cannot be overstated as a critical factor in student outcomes. A series of ineffective teachers can magnify negative outcomes for student learning, thus helps to drive leadership efforts to improve instructional quality (Heck & Hallinger, 2014). This strengthens the argument that consistent quality in teacher instruction is a factor of importance and can be fostered by strong leadership. The central efforts associated with teaching and learning have been suggested by Bush and Glover (2014) as the places where educational leaders can make a real difference in student outcomes. Likewise, behaviors associated with instructional leadership models have been shown to demonstrate greater effects than other theoretical approaches to educational leadership (Bush & Glover, 2014).

Heck and Hallinger (2014) examined the idea of leading for learning as conceptual for this kind of instructional leadership. In reviewing 109 studies through meta-analysis, Boyce and Bowers (2018) support the idea of leadership for learning and pointed out the themes that emerged from 25 years of quantitative research on instructional leadership. These themes in the research have focused mostly on principal leadership and influence. They have also included studies dealing with school climate. The review by Boyce and Bowers provided support that

principals' influences on school climate and other aspects of general academic culture are important. It is worth noting that in this meta-analysis the issue of linking student achievement to instructional leadership was not addressed, thus demonstrating a gap in the literature in explaining the relationship between instructional leadership and student achievement. While this does strengthen the nexus between the relationship or influence of the instructional leader and the teacher, more evidence is needed to understand what degree of effect instructional leadership has on student outcomes. Whether the influence instructional leadership has on student achievement is indirect as some have suggested or has a more direct relationship on student achievement, the evidence supporting this construct is important to the educational field.

Principals and teachers working together using data-driven practices to improve instruction is an important element of leadership. Observation and feedback are among the data-driven practices supported in the literature. The results of a study by Moore, Kuofie, Hakim, and Branch, (2016) suggested that leader observation and specific feedback were "not determining factors in achieving high levels of student academic achievement" (p. 13). This is a striking difference in information when compared to the majority of literature in the review. The main limitation to this conclusion by Moore et al. is that the findings were based on one study only, and Moore et al. noted that the findings were in contrast to most of the current research. Moore et al.'s findings do point to the need for more evidence in order to provide clarification on this topic. When one considers the behaviors and actions principals exhibit with teachers around instruction and data, one is led to consider two important questions: Do these actions make any difference? If not, would principals' actions and behaviors be better spent on managerial tasks?

Moore et al.'s (2016) findings are specifically in opposition to Hattie's (2009) meta-analysis findings. Hattie's research showed that principal factors have only a medium effect size

on achievement (0.36). The sub dimension of instructional leadership attained a much better effect size (0.66) and in regard to elementary level contexts instructional leadership effect sizes were even larger (0.76). These effect sizes are in comparison to transformational practices of leadership (0.36). This suggests that in general, leadership practices have a medium effect on achievement; however, when instructional leadership is leveraged a greater result is possible. Further, when instructional leaders promoted and participated in teacher development and learning, their impact seemed to be even greater (0.91). Similar effects are noted for planning and evaluating curriculum (0.91), and direct involvement in evaluating teaching and providing feedback (0.74; Hattie, 2009, pp. 84-85).

Another issue arising in this domain is the differences between instructional and transformational leadership practices. Transformational leadership and instructional leadership have been shown to have an interconnectedness (Dutta & Sahney, 2016). Evidence from this study suggested a high degree of correlation between the instructional and transformational dimensions, and that principals exhibited both behaviors to some degree (p. 953). In order to outline an understanding of instructional leadership and transformational leadership, a definition of each is appropriate. According to the Center of Educational Leadership at the University of Washington's College of Education (2018), four dimensions of instructional leadership are responsible for a framework to define this concept. First, an instructional leader must provide vision, mission, and a learning focused culture. Second, the leader must focus on the improvement of instructional practices. Third, an instructional leader must be careful with the allocation of resources. Finally, the instructional leader needs to effectively maintain systems and processes. The focal point of the current study dealt mainly with the second domain of

improving instructional practice. Under this domain two sub-domains emerge: observation and analysis, and support for teacher growth.

The integration of transformational and shared instructional leadership models facilitates the principal's role as an agent for fostering teacher growth (Marks & Printy, 2003). This focus on teachers' professional growth provides for the foundation of leadership's authority. This authority is based on moral authority involving the synergetic engagement of emotional, intellectual, and social aspects of leadership. This is important in light of the unique professional nature of the professionals in education. This is evidenced in that educators have not tended to respond well to standard or traditional forms of leadership structures (Sergiovanni, 2007).

Educational leadership in general, and specifically instructional leadership, is a complex, vital, and important aspect of the educational process. This phenomenon is so complex that Marzano, Waters, and McNulty (2005) identified 21 leadership aspects that showed a correlation with student achievement. While all the factors explored by Marzano et al. are important, four are of special concern and importance in relation to the current study's research topic. These four principal behaviors include (a) the provision of intellectual stimulation, defined as not only keeping informed about current research, but fostering discussions with teachers on research, theory, and effective practices (p. 53); (b) direct participation in supporting teachers with curriculum, assessment, and instruction (p. 54); (c) advanced acumen for coaching in curriculum, assessment, and instruction (p. 55); and (d) constant monitoring and evaluation of these factors as well as the impact of other factors on student achievement (p. 56).

Transformational and instructional leadership have some overlapping traits. Riggio (2014) identified four elements of leadership practice juxtaposed within these two styles including (a) positive role modeling, (b) inspirational motivation, (c)

individualized consideration, and (d) intellectual stimulation. These practices place an enormous investment on relationships and modeling while encouraging creativity.

Educational leaders that blended these two leadership practices as they worked in tandem had more influence in developing teacher instructional quality, resulting in improved student outcomes (Dutta & Sahney, 2016). Supportive of this idea is a concept that Hitt and Tucker (2016) called shared instructional leadership, and stated that it is desirable for positive educational outcomes (pp. 534-535). These leadership practices consist of less directive approaches as well as a collaborative approach between principal and teacher to foster growth, research, and improved practices. This shared instructional leadership has been viewed in two domains; one for learning and another for teaching (Glickman, 2002). The literature supports that leadership for teaching has been the focus of educational leadership practices and research. Little has been considered about the learning domain when compared to the teaching aspects of this construct.

Leadership for learning (which is at the core understood as instructional leadership) viewed by Glickman's (2002) work has recognized the professional status of educators and places an emphasis on collaborative approaches to educational practices as a shared endeavor between teachers and principals. This is perhaps the most productive place for the growth of professional practice and provides for a high level of principal and teacher interaction and relationship. If principals desire to influence teaching these interactions and their relational nature need appropriate attention. Payne (2005) pointed out that within the teaching learning context desired learning outcomes did not take place absent of relationship. Jensen (2009) extended this idea to relationships between members of a school staff. While relationships are central to learning, relationships alone are inadequate to meet the learning needs of all students.

Intentional efforts must be focused on specific practices with the teacher-student relationship, or in this case leader-teacher.

Bambrick-Sanyto (2016) outlined a framework to support teachers at various stages of development with professional development that address the specific needs of teachers based on their level of instructional expertise. The approach advocated in Bambrick-Sanyto's *Get Better Faster* recognized the fluid nature of instructional prowess among teachers with some needing greater levels of support while others are independently effective.

Efforts to provide professional development to meet individual needs in the context of relationships provide a framework to help to conceptualize leadership. In an effort to define modern educational leadership, three characteristics have been used (Bush & Glover, 2014). Influence, which can involve social influence, by one or multiple individuals within a school is one characteristic that shapes leadership. This influence exists regardless of a person's or group's formal authority. The values manifested by recognized leadership figures are another characteristic of this understanding of leadership. The final characteristic identified was the facilitation of a clear vision, which is considered by some as a central aspect of successful leadership (Bush &Glover, 2014).

Beyond the framework of leadership are the actual practices in which leaders engage in routinely with teachers. Observation and feedback are such practices. When quality feedback has been provided on a regular basis, research has shown it enhanced and improved student outcomes (Van Geel et al., 2016). The quantity of the feedback is a critical aspect in supporting positive instructional changes or improvements. Even when quality feedback was given by an administrator, it took from seven to 10 visits before the follow-up feedback was effective in achieving the desired results of improvement (Teemant, Leland & Berghosf, 2014; van L, van

Grift, van Veen, & Fokkens-Bruinsma, 2016). This could help explain why it is difficult for principals to influence positive development of a teacher's practice with the two to three formal visits they typically make in a year. Far too often the feedback that is given by administrators to teachers is not what is desirable to support changes in the quality of instruction. Due to the many time constraints faced by educational leaders, feedback is often the task that is both provided not often enough and may be too brief to affect any changes that matter when it is given (Kraft et al. 2016). On the other hand, when quality feedback is provided on a regular basis research has shown it enhances and improves student outcomes (van Geel et al., 2016). The quantity of the feedback is a critical aspect in supporting positive instructional changes or improvements.

