Measuring the Impact of Reducing Principal Supervisors' Leadership Portfolios in Large School Districts

DISSERTATION

Submitted in Partial Fulfillment of the Requirements for

the Degree of Doctor of Education in

the School of Education at

Florida Southern College

By

Howard Hepburn

*****

Florida Southern College

2020

FLORIDA SOUTHERN COLLEGE

Dissertation Defense Approval

Doctoral Candidate's Name Howard Hepburn

Defense Date 10/8/2020

Title of Dissertation

Measuring the Impact of Reducing Principal Supervisors' Leadership Portfolios in Large School Districts

Dissertation Defense: ✓ Successful oral defense; dissertation is approved with no changes
____ Successful oral defense; dissertation is approved pending recommended changes
____ Unsuccessful defense

The Committee hereby attests to the aforementioned defense results.

[signature]	10/8/2020
Committee Chair	Date
[signature]	10/19/2020
School of Education Member Leilani Goodman-Riley	Date
[signature]	10/08/2020
School of Education Member Silviana Falcon	Date
[signature]	10/8/2020
Member from Outside School of Education Scott Richman	Date

This is to certify that any recommended changes have been completed. The dissertation has been reviewed for original work, accepted, and approved for final submission.

[signature]	10/20/2020
Committee Chair	Date

rev June 2015

ABSTRACT

The purpose of this study was to measure the impact of reducing principal supervisors' spans of control or leadership portfolio sizes on schools' academic outcomes. For this study, principal supervisors' spans of control directly refer to the number of schools within their purview. Academic outcomes for this study included student performance on state's annual mathematics and English Language Arts assessments. Data collected during the study included academic outcomes for three years prior to a reduction in spans of control and three years after the reduction in spans of control. The study focused on two large school districts and included academic outcomes from elementary schools and secondary schools with varying complexities of academic performance and poverty levels.

Minimal research has been conducted about principal supervisors, their roles in supporting schools, and impact on academic outcomes (Corcoran, Casserly, Price-Baugh, Walston, & Simon, 2013; Goldring, Grissom, Rubin, Rogers, Neel, & Clark, 2018). The information from this study contributed to the knowledge base about principal supervisors' impact on various types of schools and roles in supporting schools. The findings from this study suggest that an overall reduction of principal supervisors' spans of control had minimal impact on academic outcomes. The findings also suggest that a reduction in elementary principal supervisors' span of control had a greater impact than a reduction in secondary principal supervisors' span of control. This research contributes to the knowledge base of principal supervisors' spans of control and its relationship to school academic outcomes.

Table of Contents

List of Tables

CHAPTER 1: INTRODUCTION

Anchored by instructional leadership practices, principal effectiveness is one of the cornerstones of positive school outcomes. Instructional leadership addresses a myriad of complex issues that include curriculum knowledge, ability to build capacity of faculty and staff, and ability to perform managerial or operational task while adhering to accountability measures mandated by state and federal departments of education (Goldring, Grissom, Rubin, Rogers, Neel, & Clark, 2018; Lemoine, Greer, McCormick, & Richardson, 2014; Meyer & Macmillan, 2001; Mitchell & Castle, 2005). Principals' impact on student achievement is only trumped by teachers (Hitt, Woodruff, Meyers, & Zhu, 2018; Quin, Deris, Bischoff, & Johnson, 2015). Principal effectiveness is paramount to the success of the school and the overall success of school districts.

Principals that leverage the concept of instructional leadership demonstrate successful school outcomes with increased student achievement (Alig-Mielcarek & Hoy, 2005; Hallinger & Murphy, 1987; Purkey & Smith, 1983). Strong principal leadership focused on curriculum and instruction leads to effective instructional leadership practices (Edmonds, 1979; Hallinger 2003). Principals' instructional leadership capacity is dependent upon their current systems and structures of support from district leaders. School districts use varied means and strategies to support school principals. Strategies vary among school districts across the country depending on context, funding, politics, leadership capacity, and other variables that may affect support strategies.