The requirements and pressures under which educational leaders must operate must be considered (Grissom, Loeb, & Master, 2013). A principal is compelled to accomplish as much as possible to get the work completed. The principal's goal must be to enhance, improve, and generally influence positive student changes in learning and achievement. Reaching the goal of school success is bound up in individual student success. This is most impacted by the classroom teacher, as established in the literature. While coaching teachers has been "positively associated with achievement gains," it is a "rare practice among observed principals" (Grissom et al., 2013, p. 440).

Grissom et al. (2013) further suggested that the context of coaching is influenced by how it is both viewed and received by teachers. A related study by Mette et al. (2015) found that teachers identified a principal's effectiveness with his/her ability to build capacity that caused teachers to self-reflect on instructional improvement.

Teachers' Role

Even though ample data exist (Marsh & Ferrell, 2015), it seems that educators continue to operate as they always have for over a hundred years (Hattie, 2009, p. 5). Hattie conducted a meta-analysis and synthesized findings from over 800 studies yielding the effect sizes of multiple factors in relationship to student achievement. The data from Hattie's study supported the idea that many things are of value within the practices of education but pointed out that while something might work or actually, does work, it may not provide the most gain for the most effort or investment. These findings suggested that domains with an effect size of 0.40 or greater hold the ability to move students more than one year of achievement growth (pp. 249-250). Hattie outlined that teacher-student relationships had one of the largest effect sizes (0.72) on student achievement. Out of 138 various factors examined in a large- scale meta-analysis, teacher-student relationships ranked number 11.

Greer (2013) linked the use of data-driven instruction to predicting student achievement through multiple factors. Four key factors were identified: (a) the understanding and use of data-driven instruction as a tool for closing the achievement gap, (b) a clear vision for data use, (c) changes to instruction after analyzing data, and (d) view of data-driven instruction as a natural and necessary aspect of the teaching and learning process and not just extra work (p. 122). Schmonker (2019) suggested that the wide-spread use of poor instructional practices has resulted in "hundreds of hours of wasted class time" (p. 31). Schmonker pointed to the need for the use of "evidence-based" (p. 30) instructional practices. This necessitates a greater need for teacher development and learning.

Professional Development

Foundational understanding to move educators forward through improved leadership that leads to improved student achievement came from the work of Leithwood, Louis,

Anderson, and Wahlstrom (2004). Specifically, these researchers analyzed the literature and challenged districts, schools, and classroom leaders with the following conclusion: "[The] direct and indirect effects of school leadership account for about a quarter of total school effects" (p. 3). If one quarter of what a school does to impact student outcomes is directly related to the principal, then it is critical to understand, focus, and improve upon the interactions and behaviors of these leaders.

Based on this knowledge, it follows that the ability to deliver quality professional development is valuable in equipping educational leaders with the necessary tools to lead schools effectively; however, research suggests that more standard methods of professional development are less productive and therefore their effectiveness is questioned (Gumus & Bellibas, 2016). In contrast, methods of professional development for educational leaders that include strategies of mentoring, networking, and researching might be more likely to improve instructional leadership and specifically influence the amount of time leaders spend on the aspects of teaching and learning in schools (Gumus & Bellibas, 2016).

Providing administrators with adequate training and professional development is critical in developing data-driven instructional leadership (Miller et al., 2016; Young, 2016). Champion (2017) suggested leadership training may be viewed as two-fold. First, according to Champion, educational leaders must be able to identify and analyze data in such a way that the collective organization works collaboratively to identify gaps in achievement, develop action plans and goals to address these gaps, and be able to monitor progress toward these goals. This practice must be developed in educational leaders as a natural or embedded aspect of day-to-day work and become common place in the routine discussions of educators. For this to happen, feedback alone may not be enough to improve the quality of leadership practices to enhance learning.

Adding the component of coaching with feedback to an administrator's professional development experience may multiply the impact the leader has when working to improve instruction (Bickman, Goldring, De Andrade, Breda, & Goff, 2012).

Secondly, leaders need the skills to collect observational data and provide feedback that can be leveraged for coaching moments, which ultimately can become a driver for teacher development and the improvement in quality of instruction (Rigby et al, 2017). According to Rigby et al. this data collection can be used to drive collaborative learning. These authors also suggested that the literature on this matter points to the benefit of principals learning from an expert. The learning of better ways to support teachers is underpinned by teachers' propensity to develop "ambitious practice" (p. 505) by focusing on a small number of levers that have the potential for the most significant impact on student learning

Questions were raised by Rigby et al. (2017) as to the quality of leader feedback and coaching suggestions. Further, without value added training and support for principals and other instructional leaders who provide observation and feedback to teachers, significant improvements in instructional practices are less likely to occur (p. 476). Compounding this issue is the idea that educational leaders also need support in the acumen for more effective interpersonal abilities, which target fostering conservations around the quality of teaching and learning (Le Fevve & Robinson, 2015).

Efforts to improve teaching practice through instructional coaching was found to be consistent with research-based effective professional development (Desimone & Pak, 2017). School districts that need to provide support for school improvement efforts should ensure school leaders are able to provide professional development that best addresses teacher learning. Desimone and Pak suggested this can be accomplished through instructional coaching.

Principals therefore must have the skills and training to deliver and monitor this construct. Johnson (2016) questioned whether or not school leaders have the experience to deliver professional development effectively with this type of model and therefore called for the need of further support.

Delivering embedded quality professional development is critical. In addition to the necessary training to carry out general improvement efforts, leaders also need to be able to provide professional development to meet teachers' needs. Brown and Green (2014) identified professional development as a leadership strategy used in successful school transformations. When coaching was viewed as the method for delivering professional development, it was viewed quite positively by teachers (Grissom et al., 2013). Coaching as a method to implement the use of research-based instructional skills to a broader base of teachers has been implemented with positive results in teacher practices (McCollum, Hemmeter, & Hsieh, 2013), and has provided further evidence for the benefits of this type of professional development approach.

Teachers seem to have a basic distrust for professional development that is provided by school districts, and thus tend to maintain control over their own professional development and growth (Makkonen, Tejwani, Venkateswaran, Regional Educational, National Center for Education Evaluation and, Regional Assistance, & WestEd. 2016). Research has shown that teachers do not always see a clear relationship between their evaluation and professional development and their instructional practices (Makkonen, 2016). As a result, districts and school leaders are well advised to consider professional development activities at the school level that align with individual teachers' or groups of teachers' needs. This could help encourage teachers in seeing the value of the professional development activities, as well as in being actively

engaged with the leader providing the learning. The goal would then be a greater buy-in and application of the learning to practice by the teachers (Makkonen, 2016).

The provision of coaching as embedded professional development is an integral part of a data-driven approach to educational leadership. One can identify a disconnect between the behaviors and activities of leaders and the expectations held for improved student outcomes when considering the findings of Leithwood et al. (2004), who noted that 25% of school outcome effects were attributed to leadership, yet participants spent only three to five hours per week (8% of a principal's time on average) on instructional leadership activities (May & Supovitz, 2011).

Instructional coaching has been shown to be an effective professional development approach (Teemant, 2014). Through the operational definition of instructional leadership, the focus is clearly to improve instruction. Teemant stated, "Instructional coaching… provides teachers with ongoing, longitudinal, collaborative, and job-embedded professional development focused on their individual needs and student learning" (p. 143).

Instructional coaching was clearly defined by Teemant (2014) as a process that is collaborative, reflective, and results in new practices that improve classroom instruction. Furthermore, the relationship component described is one of respect, reciprocity, and genuine dialogue. This is the type of culture that educational leaders should seek to build in the process of developing teachers both personally and professionally.

The amount of time that principals commit to coaching and providing feedback to teachers is an important consideration for educational leaders desiring to improve instructional practices and student outcomes. The amount of time spent on these activities may not be as critical as the "quality and focus" (Foster, 2018, p. 19) of the coaching itself. The review of

literature has shown that the complex set of competencies and or activities in which an educational leader influences teachers' practices or general school improvements was linked to developing trust, relationships, and shared leadership practices. These should all have the focus of improving student achievement through improved quality of teaching (Foster, 2018). This was supported by Huff, Preston, Goldring, and Guthrie (2018), who sought to understand what role principals played in providing support that brought improvement through changes in teacher practices.

Leaders must attend to important aspects and implementation of support that lead to actual changes in educator practices (Huff et al., 2018, p. 30). Monitoring and feedback are the focal points regarding how this can bring about better quality of instruction. Exactly which leadership practices foster these changes remains in need of development and understanding (Huff et al., 2018, p. 30). Critical knowledge of teachers' skills factors into this cycle of observation, coaching, and feedback. Research supports the idea that quality feedback occurs once the observer has made three visits to a teacher's classroom, and at least 10 visits are needed to provide any quality summative evaluation (van L et al., 2016).