Principals' direct support for increasing their instructional leadership expertise are usually principal supervisors. Principal supervisors' duties and responsibilities are vast in large urban school districts where compliance becomes the mainstay of principal support (Goldring et al., 2018). The current ratio of principals per principal supervisor in many large school districts limits coaching and support opportunities that could lead to increased principal effectiveness (Bambrick-Santoyo, 2018; Corcoran, Casserly, Price-Baugh, Walston, & Simon, 2013; Goldring et al., 2018). This issue has only recently come to the forefront of leadership development initiatives as school districts grapple with changes to meet the demands of evolving accountability systems (Bambrick-Santoyo, 2018; Goldring et al., 2018). District leaders understand the impact of school-based leadership and its correlation to successful academic outcomes (Davis & Darling-Hammond, 2012; Huang, Beachum, White, Kaimal, Fitzgerald, & Reed, 2012; Lemoine et al., 2014). Therefore, new strategies of ensuring principal effectiveness are warranted for improved and sustainable academic outcomes.

Background

School principals are expected to perform numerous roles that will hopefully lead to increased student achievement; a conducive climate and culture, programmatic support and infrastructure, managerial task, and building capacity of faculty and staff encompass daily responsibilities (Blasé & Blasé, 1998; Hallinger, 1992; Hallinger 2005; Leithwood, Jantzi & Steinbach, 1999). The roles of principals have increased in complexity over time and mirror increases in accountability and mandates that often mar good intentions. Principals are often perceived as the final decision-maker and pinnacle of leadership in their schools. Principals are tasked with establishing the school's vision and mission while charged with influencing faculty and staff to implement aligned practices (Hallinger, 2005; Lemoine et al., 2014). The role of the modern principal is directly aligned to instructional leadership centered on improving student achievement, overshadowing past leadership priorities (Ismail, Yahya, Husin, & Khalid, 2018).

Leadership practices implemented by school leaders must yield consistent results to meet state and federal high accountability thresholds.

Effective leadership practices are not inherent in the role of principal. Knowledge and skills that lead to effective leadership practices and subsequent positive school outcomes must be coached and supported. Principal supervisors are tasked with the role of building principal leadership capacity, but minimal research is available to detail the strategies that lead to increased capacity (Whitt, Scheurich, & Skrla, 2015). Onboarding of new principals and introducing veteran principals to new leadership practices are usually left to development opportunities initiated by the school-based leader themselves. Principal supervisors support for skill development emphasizes compliance and non-instructional tasks (Goldring et al., 2018). The gap created due to lack of instructional leadership support can ultimately affect academic outcomes by affecting current levels of principal effectiveness.

Principals' implementation of instructional leadership practices are an expectation by many district leaders (Whitt, Scheurich, & Skrla, 2015). The leadership practice is ostensible on school campuses but lacks the support by district leaders or principal supervisors to ensure implementation (Whitt, Scheurich, & Skrla, 2015). Principal leadership resonates as a high leverage component of effective school outcomes, but the absence of critical developmental opportunities reduces its effectiveness (Hauserman & Stick, 2013). Principal supervisors' lack of support for instructional leadership practices indicates the need for restructuring of support systems for principals. Lamenting about low achievement and low efficacy can be countered with strategies and mechanisms that align to instructional leadership practices (Hallinger, 2003).

Instructional leadership has been a preferred practice by school leaders since the 1980s with research supporting its prowess for enhancing student achievement (Hallinger & Murphy, 1985; Leithwood, 1992). Although several conceptual models for instructional leadership exist that guide research for implementation and impact, efforts to examine principals' development of these skills are still minimal. Current and past research does not delve into the prerequisite knowledge and skills that lead to effective instructional leadership practice. Furthermore, the support systems and structures implemented by principal supervisors or other district leaders are also excluded.