Extending the idea of the value and quality of coaching, Militello et al. (2013) suggested that use of data by teachers should be primarily used to make classroom decisions. Leaders need to support teachers in tailoring their instruction to increase student learning with the right data (Militello et al., 2013). Critical to this is assisting teachers with defining the data, providing time for teachers to collectively interpret the data and subsequent actions to take, and training in the data literacy necessary to use the data appropriately (Militello et al., 2013). This training, coupled with the use of high yield instructional strategies using data to improve instructional practice and student learning, stands as the desired outcome of the educational process.

In the literature, dimensions of an educational leader are suggested as having the power to identify leaders for specific schools or contexts. Hitt, Woodruff, Myers, and Zhu (2018) claimed these competencies were high leverage, underlying, enduring, and related to effective performance. In total, these researchers indicated seven competency categories with sub domains for each. A full examination of the competencies and domains manifests the complexity of leadership behaviors necessary for leading today's schools and attaining the academic improvement demanded by stakeholders.

A number of characteristics were explored by Hitt et al. (2018), and several of these competencies specifically related to the topic of the proposed study. Competencies Hitt et al. outlined include (a) builds capacity with support and accountability by creating a culture of high performance by matching individual growth and goals to the school's vision, and developing school leadership with coaching and mentoring in order to gain skills for reaching school goals, (b) elicits intended responses by acting to influence thinking and mindsets of others and influencing others' perceptions with data, (c) fosters group interactions that demonstrate the importance of collaborative effort and intentional work, fostering information sharing and relationship building, (d) demonstrates a commitment to student learning through policy leverage, decision-making, and instructional improvement; (e) prioritizes, especially with complex data, to identify related concepts or what is most important, (f) provides clarity by narrowing the meaning and value of complex data into prioritized focus that others can understand and act upon, (g) develops others, (h) fosters growth through professional development, (i) works to resolve performance that is lacking, and (j) communicates progress toward and work that remains in order to meet goals.

The difficult task of defining a quality teacher is outlined by Saultz et al. (2017), as well as with the federal policy review on the Every Student Succeeds Act (ESSA). Saultz et al. stated that teacher quality has previously been determined or commonly associated with student outcomes. Prior to the current so-called accountability era, educational attainment and licensure were frequently used to define a quality teacher. Saultz et al. described how the role of the federal government has decreased in regard to defining a quality teacher under ESSA. Outcome-based observational systems that tried to define a good teacher have been criticized (Good & Lavigne, 2015). The aspects of these systems under critical analysis include the concepts that teacher performance was not consistently stable over time and that these systems to evaluate teachers tended to dismiss good teachers and reward poor teachers.

There is a concern over teaching to the test or providing instruction that might be considered cookie cutter in nature. Liou, Grigg, and Halverson (2014) explained the need for professional development and a quality system design for data use. A primary function of these systems is an approach that places emphasis on improving the test scores of the school. The overemphasis on scores stands in oppositional contrast with the autonomy teachers have traditionally enjoyed. Such a narrow focus of instructional purposes on one set of central outcomes such as standardized tests scores could produce negative consequences. It has been argued that "Good teaching involves much more than increasing students' scores on standardized achievement tests. Good teaching includes helping students to become better problem finders and problem solvers, as well as encouraging student civility, social responsibility, and much more" (Good & Lavigne, 2015, p. 10). However, current politics, policy, and opinions support these kinds of systems as methods to maintain systems of accountability. Under these

circumstances, professional development activities should align with meeting the aforementioned expectations.

Summary

Educators, parents, and other stakeholders desiring the best possible educational outcomes for students seek answers to questions about how to improve the quality of instruction that inevitably leads to desired student outcomes. Hanushek (2016) stated that the 1965 *Coleman Report* suggested that forces outside of the school such as a student's home environment, economic status, and race were largely responsible for student achievement. This provided schools with the excuse of having little to no control over these issues and thus schools operated largely in a fashion that enabled the status quo for years. The Coleman Report shifted focus to student outcomes and the use of extensive data in education, which effectively linked data to policy thereafter (Hanushek, 2016).

In time, changes in society, culture, and global economic matters resulted in federal mandates of the No Child Left Behind (NCLB) legislation in 2001. This marked the start of a new era of accountability and brought laser focus onto what happens in schools and classrooms. Public reporting of standardized high stakes testing, and teacher evaluations based on those test results are now the norm. Schifter et al. (2014) stated that while data have always been used by educators, the use of data is now expected according to these federal guidelines. According to Levin and Datnow (2012) national and local educational reform maintains the expectancy for schools to use data-driven decision-making principles. Subsequently, data use to date has largely had a focus on evaluation or accountability purposes (Shen et al., 2010). Bambrick-Sanyoto (2018) suggested that a different approach is more important; that is, improvement of teacher instructional quality, especially as it leads to improved achievement.

In December 2015 the reauthorization of federal policy in education was passed as the Every Student Succeeds Act (ESSA) under Obama's tenure. ESSA is commended for recognizing the importance of school leadership – both in leadership development and practice (Young et al., 2017). Young et al. reported that 40 years of educational leadership research has led to the realization, especially in the last 15 years, that educational leaders impact every aspect of schooling, including teacher practice. A search using Liberty University Library's search tools for educational leadership produced 114,265 hits with a date range from 1898 to 2019. Peer reviewed articles reduced this number to 45,268. When filtered by years, more than half of these articles, some 24,006, originated from the last decade (2009 to 2019). Furthermore, almost half of the research articles in the last decade (10,517) appear since 2015. This supports the idea that actually studying educational leadership is a relatively new field. Educational change is a slow process and 10 years has not provided the adequate attention and improvements to educational leadership that students deserve.

Much work remains to be done in this domain. Approaching this work from a research standpoint is an important factor for leaders. Young et al. (2017) continue to provide positive statements as to the allowances of Every Student Succeeds Act (ESSA) for states to be able to make a "3% set-aside" (p. 717) of Title II funds under Part B to dedicate to leadership development. Strong support for leadership outlines leadership responsibilities that encompass "providing guidance and advice about instructional practices and crafting targeted and individualized feedback, support, and opportunities for teachers in this endeavor (May & Supovitz, 2011)" (Young et al., 2017, p. 714). A leader's "personal involvement in planning, coordinating, and evaluating teaching and teachers" (Young et al., 2017, p. 714) has enduring aspects of impacting student achievement. The difference in leadership practices was noted as

the difference between high and low performing schools (Young et al., 2017, pp. 714-715), and places the value of "active engagement" (Young et al.,2017, p. 715) as a factor in positive influences on student outcomes.

Three states have elected to invest in leadership by leveraging the three percent of Title II funding. New Mexico is one of these states and is the setting for the current study, which examined the effects of data-driven leadership practices as implemented by participants of the New Mexico Principal's Pursuing Excellence (PPE) program on school achievement scores. The Every Student Succeeds Act (ESSA) supports evidence-based practices such as the model that was considered. Young et al. (2017) stated, "Specifically, the reauthorization of the ESSA, emphasizes evidence-base initiatives while providing new flexibilities to states and districts with regard to the use of federal funds, including funds to promote effective school leadership" (p. 716).

In a meta-analysis, Hattie (2009) provided evidence that among the factors educators can control, the most significant influences on student academic outcomes are teacher actions and behaviors. Other research indicated that second only to teacher effects is that of principal effects on student learning outcomes (Brown' 2015). While these effects have been called indirect by Allen et al. (2015), they are important to student achievement and teacher effectiveness. According to Datnow and Hubbard (2016), principals are an essential catalyst in assisting teachers with data use. Sun et al. (2016) stated, "Principals' use of data to lead schools has been identified by some researchers as the most prominent way to help move schools forward on a large scale" (p. 93).

According to Brown (2015), the interactive participation between school leaders and teachers is critical. In reviewing schools where high gains in achievement were made, Brown

found that teachers considered the principal as an effective instructional leader. Further, Brown indicated that leaders who are unable to foster change around student assessment and data use are likely to be inadequate in accomplishing organizational or academic goals.

Clearly, what happens in the classroom and the relationship between students and their teacher are important to the achievement experienced by students (Hattie, 2009). Knowing that principals have an important positive relationship with student outcomes, the question arises, what can teachers and principals do to significantly influence student outcomes?

Schifter et al. (2014) stated that while data have always been used by educators, the use of data is now expected according to federal guidelines. According to Levin and Datnow (2012), national and local educational reform maintains the expectancy of using data-driven decision-making principles. In spite of this knowledge, data-driven practices are not always utilized and when they are it is most often for accountability and evaluation purposes as opposed to improvement reasons. What options remain for educational leaders and teachers? Providing more evidence for the support of data-driven practices with a focus on improvement is needed.