Large urban school districts' principal development initiatives are challenged by the volume of school leaders in the district. With few district leaders dedicated to supporting principals, principal supervisor to principal ratios lead to ineffective support strategies (Corcoran et al., 2013; Goldring et al., 2018). Principal supervisors' span of control can exceed 25 or more principals, leading to addressing compliance rather than building instructional leadership capacity (Goldring et al., 2018). High ratios of principals to principal supervisors constrains time allotted per principal which diminishes time available to meet specific capacity building needs. Principals' leadership capacity is developed through long-term development plans with effective support (Harper, 2015).

Principals desire an ongoing cycle of coaching and support that exceeds annual teacher and classroom observation trainings to assist with development goals (Hassenpflug, 2013; Hvidston et al., 2015). Most large school districts cannot obtain this desired state due to the current structures of principal support models. Principal supervisors are not allocated to maximize principal effectiveness which leads to stagnate or decreased academic outcomes (Corcoran et al., 2013). Traditional large scale professional development has been the mainstay for school district principal support strategies. Currently, new strategies are being implemented by a few large school districts to address principal effectiveness and student achievement

(Goldring et al., 2018). These new strategies deviate from traditional means of building capacity with principal supervisors as the central component for leveraging principal effectiveness.

Problem Statement

Instructional leadership is a high leverage component of principal effectiveness that leads to increased student achievement (Blasé & Blasé, 1998; Hallinger & Heck, 1996; Hallinger & Murphy, 1985; Purkey & Smith, 1983). One person who can have an effect on principal effectiveness is the principal supervisor. Principal supervisors’ roles vary for each school district, but their main task includes directly supporting and evaluating principals. The Wallace Foundation has recognized the principal supervisor as an essential role in building principals’ instructional leadership capacity that eventually leads to greater academic outcomes. As a result, the Wallace Foundation initiated the Principal Supervisor Initiative (PSI) in 2014.

Prior to the PSI, principal supervisors rarely received professional development to increase the instructional leadership capacity of principals (Goldring et al., 2018). This initiative sought to alter the principal supervisors’ essential task and reduce their span of control to influence principal effectiveness and academic outcomes. The initiative has been adopted by some large school districts across the country to improve academic outcomes. However, little research has been conducted to evaluate the success or failure of the components of this initiative, specifically, the reduction in principal supervisors’ span of control. Therefore, the purpose of this study is to understand the impact of principal supervisors’ reduced span of control on schools’ academic outcomes.

Purpose

The purpose of this study was to measure the impact of reducing principal supervisors’ span of control on schools’ academic outcomes. Academic outcomes are influenced by instructional leadership practices when implemented with structure and alignment to desired outcomes (Hallinger & Murphy, 1987; Hallinger, 2003). The Wallace Foundation's PSI focuses on five components to improve principal effectiveness. One of the components focuses on the reduction of principal supervisors' span of control (Goldring et al., 2018). Increasing instructional leadership skills was the main purpose of the initiative with participating school districts implementing the most feasible action of reducing spans of control (Goldring et al., 2018).

Research lauds instructional leadership practices as an effective tool that supports increased academic outcomes and other components of school operations but lacks specificity about influences by principal supervisors (Hallinger & Murphy, 1985; Hallinger & Murphy, 1987; Hallinger, 2003; Hallinger, 2005). The absence of principal supervisors' impact is deliberate since roles and responsibilities are blighted by compliance and operational tasks. A deliberate change in principal support strategies focused on instructional leadership may bolster stagnate growth and evolve leadership practices.

Significance of the Study

The study is significant since it will extend the knowledge of the impact of reducing the span of control of principal supervisors or similar roles. Few large school districts have implemented this practice to increase principal effectiveness and academic outcomes. This initiative has been spearheaded by the Wallace Foundation, but results have yet to be analyzed. This study isolates one component of the Wallace Foundation's broad initiative to increase the impact of principal supervisors.

School districts in the midst of reducing principal supervisors' span of control or planning to initiate this strategy can utilize the findings of this study to review returns on investments prior to implementation. Findings can inform large school districts about initial steps in restructuring principal support models, providing data for effective decision-making. School districts can utilize the findings of this study to support current or new practices, further clarifying the roles and purpose of principal supervisors in supporting principal effectiveness. Measuring the impact of this single strategy provides guidance for school districts to strategically plan implementation of other complementary strategies. Contributors to the research can extend knowledge pertaining to professional development and specific support strategies implemented by principal supervisors. The body of knowledge produced will guide school districts in planning implementation, influencing stakeholders, and gauging risk of investments.

This study enhances school district leaders' decision-making for supporting principals. Leaders are better informed with an expanded knowledge of the impact of principal supervisors' varied spans of control on academic outcomes. Investments in human resources can be strategically designed and implemented for the highest returns. School districts can enhance their fiduciary responsibilities by maximizing funding strategies to meet the needs of principals via principal supervisor support strategies and size of leadership portfolios.

Hypothesis/Research Questions

The research questions facilitated a detailed analysis about the impact of reducing principal supervisors' leadership portfolios. Reducing principal supervisors' span of control is one of several components that has been implemented by the Wallace Foundation's Principal Supervisor initiative. The research questions supported an analysis of the impact of changing organizational structures to increase the effectiveness of principal support systems by measuring pre and post changes of principal supervisors' span of control or the reduction in their leadership portfolio of schools. The research questions also measured the impact of reducing principal supervisors' leadership portfolios at several types of schools to address the range of schools' complexities.

The study will be guided by the following overarching research question.

Research Question 1: What impact does a reduced principal supervisors' span of control have on schools' percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment?

Sub-questions include the following:

RQ 2. What impact does a reduced principal supervisors' span of control have on Florida Department of Education Differentiated Accountability schools' percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment?

RQ 3. What impact does a reduced principal supervisors' span of control have on Title I schools' percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment?

RQ 4. What impact does a reduced principal supervisors' span of control have on schools' percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment for a period of three consecutive years?

RQ 5. Which principal supervisors' leadership portfolio size has the greatest impact on schools' percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment?

Hypothesis

- Null Hypothesis:
  - h_0: There is no correlation in the reduction of principal supervisors' span of control and schools' percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment.
- Alternative Hypothesis:
  - h_1: There is a correlation in the reduction of principal supervisors' span of control and schools' percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment.

Procedures

Research design included a quantitative research study. The study attempted to answer research questions by analyzing archival school and district data of before and after changes to principal supervisors' span of control. Meticulous data collection was applied to gather Florida Standards Assessment (FSA) data, number of principals being supervised by principal supervisor, and school district years of implementation of a reduction in the span of control from two large urban school districts in Florida.

Academic outcomes were determined by mathematics and English Language Arts school achievement data from the Florida Standards Assessments. Achievement data three years before the change in principal supervisors' span of control and three years after were analyzed to support hypothesis.

The research study took place in two large urban school districts in Florida. These school districts have made changes to their principal supervisor models within the past three or more years where a reduction in principal supervisors' span of control was implemented. The school districts' student population exceeds 100,000 students. The school districts' populations are diverse in race, ethnicity, and socio-economic status, providing a range of school complexities. All school districts have similar principal supervisor models where principal supervisors directly support and evaluate principals. Combined, the school districts have a total number of 29 principal supervisors that supervise a total of 360 comprehensive schools. Although a decrease in the span of control has been implemented, the number of principals for each principal supervisors' leadership portfolio varies per school district.