While the evidence connecting leadership behaviors and student outcomes has provided an opportunity for improvement, principals' skills and acumen in determining how to identify and support teachers in the average category are lacking. Research suggests principals can identify the teachers who are demonstrating the greatest need as well as those whose performance is exemplary rather effectively (Munro, 2017, p. 147); however, Munro revealed that teachers performing in the average range of effectiveness on measured performance scales presented principals with a more difficult task in identifying ways to improve the quality of instruction. This implies training is needed in educational leaders' practices, which could improve their ability to identify specific teacher behaviors that fall within the median range of

effectiveness ratings. Additionally, what strategies to employ in improving instruction for the average teacher's practice remains an elusive concept for leaders.

Improving a school's performance is critical and the literature suggests this can effectively be accomplished through assisting individual teachers to improve the quality of their instruction. Bickert (2011) found that in reference to student achievement, the quality of a student's teacher was more important than the quality of the school a child attended. This conclusion is congruent with Hattie's (2009) findings that teacher effects are the most significant factor for student achievement.

CHAPTER THREE: METHODS

Overview

The purpose of this causal-comparative study was to examine the outcomes of data-driven instructional leadership practices on student reading and math achievement within the context of social cognitive theory. The researcher analyzed the differences in proficiency scores of reading and math between schools that used data-driven instructional practices and those that did not. The specific behaviors of leaders that have been linked to some of the strongest influences on student learning are participation in teacher learning, planning, and evaluating instruction (Brown, 2015). This study examined the actions taken by leaders that provide opportunities for teachers to reflect, collaborate, and improve on instructional practice through the secondary results these practices have on student achievement. Chapter Three describes the research design, questions, null hypotheses, and the participants and setting. The chapter also provides the instrumentation, procedures, and the data analysis for the study.

Design

The researcher used a causal-comparative design for this quantitative study. This design is the most appropriate one because the researcher wanted to compare the differences of the outcomes of the dependent variable (reading and math achievement scores) between the groups of the independent variable of leadership practices. This design was also appropriate for the study because the researcher could not manipulate the independent variable (Gall, Gall, & Borg, 2007). According to Gall et al., a causal-comparative design aligns with how educators and educational stakeholders view the world (p. 307).

The researcher examined the independent variable of instructional leadership practices used by principals. Instructional leadership practices are defined as the "active collaboration of

principal and teacher on curriculum, instruction, and assessment" (Marks & Printy, 2003, p. 371) wherein "The principal seeks out the ideas, insights, and expertise of teachers… and works with teachers for school improvement" (Marks & Printy, 2003 p.371). The independent variable consisted of two groups. One group included schools whose principal practiced data-driven instructional leadership as demonstrated through participation in the Principals Pursuing Excellence Program (PPE) sponsored by the New Mexico Public Education Department (NMPED). The second group was comprised of schools whose principals did not participate in the PPE program.

The dependent variable was the reading and math achievement scores, measured by the Partnership for Assessment of Readiness for College and Careers (PARCC), reported as a percentage on a continuous scale from 0-100 (Green & Salkind, 2017), and maintained on the New Mexico Public Education Department's Accountability page. Reading and math achievement scores on the PARCC assessment are defined as the school average proficiency scores for reading and math reported as a percentage of 100. These scores are a standardized measure of students' reading vocabulary, general ability to read, ability to read and draw meaning from both informational text and literature, mathematical reasoning ability, mathematical conceptualization, modeling practice, and general content knowledge of math. In this study these scores are reported as the average school level percentage proficient for grades three through eight.

Gall, et al. (2007) stated that this type of design allows the researcher to identify cause-and-effect relationships between the identified variables. Since the data analyzed was derived from previously obtained assessment scores, the analysis is a type of ex post facto research that examined differences between groups on given variables (Gall et al., 2007, p. 306).

Research Questions

The research questions for this study are:

RQ1: Is there a difference in the reading achievement scores on the Partnership for Assessment of Readiness for College and Careers between schools that used data-driven instructional leadership practices and those schools that did not use data-driven instructional leadership practices?

RQ2: Is there a difference in the math achievement scores on the Partnership for Assessment of Readiness for College and Careers between schools that used data-driven instructional leadership practices and those schools that did not use data-driven instructional leadership practices?

Hypotheses

The null hypotheses for this study are:

$H_0$1: There is no statistically significant difference in the reading achievement scores on the Partnership for Assessment of Readiness for College and Careers between schools whose leaders practiced data-driven instructional leadership and schools whose leaders did not practice data-driven instructional leadership.

$H_0$2: There is no statistically significant difference in the math achievement scores on the Partnership for Assessment of Readiness for College and Careers between schools whose leaders practiced data-driven instructional leadership and schools whose leaders did not practice data-driven instructional leadership.

Participants and Setting

The participants for this study were from schools with a D or F rating on their state report card in the state of New Mexico. Participants were selected from the New Mexico Public Education Department's (NMPED; n.d.) Accountability Office records for school grading and

based on the school's reported scores falling between 0 and 49.9 during the 2014 or 2015 school year(s). These data are public archived information and maintained by the NMPED and thus required no special permissions to access. The NMPED maintains the report cards for each school, which contains demographic information, stakeholder survey results, and scores from the Partnership for Assessment of Readiness for College and Careers, along with other data. Since these are publicly available data; the researcher was able to access without any special permission. Schools using data-driven instructional leadership practices are defined as participants in the Principals Pursuing Excellence Program (PPE). Schools that practiced data-driven instructional leadership have been identified by the New Mexico Public Education Department's (NMPED) Priority Schools Bureau. These schools were identified, invited to apply, and selected (as well as monitored) during the implementation of data-driven practices by the NMPED through the state PPE program.

A sample was taken from the schools with a D or F on their state report cards by simple random sampling. From that sample the researcher established a control groups of schools that did not participate in the Principal's Pursuing Excellence Program (PPE). A convenience sample of schools identified as having participated in the PPE program was used to establish the treatment groups. This type of sampling was used because the treatment of data-driven instructional leadership practices had already been applied with the PPE schools; these schools were limited in number, and it was impossible for the researcher to randomly select a treatment group.

New Mexico is a sparsely populated state in the southwestern United States. New Mexico's southern border is with Mexico, and Arizona, Colorado, Texas, and Oklahoma are neighboring states (DataUSA22, 2019). New Mexico is considered an economically challenged

state (Mitchell & Esquivel, 2017). Educationally, New Mexico ranks near the bottom of U.S. states and has a high population of English Language Learners (Ballotpedia, 2019). Even though the feel of New Mexico is rural, two-fifths of the population lives in urban areas (Regan, Bureau of Business and Economic Research, 2016). According to the U.S. Census Bureau QuickFacts: United States (2019), New Mexico has a population comprised of individuals that are 49.1% of Hispanic ethnicity, 37.1% of White ethnicity, 10.9% of Native American ethnicity, and less than 2% of all other ethnicities.

According to *Education Week* (2019), New Mexico serves 340,365 students. Of these, 62% are considered eligible for free and or reduced lunch and 14% are considered English Language Learners. *Education Week* also reported that the 2015 National Assessment of Educational Performance proficiency rates for fourth graders in New Mexico in math were 27.2 %, and for reading 24.8%.

The sample for the study was comprised of 81 schools that earned the status of D or F by scoring from 0 to 49.9 on the New Mexico Public Education Department's (NMPED) School Report Card. The treatment groups consisted of 39 schools that participated in the Principals Pursuing Excellence Program (PPE) sponsored by the NMPED. The control groups drew from 42 schools selected from the remaining 296 schools in the state that did not participate in the PPE Program. These schools were entered into an Excel spreadsheet and a simple random sample was generated for 35 for reading and 32 for math. The treatment group for reading had 35 and for math 32. The reading $n = 70$ and the math $n = 64$ satisfied the minimum number of 64 participants for a causal-comparative design that is needed to obtain a medium effect size with an alpha level of 0.05 and a statistical power of 0.7, which assists in avoiding a Type II error (Gall et al. ,2007).

The sample for the study consisted of 81 schools drawn from the 336 (50) elementary and (31) middle schools that earned a D or F on their state report cards in the 2014 or 2015 school years. From this sample, schools that were participants of the Principals Pursuing Excellence Program formed the treatment groups as a convivence sample. The control groups were randomly selected from the remaining 297 D and F schools that did not participate in the program using simple random sampling. Demographic composition of the schools in the sample consisted of total population of 30,970 including 15,784 male students, 15,107 female students, 5,072 students of Anglo ethnicity, 343 students of African American ethnicity, 18,929 students of Hispanic ethnicity, 56 students of Asian ethnicity, and 6,094 students of Native American ethnicity. The sample represents 27,474 students belonging to economically disadvantaged families, 6,167 students identified as English Language Learners, and 4,521 students with disabilities.

These participants represent a cross section of the state, including those living in both urban and rural areas.

Instrumentation

The instrument for this study was the Partnership for Assessment of Readiness for College and Careers (PARCC). This was the state mandated standardized assessment for K-12 public schools in New Mexico until 2019 (Gewertz, 2019). The results of this assessment are maintained on the NMPED website under the Accountability Office tab.