Study Sample/Sampling Method

The study utilized purposive sampling. Few school districts have embarked on reducing the span of control for their principal supervisors. Targeted school districts have implemented a recent change in principal support strategies, specifically a reduction in principal supervisors' span of control. The population of this study focused on principal supervisors that supervise K-12 schools in two large urban school districts in Florida. Schools will be limited to those that are within a principal supervisors' direct purview with the responsibility of supervising, supporting, and evaluating the principal of the school. Charter schools, alternative schools, and online or virtual schools will be excluded from the study. Charter schools, although public schools, are not regulated or supervised by school districts. Alternative schools are usually populated by students who have major discipline infractions and have been removed from their traditional zoned school. Online or virtual schools utilize methods and modes of instruction that contrast face-to-face instruction. In addition, some students attend part-time and are immersed in other supplemental education options such as home schooling from parents.

Data collection

Permission was solicited from participating school districts to obtain portfolios of schools by principal supervisor detailing the school levels. In addition, the public database of the Florida Department of Education was utilized as the primary source for annual mathematics and English Language Arts achievement data, Differentiated Accountability status, and Title I status.

Analysis

Data analysis was performed utilizing several statistical methods to analyze correlations between several variables. Independent variables include the principal supervisors' span of control before and after reduction and the range of principal supervisors' leadership portfolio sizes. Leadership portfolio sizes were grouped by size intervals; 1-14, 15, 16 or more for elementary school principal supervisor portfolios and 1-11, 12-15, 16 or more for secondary school principal supervisor portfolios. This is due to the current and past portfolio sizes of the school districts that were involved in the study. The portfolio size groups also afforded the best sampling size without removing a school within a portfolio which would compromise the study. Dependent variables included school's mathematics and English Language Arts achievement before and after the reduction of principal supervisors' span of control. Dependent variables also included sustainable mathematics and English Language Arts achievement for three years after the change.

Data analysis for research questions was accomplished by utilizing several methods of statistical analysis: simple linear regression, one-way multivariate analysis of variance (MANOVA), one-way analysis of variance (ANOVA), and Tukey post hoc test.

Research Question 1

What impact does a reduced principal supervisors' span of control have on schools' percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment?

A simple linear regression was used to analyze the impact of reducing principal supervisor portfolios for all schools involved in the study. Impact of reducing principal supervisor portfolios was measured by student performance on mathematics assessments and English Language Arts assessments of the Florida Standards Assessment. The analysis was performed individually for each assessment and for each school year of the study.

Research Question 2

What impact does a reduced principal supervisors' span of control have on Florida Department of Education Differentiated Accountability schools' percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment?

A simple linear regression was used to analyze the impact of reducing principal supervisor portfolios for Differentiated Accountability schools involved in the study. Impact of reducing principal supervisor portfolios was measured by student performance on mathematics assessments and English Language Arts assessments of the Florida Standards Assessment. The analysis was performed individually for each assessment and for each school year of the study.

Research Question 3

What impact does a reduced principal supervisors' span of control have on Title I schools' percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment?

A simple linear regression was used to analyze the impact of reducing principal supervisor portfolios for Title I schools involved in the study. Impact of reducing principal supervisor portfolios was measured by student performance on mathematics assessments and English Language Arts assessments of the Florida Standards Assessment. The analysis was performed individually for each assessment and for each school year of the study.

Research Question 4

What impact does a reduced principal supervisors' span of control have on schools' percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment for a period of three consecutive years?

A simple linear regression was used to measure schools' percent of students' passing over time on the mathematics assessments and English Language Arts assessments of the Florida Standards Assessment. Student performance was measured over a continuous time period of three years post reduction of principal supervisors' portfolio sizes.

Research Question 5

Which principal supervisors' leadership portfolio size has the greatest impact on schools' percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment?

A MANOVA was used to simultaneously analyze mathematics and English Language Arts achievement by size intervals 1-14, 15, 16 or more for elementary school principal supervisor portfolios and 1-11, 12-15, 16 or more for secondary school principal supervisor portfolios. An ANOVA was used to separately analyze mathematics and English Language Arts by size intervals 1-14, 15, 16 or more for elementary school principal supervisor portfolios and 1-11, 12-15, 16 or more for secondary school principal supervisor portfolios. The MANOVA and

ANOVA were performed for each school year of the study post change in principal supervisors' span of control.