The purpose of PARCC was to measure student learning as it relates to the Common Core State Standards (CCSS; Meyer & Paxson, 2019). This assessment is referred to as a "new-era assessment that measures students' readiness for college and career" through demonstrating "mastery of rigorous" content, thinking critically and solving problems (PARCC, n.d.). The

collaborative partnership of states adopting the Common Core State Standards in 2010 joined to develop this instrument to reflect the high expectations based on competencies that students will need for future success. This instrument has been used in studies by Kozleski and Choi (2018), Backes and Cowan (2019), Arellano et al. (2018), and Mihaly et al. (2018).

According to the Partnership for Assessment of Readiness for College and Careers (PARCC; n.d.) "PARCC states have carried out research to establish the validity of the assessments." PARCC also provides feasibility study information and a list of independent studies supporting the idea that it is an effective test. This instrument has been administered in over 24 states as the state level standardized measure since 2014. In 2018 PARCC was the state adopted standardized assessment for six states, the District of Columbia, the Bureau of Indian Education, and the Department of Defense Education Activity.

The Partnership for Assessment of Readiness for College and Careers (PARCC) utilizes internal validity methods to establish and maintain construct validity. Reported validity scores for 2017 by subclaim (subscale) and grade for grades three to five yield an average intercorrelation for validity of 0.75 in reading and 0.72 in math.

The Partnership for Assessment of Readiness for College and Careers' (PARCC, n.d) Technical Report for 2017 reported reliabilities for the Reading Complex Text for grades three through 11 from 0.87 to 0.91 for Computer Based Test (CBT), and from 0.80 to 0.93 for Paper Based Test (PBT). The median reliability across all grades and modes is 0.90. The reliability for grades three through five ranges from 0.85 to 0.89, and for all grades and modes the median of the average reliabilities for the sub claim is 0.83. Reading Information is 0.79 overall. The Reading Vocabulary sub claim is based on points from 12 to 24. The subclaims' average

reliabilities are 0.67. The Partnership for Assessment of Readiness for College and Careers. (n.d.) provides evidence of Cronbach's alpha for math at 0.93 and reading at 0.83.

The number of items and their point values for each subclaim are listed as follows: Third grade English Language Arts; Reading Literature (RL) and Reading for Information (RI) each have nine to 12 items worth 19-20 points. Reading Vocabulary (RV) four to seven items worth eight to14 points. The Reading section has a total of 22 items worth 46 points. Grade four varies slightly from grade three with RL seven to 19 items worth 16-40 points, RI six to17 items worth 14-36 points, and RV four to eight items worth eight to 16 points. The total for fourth-grade Reading is 30 items worth 64 points. For fifth grade RL has 10-16 items worth 24-34 points, RI nine to 13 items worth 22-28 points, and RV four to eight items worth eight to 16 points. The total for fifth grade is 30 items worth 64 points. For math in third grade Math Calculation (MC) has 26 items worth 30 points, Additional and Supporting Content (ASC) 10 items worth 10 points, Math Reasoning (MR) four items worth 14 points, and Modeling Practice (MP) three items worth 12 points. There is a total for math of 43 items worth 66 points. The fourth-grade MC has 25 items worth 31 points, ASC has eight items for nine points, MR four items for 14 points, and MP three items for 12 points. A total of 43 items worth 66 points make up this part of the assessment. Fifth-grade MC has 25 items worth 31 points, ASC eight items worth nine points, MR items worth 14 points and MP three items worth 12 points. A total of 40 items worth 66 points is the structure of the subclaim.

Scores for the Partnership for Assessment of Readiness for College and Careers (PARCC; n.d.) are reported as Scaled Scores. These scores range from 650-850. Five levels are assigned to the scores as follows. Level 1 Does Not Meet Expectations is defined as a score of 650-699 for any grade level; Level 2 Partially Met Expectations is defined with a score of 700-

725 or 726 depending on the grade level and subject; Level 3 Approaches Expectations is defined by a score of 726 or 727; Level 4 Met Expectations has a score of 750-789; and Level 5 Exceeds Expectations with scores of 790 and above.

The Partnership for Assessment of Readiness for College and Careers (PARCC) assessment is conducted as a secure testing event requiring state adoption and adherence to testing windows and other standardization protocols. The test is intended for students in grades three through 11. The PARCC test has two forms, paper-based (PBT) and computer–based (CBT). It should be noted that validity, reliability, and number of test items vary based on the format in which it is delivered. Only scores for the CBT are reported in this paper for validity and reliability purposes.

In regard to math, the Partnership for Assessment of Readiness for College and Careers (PARCC;2018) subclaims have greater numbers of points, thus are thought to have greater reliability estimates. The average reliability for the subclaim is 0.83. PARCC reports validity results between 0.83 and 0.91 on scaled subclaims of the assessment. Doorey, Polikoff, and Fordham (2016) found PARCC to be an excellent match for measuring criteria in both content and depth in English language arts and a good match in mathematics.

Finally, Nichols-Barrer, Place, Dillon, and Gill (2016) found that the Partnership for Assessment of Readiness for College and Careers (PARCC) is adequate to predict college success among students and has a higher standard for performance when compared to the Massachusetts Comprehensive Assessment System. The researchers found a 0.23 coefficient in English language arts and a 0.43 in math when compared to college grade point averages.

The Partnership for Assessment of Readiness for College and Careers (PARCC) is a nationally known standardized test (Stotsky, 2015). Public entities have used the instrument and published the results in the public domain, thus no special permission was needed to utilize the

data.

Procedures

After Institutional Review Board (IRB) approval, school level proficiency scores for reading and math on the Partnership for Assessment of Readiness for College and Careers were collected from the New Mexico Public Education Department (NMPED) archival records found on the Accountability Department website. These data included the percentage of students scoring proficient and advanced on the Partnership for Assessment of Readiness for College and Careers (PARCC). No permissions were required by the NMPED to access the data, as the information is public domain. The researcher inquired about any permissions the New Mexico Public Education Department might have required. A representative from the NMPED affirmed that the information is public domain and no permission was required. The researcher contacted the Priority Schools Bureau of the New Mexico Public Education Department by phone. The Director stated that information about the Principals Pursuing Excellence (PPE) was public information. The Director then asked that the researcher send his email contact. After the researcher sent this information, the Priority Schools Bureau sent by email the Principals Pursuing Excellence Program's participating cohort schools to the researcher on a spreadsheet. These data indicated the schools that participated in PPE and in which school years they were participants of the program.

The data to be obtained from these records are comprised of scores obtained from the Partnership for Assessment of Readiness for College and Careers (PARCC) scores. PARCC results are maintained under the achievement results section of the New Mexico Public Education Department's Accountability page.

A convenience sample was drawn using the New Mexico Public Education Department (NMPED) Accountability website. The researcher identified all elementary and middle schools in New Mexico that earned a D or an F on their report card for the school year 2014 and or 2015 or were in the Principals Pursuing Excellence (PPE) Program for the same year. Since the schools that participated in the PPE program have already applied the practices of data-driven instructional leadership, it was not possible to identify this group randomly; therefore, this group was selected as a convenience sample by the researcher. The schools that participated in PPE were then identified as the treatment groups.

Due to state reporting some data points were missing from the proficiencies table. In order to maintain the greatest number of participants the researcher established treatment and control groups for each research question separately using the maximum amount of data possible. This created differences in the number of schools participating and the use of different schools for each research question. The reading groups each had 35 for a total of 70 and the math groups each had 32 for a total of 64.

The treatment groups would have participated in the professional development activities and implementation of data-driven leadership practices for two years under the supervision of the New Mexico Public Education Department. During participation in the PPE (the treatment) leaders of the participating schools would have experienced collaboration with district and state leaders as well as other leaders throughout the state and national experts on school turnaround and improvement practices. Each participant had support from a specific district leader, a state turnaround leader, the New Mexico Public Education Department, and a third-party expert mentor. Participants were guided in assessing school status and needs, developing a 90-day action plan leveraging effective practices such as data-driven instruction, culture, and

instructional observation and feedback. The participants received ongoing coaching and mentoring including monthly onsite visits from their mentor and district leader. Additionally, the participants had periodic check-ins with state leaders, as well as four face-to-face (one to three day) professional development convenings with state and national leadership. The goal of these efforts was to provide leaders with stronger competencies to initiate actions resulting in dramatic positive changes in student achievement. Participants for the control group were selected from the remaining schools earning a D or F on their state report cards using methods of simple random sampling. Each school was entered into an Excel spreadsheet and a simple random sample was generated for the control groups.

Using the Statistical Package for the Social Sciences (SPSS) software the researcher conducted data screening and assumption testing for an independent samples *t*-test. A *t*-test was conducted on the reading and math scores found on the state accountability page for the 2016-2017 school year for the participating schools. The researcher compared the outcomes of the assessment scores to determine differences between the two groups after the implementation of the practices of data-driven instructional leadership as demonstrated through participation in the Principals Pursuing Excellence Program by the treatment group.

Data Analysis

The data for this study was drawn from the Accountability Bureau of the New Mexico Public Education Department for each member of the sample. Scores are reported in a numerical format from zero to 100, so these scores are considered a continuous type of variable (Gall et al., 2007). The data were analyzed using Statistical Package for the Social Sciences (SPSS) software for an independent samples *t*-test. Data screening and assumption testing were conducted. The independent samples *t*-test confidence level was determined at 95% with an alpha level (a), $p <$

0.05. This alpha level of significance allows for a statistical power of 0.7. All assumptions were met at an a=.05.

In order to determine if a difference existed between the means of the two groups of the independent variable the researcher used a *t*-test to analyze the PPE groups compared to the non-PPE groups. A two-tailed test was used to test the null hypotheses. According to Gall et al. (2007), some researchers see this model as a "more compatible… view of social science" (p. 143). The independent samples *t*-test provides for a medium effect size with a statistical power of 0.7 at the alpha level a=.05 with N=64 (Gall et al., 2007, p. 145).

With an independent samples *t*-test, data need to satisfy six assumptions. The dependent variable must be continuous, the independent variable should be categorical, and there must be independence of observations. According to Gall et al. (2007) continuous scores such as educational tests and measures are considered as an interval scale for the reasons of analysis (p. 130). The data for this study were reported on a continuous scale from zero to 100; the independent variable consist of two categorical groups (data-driven and non-data-driven); and no relationship existed between groups. The researcher screened the data for outliers using a boxplot. The researcher tested for normality of distribution using the Kolmogorov-Smirnov[a] test of normality since the sample size was greater than 50. Finally, the homogeneity of variances was tested with Levene's test of equality of variances. The data analysis design determined if there was a difference between the means of the two groups of the independent variable on the one continuous dependent variable. According to Warner (2013), a commonly accepted alpha level of .05 can be used to analyze the data. According to Green and Salkind (2017), this alpha level will assist in avoiding a Type I error. Based on this information the researcher used an alpha level of .05 for this study.

CHAPTER FOUR: FINDINGS

Overview

This causal-comparative study had the purpose of determining if a statistical difference exists between the achievement results of schools using data-driven leadership practices and those not using formal data-driven practices in New Mexico. The study examined both reading and math scores on state achievement assessments. Each content area will be discussed independently. An independent samples *t*-test was used to conduct the statistical analysis. This chapter will discuss the study's findings, outline the research questions, null hypothesis, descriptive statistics, and the statistical analysis results of the tests.

Research Questions

RQ1: Is there a difference in the reading achievement scores on the Partnership for Assessment of Readiness for College and Careers between schools that used data-driven instructional leadership practices and those schools that did not use data-driven instructional leadership practices?

RQ2: Is there a difference in the math achievement scores on the Partnership for Assessment of Readiness for College and Careers between schools that used data-driven instructional leadership practices and those schools that did not use data-driven instructional leadership practices?

Hypotheses

$H_0$1: There is no statistically significant difference in the reading achievement scores on the Partnership for Assessment of Readiness for College and Careers between schools whose leaders practiced data-driven instructional leadership and schools whose leaders did not practice data-driven instructional leadership.

$H_0$2: There is no statistically significant difference in the math achievement scores on the Partnership for Assessment of Readiness for College and Careers between schools whose leaders practiced data-driven instructional leadership and schools whose leaders did not practice data-driven instructional leadership.

Descriptive Statistics

Descriptive statistics were generated for each research question. For Research Question One, 70 schools were compared on reading achievement proficiencies of the 2016 Partnership for the Assessment for Readiness for College and Careers (PARCC). The sample included 35 schools with leadership practices identified as data-driven (17 middle and 18 elementary) and 35 schools not participating in formal data-driven practices (14 middle and 21 elementary). The schools with data-driven leadership attained a higher percent proficiency rate (M = 17.71, SD =7.95) than did schools that used non-data-driven practices (M =15.31, SD =5.89). For Research Question Two, 64 schools were compared on math achievement outcomes for PARCC including 23 middle schools and 41 elementary schools. This sample included 32 schools using data-driven leadership practices and 32 schools in the non-data-driven instructional practices group. The math scores for the data-driven group were higher (M =16.81, SD =8.08), than the group of schools that used non-data-driven practices (M =15.06, SD =7.15; see Table 5).

Table 1

Descriptive Statistics for PARCC Reading Scores (Research Question One)

Leadership Practice	Mean	Std. Deviation	*N*
Data-Driven	17.71	7.954	35
Non-Data-Driven	15.31	5.890	35

Table 2

Descriptive Statistics for PARCC Math (Research Question Two)

Leadership Practice	Mean	Std. Deviation	*N*
Data-Driven	16.81	8.08	32
Non-Data-Driven	15.06	7.15	32

Results

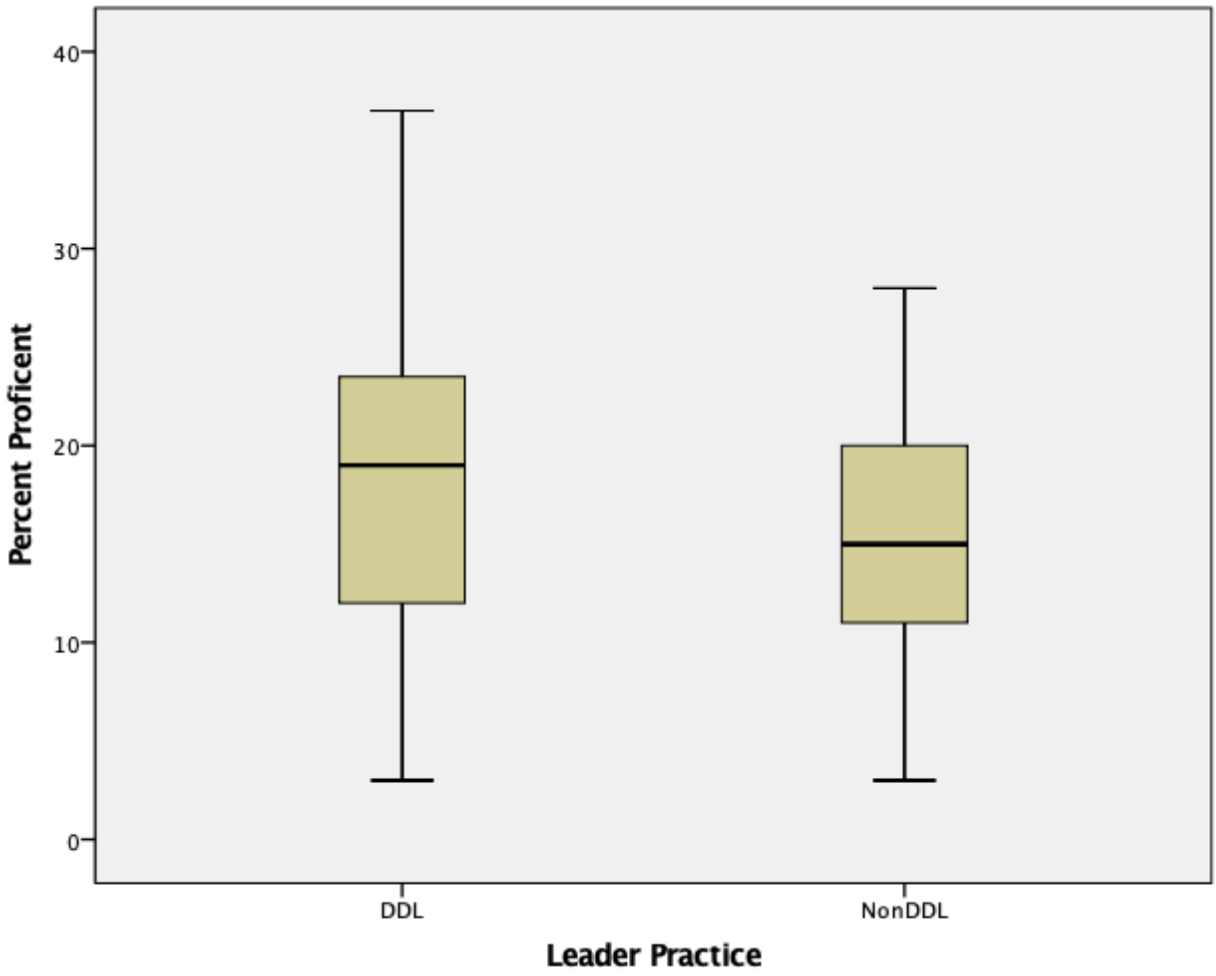
The following section presents the results of the data screening for the research questions. This section includes data screening using boxplots to determine whether any outliers existed in the data.

Data Screening

The data sets for reading and math achievement scores were screened independently for outliers. In the analysis of data for reading, no outliers were identified through a review of a boxplot output. The results of this screening can be seen in Figure 1.

Figure 1.