Conceptual Framework

Weber's (1989) concept of instructional leadership serves as an overarching guide for classification of instructional leadership competencies demonstrated by school-based leaders and the principal supervisors who support them. Weber's (1989) concept of instructional leadership was used to categorize instructional leadership behaviors that influence academic outcomes. Weber's (1989) concept of instructional leadership is constructed of leadership behaviors grouped into five dimensions: defining the school's mission; managing curriculum and instruction; promoting a positive learning climate; observing and improving instruction; assessing the instructional program. Weber's (1989) concept of instructional leadership was utilized to further clarify assumed duties and task accomplished by principals and principal supervisors who influence academic outcomes.

Instructional leadership has a direct correlation to leading instructional programs (Tice, 1998; Weber, 1989). Evidence supports that principals primarily affect academic outcomes indirectly (Hallinger, 2003; Huang et al., 2012; Weber, 1989). Activities within this indirect approach support goal development, securing buy-in from faculty and staff, frequent review and reflection of practices that support the instructional program while being anchored by direct support. The study examined the effects of principal supervisors' instructional leadership on principal effectiveness, consequently examining principals' instructional leadership impact on academic outcomes. The study also sought to understand the impact of principal supervisors on academic outcomes while also understanding the unique portfolio sizes that lead to the best academic outcomes. Academic outcomes were measured by schools' percent of students passing state mathematics assessments and English Language Arts assessments with a level 3 or above.

Researchers contend that instructional leadership is the cornerstone of an effective educational leader, executing essential actions of establishing goals and expectations while aligning capacity building initiatives to obtain desired outcomes (Olson, 2009; Robinson, 2010). Early transactional practices utilized in industrial-age business environments have evolved to more transformational-centric instructional leadership practices. Although researchers of instructional leadership sparsely discuss the leaders' ability to inspire with charismatic qualities to obtain goals, establishing goals and expectations with high levels of buy-in are deliverables of a transformational leader (Bass, 1985). Instructional leadership has been a dominant topic of discussion and practice within the past few decades with research of prowess and effectiveness in increasing academic outcomes (Blasé & Blasé, 2000; Hallinger & Murphy, 1985; Heck, Larsen, Marcoulides, 1990; Vogel, 2018).

Definition of Terms

<u>Florida Department of Education Differentiated Accountability</u> – This term refers to a program implemented by the Florida Department of Education to support successful school improvement of the state's failing public schools. Specific criteria that include schools' annual grades are used to select schools for the program. Schools with perennially low achievement and school grades of a D or F on a scale of A to F are required to participate in the Differentiated Accountability program (Florida Department of Education, 2019).

<u>Instructional Leadership</u> – The concept of instructional leadership includes practices and strategies that support school's mission and vision, management of instructional curriculum and programs, ensuring an environment conducive to learning, building teacher capacity,

development of curriculum, and supervision of faculty and staff (Blasé & Blasé, 1998; Hallinger, 1992; Hallinger & Heck, 996; Leithwood, Jantzi, & Steinbach, 1999).

<u>Leadership Portfolio</u> – This term is synonymous with principal supervisors' span of control. This term refers to the number of principals or schools within a principal supervisors' purview.

<u>Span of Control</u> - This term refers to the number of principals or schools within a principal supervisor's purview or leadership portfolio. Principal supervisors are responsible for supervising, supporting, and coaching principals (Corcoran et al., 2013; Goldring et al., 2018).

<u>Title I</u> – Title I is a federal education program focused on improving academic achievement of disadvantaged students. For this study Title I refers to the Title I Part A program that provides federal funding to schools with students from low-income families. Schools are eligible for this program if 40 percent or more of the student population are students from low-income families (Florida Department of Education, 2019; U.S. Department of Education, 2020).