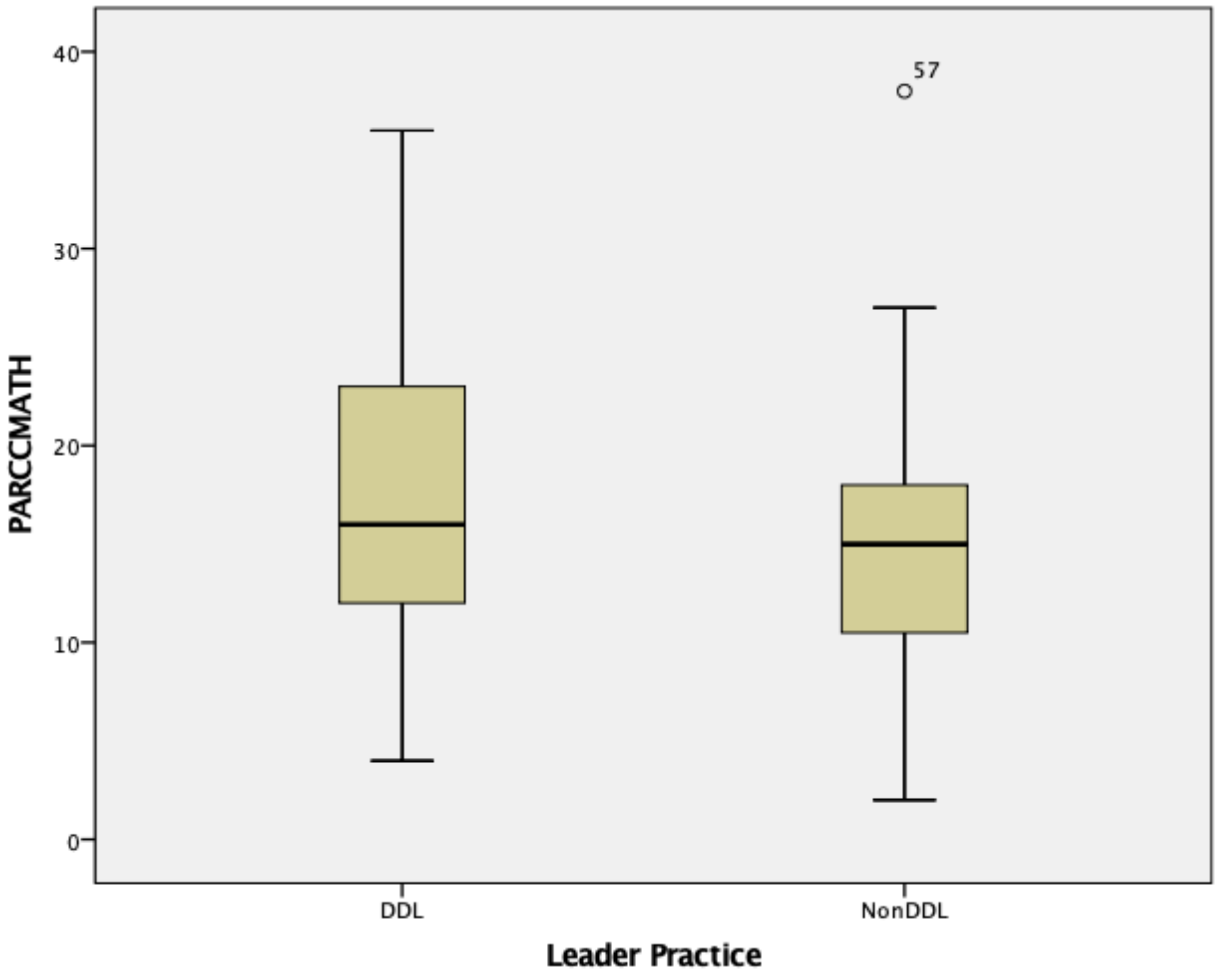
Boxplot for Leader Practices and Percent Proficient on Reading PARCC.



In the analysis of data for math, one outlier was identified through a review of a boxplot output. The results of this screening can be seen in Figure 4. In order to determine whether to keep the outlier or remove it from the data set the researcher ran the analysis with the outlier and again without the outlier. Results of the analysis did not cause a change in the significance levels (difference of 0.75 on the Means Difference and 0.206 on the *p*) of the results. Therefore, the outlier was considered a genuinely unusual data point and was included for the final analysis.

Figure 2.

Boxplot for Leader Practice and Percent Proficient on Math PARCC.



Results for Null Hypothesis One

In this section, the results of assumption testing and results of the independent samples *t*-test for Research Question One are discussed. Data from these analyses are given in the tables found within the section.

Assumptions. The statistical analysis for an independent samples *t*-test requires testing for the normality of the data. The data sample consisted of 70, so the researcher used the Kolmogorov-Smirnov to satisfy this assumption. PARCC achievement scores for both data-driven leadership practices and non-data-driven leadership practices were determined to be

normally distributed, as assessed by the Kolmogorov-Smirnov[a] test of normality with a $p > .05$ (see Table 3).

Table 3

Kolmogorov-Smirnov[a] Test of Normality for PARCC Reading Scores

Leader Practice	Statistic	*df*	Sig.
DDL	.086	35	.200*
NonDDL	.142	35	.073

Note. This is a lower bound of the true significance.
a. Lilliefors Significance Correction.

The researcher tested the homogeneity of variances using Levene's test for equality of variances. There was homogeneity of variances for achievement scores for schools with data-driven leadership practices and those with non-data-driven practices as assessed by Levene's test of equality of variances ($p = .094$; see Table 4). Since the *p*-value for these data were greater than .05, this assumption was satisfied.

Table 4

Levene's Test for Equality of Variances

	F	Sig.
Percent Proficient Equal Variances Assumed	2.887	.094

Results. Since the assumptions were met, the researcher used the standard *t*-test to determine any differences between the two groups of the study. The mean achievement scores of the data-driven group was 2.40, 95%CI [-.938 to 5.738] higher than that of the non-data-driven group (see Table 5). There was not a statistically significant difference in achievement scores between schools using data-driven and non-data-driven leadership practices, M=2.40, 95% CI [-.938 to 5.738] t (68) = (1.44), $p = .156$. Since there was not a statistically significant difference

between the means of schools using data-driven and non-data-driven leadership practices ($p > .05$), the null hypothesis for Research Question One was retained. Since no statistically significant difference was found in the data, the researcher did not explore effect sizes with Cohen's d.

Table 5

t-test for Equality of Means

	t	*df*	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Level of the Difference	
						lower	upper
Percent Proficient Equal Variances Assumed	1.435	68	.156	2.40	1.673.	-.938	5.738

Results for Hypothesis Two

In this section, the results of assumption testing and results of the independent samples *t*-test for Research Question Two are discussed. Data from these analyses are given in the tables found within the section.

Assumptions. The statistical analysis for an independent samples *t*-test requires testing for the normality of the data. The data sample consisted of 64, so the researcher used the Kolmogorov-Smirnov to satisfy this assumption. PARCC achievement scores for data-driven leadership practices met the assumption of normal distribution ($p > .05$; see Table 6). The non-data-driven leadership practices group data were determined to violate the assumption of normal distribution, as assessed by the Kolmogorov-Smirnov[a] test of normality with a $p < .05$ (see Table 6). Since the independent samples *t*-test is considered robust to normality deviations (Laerd Statistics, n.d.) especially if the numbers of the comparison groups are equal, the researcher determined to proceed with the analysis.

Table 6

Kolmogorov-Smirnov[a] Test of Normality

Leader Practice	Statistic	*df*	Sig.
DDL	.103	32	.200*
NonDDL	.166	32	.025

Note. This is a lower bound of the true significance.
a. Lilliefors Significance Correction.

The researcher tested the homogeneity of variances using Levene's test for equality of variances. There was homogeneity of variances for achievement scores for schools with data-driven leadership practices and those with non-data-driven practices as assessed by Levene's test of equality of variances (p = .256; see Table 7). Since the p-value for these data were greater than .05, this assumption was satisfied.

Table 7

Levene's Test for Equality of Variances

	F	Sig.
Percent Proficient Equal Variances assumed	1.317	.256

Results. Since the assumptions were met, the researcher used the standard t-test to determine any differences between the two groups of the study. The mean achievement scores of the data-driven group was 1.75, 95% CI [-2.063 to 5.563] higher than that of the non-data-driven group (see Table 8). There was not a statistically significant difference in achievement scores between schools using data-driven and non-data-driven leadership practices, M=1.75, 95% CI [-]2.063 to 5.563 t (62) = (.918), p = .362. Since there was not a statistically significant difference between the means of schools using data-driven and non-data-driven leadership practices (p > .05), the null hypothesis for Research Question Two was retained. Since no statistically

significant difference was found in the data, the researcher did not explore effect sizes with Cohen's d.

Table 8

t-test for Equality of Means

	t	*df*	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Level of the Difference	
						lower	upper
Percent Proficient **Equal Variances Assumed**	.918	62	.362	1.75	1.907	-2.063	5.563

CHAPTER FIVE: CONCLUSION

Overview

The purpose of this study was to determine if there was a difference between the achievement scores of schools using data-driven instructional leadership practices and schools not using data-driven practices. The contents of this chapter will discuss the results of the statistical analysis for each research question, implications of the study, and provide recommendations for further research.

Discussion

The goal of this study was to identify any differences between the reading and math achievement scores on the Partnership for Assessment of Readiness for College and Careers of schools with leadership practices that are data-driven and schools not practicing data-driven leadership. The study was guided by the following research questions.

RQ1: Is there a difference in the reading achievement scores on the Partnership for Assessment of Readiness for College and Careers between schools that used data-driven instructional leadership practices and those schools that did not use data-driven instructional leadership practices?

RQ2: Is there a difference in the math achievement scores on the Partnership for Assessment of Readiness for College and Careers between schools that used data-driven instructional leadership practices and those schools that did not use data-driven instructional leadership practices?

The first research question sought to determine differences between schools using data-driven and non-data-driven leadership practices on reading achievement scores. There were 35 data-driven and 35 non-data-driven schools examined. An independent samples *t*-test was run to determine if there were differences in percent proficient scores of reading between data-driven

and non-data-driven groups. While the reading scores for the data-driven group were higher than the group of schools that used non-data-driven practices, there was not a statistically significant difference on the reading scores (p = .156). Therefore, the null is retained.

The second research question sought to determine differences between schools using data-driven and non-data-driven leadership practices on math achievement scores. There were 32 data-driven and 32 non-data-driven schools examined. An independent samples t-test was run to determine if there were differences in the percent proficient achievement scores on math between data-driven and non-data-driven groups. While the math scores for the data-driven group were higher than the group of schools that used non-data-driven practices, there was not a statistically significant difference on the math scores (p = .362). Therefore, the null is retained.

The difference between schools using data-driven and non-data-driven practices was not found to be statistically significant. However, the data-driven groups in this study did score higher than the non-data-driven groups on both measures of achievement. This aligns with other research found in the literature that provides evidence that leadership has an important positive effect over many educational factors including achievement, even though the effect on achievement has been found to be indirect in nature rather than having a direct effect on student achievement outcomes (Allen et. al, 2016; Brown, 2016; Dutta & Sahney, 2016; Hitt et. al, 2018; Yoon, 2016). One might conclude that the practices of data-driven leaders in this study contributed to the higher mean averages of achievement scores in both reading and math among groups of the independent variable. Considering that the well-supported construct (as outlined by the literature review of this study) that leadership is second only to teacher effects among school factors makes the behaviors of educational leaders of importance to the field. Consequently, the function of data-driven instructional leadership is important to the field of

education despite the findings of this specific study. Slavin et. al (2013) found no direct significant differences in achievement scores as a direct, immediate effect of data-driven leadership practices; however long-term differences were noted.

In conflict with the findings of the current study, Shatzer, Caldavella, Hallam, and Brown (2014) stated that a principal can have a positive impact on student achievement outcomes. Other studies (Glover, 2017; Lynch, Smith, Provost, & Madden, 2016) have also purported that leadership practices have shown a positive effect or relationship to student achievement. In addition to these studies, Moore et. al (2016) found mixed results related to data-driven professional development activities and positive student outcomes on achievement measures.

The most striking contrast to this study is the report and current claims touted by Uncommon Schools. In a report, Teh, McCullough, and Gill, (2010) provided evidence that the efforts of Uncommon Schools in New York had "achievement impacts [that] are positive, significant, and substantial" (p. 10). These schools claim to leverage data-driven practices aligned with the treatment group of this study. Further claims found on the Uncommon Schools (n.d.) website state that they are closing the achievement gap with demographic challenges such as 82% of students living in low income homes. These schools claim they outperformed the other New York City schools on average by 20% in math and 7% in English Language Arts in 2019 state testing.

Social cognitive theory provides support in viewing these results. Social cognitive theory identifies the behaviors of leaders in the context of interactions between individuals that provide opportunities for learning, change, and growth. Leithwood and Sun (2018) pointed out this idea, as well as the influence leaders had on school culture and attributed it to changes in student achievement. Bandura (1977) suggested that within social cognitive theory an individual was

more likely to change a given behavior based on the relationship the individual had with the model or mentor providing the stimulus for change. In this case, that model is the educational leader as they interact with teachers. Directly related to this study, social cognitive theory explains how the interactions, based on relationships between leaders and teachers and intended to bring positive change, can help explain identified differences.

Vygotsky's (1978) sociocultural learning theory helps explain this phenomenon further. Sociocultural learning theory states that learning does not take place in a social vacuum, but rather in the culture and community of social interactions. Marsh and Farrell (2015) used this idea to study communities of social learning and culture and provided further support for this theoretical basis. The collaborative approach in data-driven leadership draws directly from this construct.

These theories provide a basis for understanding that the relationships formed in a social setting and leadership provided within that context can be seen to have an influence on the indirect effects that leadership has on student achievement. This explains the differences found on mean averages for both reading and math scores in this study, even though they were not found to be statistically significant.

The impact of leadership behavior remains an important aspect of educational concern. Louis et. al (2010) have shown that a key aspect of connecting student learning and school leadership is the role leaders play in developing people. As demonstrated in the literature, the complexities of educational leadership and how leadership affects people through aspects of school culture, teacher quality, and student achievement outcomes continue to evade a full understanding by professionals in the field. Thus, they deserve further examination and attention. This study did not find statistically significant differences; however, given the

limitations of the study and the small sample size the researcher believes that it is important to note that both reading and math means were higher for the schools using data-driven practices. Those practices remain a potential explanation of the differences and a source worthy of further study.

Implications

Regardless of the findings of this study being not statistically significant, the findings do support the body of research on the important, albeit indirect, role that leadership has on student achievement. Hattie (2009) pointed out the primary importance of the teacher in relation to student achievement. A body of literature supports the idea that the role leadership has in creating collaborative, positive cultures that develop individuals and improve teacher quality is vital. Slavin et. al (2013) stated, "What the findings imply is that helping school leaders understand student data is helpful but in itself does not produce educationally important gains in achievement. Schools must actually take action to change teaching and learning*"* (p. 390). Leaders providing positive school cultures and changes in instructional quality leading to improved achievement are critical to the educational landscape. Solid evidence by Leithwood et. al (2004) promoted by The Wallace Foundation (n. d.) clearly support that second only to the role of teachers is the role that leaders play in student achievement results.

Therefore, the findings of this study can be used to support the constructs of developing the skills of leaders to enable them to create communities of collaborative culture that focus on data-driven practices that improve the quality of instruction. It can be concluded that what leaders do, does matter. Knowing that their behaviors are second only to teacher effects, leaders should work to provide the best possible culture in which teachers can collaborate around data focused on improved instruction in order to improve student achievement. This concept aligns

with the idea Bambrick-Santoyo (2018), suggested that quality teaching to ensure student achievement should be the goal of educational leadership.

Limitations

This study was limited in a number of ways. The data for the study were archival and accessed from the New Mexico Department of Public Education's website. Due to reporting factors controlled by the NMPED, some data were not included on the PARCC data file resulting in some potential participants of the study to be eliminated from the sample. These data could have had an effect on the overall analysis and results. This **c**ould also explain and or have caused the violation of normal distribution for the math data set, as well as the outlier identified.

The design and implementation of the Principal's Pursuing Excellence Program (PPE) was changed by the NMPED between year two and three of the program. This allowed more schools with a report card grade higher than an F or a D to be in the program and forced the researcher to eliminate those schools from the study due to factors that could not be controlled otherwise.

The study also consisted of a small sample size due to a convenience sampling that was available to the researcher for the treatment group. This study was conducted using data from schools with grades three to eight in the state of New Mexico. Due to the limited population for this study it is not possible to generalize any findings to any other groups or areas within the country. The size of the sample met requirements of Gall et. al (2007), but a larger size would have provided a better basis for the study.

Finally, the research design might have contributed to the limitations of the results by comparing only one data point between the two groups.

Recommendations for Future Research

After a review of the results from this study, the following recommendations are made for any future research. First, a larger sample size should be considered. The sample size for this study was a main limitation for obtaining results with a greater added value.

A second recommendation would be to include a more representative sample of participants from across a region or the country. This would allow for the results to be more generalizable to a larger population.

Any future research should also include the consideration of a correlational design. Since the literature supports leadership's indirect effect on achievement, a causal-comparative design might not have been the best fit. Rather, future researchers should consider what the relationship between the variables might be through a bivariate correlational design, allowing the researcher to have some reasonable evidence that the association of scores has any causation (Warner, 2013).

Finally, future researchers should consider examining differences in the achievement gains made by the groups rather than using only one data point. This should also include differences on the factors of gender, grade level, socioeconomic status, and ethnicity.

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APPENDIX