Scope, Limitations, and Delimitations

Two large urban school districts in Florida were chosen for this study. School districts with a recent reduction in principal supervisors' span of control were targeted. Annual state mathematics assessments and English Language Arts assessments were chosen to measure impact of variables. Traditional public schools were selected for this study, excluding charter schools, virtual schools, and alternative schools.

Limitations for this study are few but are essential to further the study. School districts' principal supervisors vary in capability and tenure resulting in varied levels of experience that may affect academic outcomes. Changes in the span of control of principal supervisors were dependent upon district leadership being forthright with accurate information. Student assessment data was collected from the Florida Department of Education. Schools' levels, elementary or secondary, were collected from school districts. Achievement is also based on multiple other factors which may influence the outcome of this study. In addition, the districts in this study are large. Therefore, findings from this study may not be transferrable to districts with smaller student populations or different contexts.

Summary

The research has been organized to focus on an initial step in changing the roles and responsibilities of principal supervisors. If school districts are to initiate change and allocate funds to do so, data from this study can enhance decision-making processes. The problem and purpose of the study espouses a common concern of principal effectiveness and resulting academic outcomes. The conceptual framework overtly details the actionable steps in effective instructional leadership to guide the study of analyzing the impact of reducing principal supervisors' span of control. Research questions seek to obtain correlational data for diverse schools in large urban school districts. Schools range from low-poverty to high poverty schools. Schools with perennially low achievement, commonly known as turnaround schools, are also included. The study embarked on a problem with minimal research available and lack of purposeful development opportunities. This contribution to the research provides a new body of knowledge to support strategies to improve principals' systems of support.

CHAPTER 2: LITERATURE REVIEW

Introduction

This chapter expounds on the concept of instructional leadership and supports the rationale to research principal supervisors' impact on school academic outcomes. The literature review will explore the practice of instructional leadership by school districts and school leaders. Furthermore, the literature review will cite principal support strategies provided by immediate supervisors to develop instructional leadership capacity.

This review includes literature about the concepts of instructional leadership, principal roles and responsibilities, principal supervisor roles and responsibilities, and the Wallace Foundation's Principal Supervisor Initiative. The researcher's review of literature seeks to clarify the influence of principal supervisors' impact on academic outcomes via principal effectiveness. The researcher also seeks to discover knowledge of past and current practices to support principals, specifically support from principal supervisors.

Instructional Leadership

Instructional leadership has been an essential strategy resulting in increased student achievement over time and examined in multiple research studies (Blasé & Blasé, 2000; Goldring, Porter, Murphy, Elliott, & Cravens, 2009; Hallinger & Murphy, 1987; Hallinger & Murphy, 1985; Vogel, 2018;). Instructional leadership facilitates principal effectiveness and increased academic outcomes (Hallinger, 2005; Lemoine, Greer, McCormack, & Richardson, 2014). Research suggest that structured support of principals leads to increased instructional leadership capacity anchored by increased academic outcomes (Hallam & Boren, 2019; Lemoine et al., 2014). Principal supervisors are principals' direct system of support, especially for growth and development (Bambrick-Santoyo, 2012; Bambrick-Santoyo, 2018; Goldring, E. B., Grissom,

J. A., Rubin, M., Rogers, L. K., Neel, M. & Clark, M., 2018). A void in research exists for principal supervisors' role in supporting and developing principals' instructional leadership capacity. Principal supervisors' duties have been heavily focused on compliance and managerial issues while being challenged to support principals (Goldring et al., 2018).

Instructional leadership is a set of actions leveraged by school leaders that improve teaching and learning, subsequently impacting academic outcomes (Ismail, Yahya, Husin & Khalid, 2018; King, 2002; Mark & Printy, 2003). Principal effectiveness has been highly dependent on instructional leadership (Bambrick-Santoyo, 2012; Bambrick-Santoyo, 2018; Goldring et al., 2018; Hallinger & Murphy, 1985). Instructional leadership has been the mainstay of preferred educational leadership strategies within recent decades. The 2001 the No Child Left Behind law was a major catalyst for changes in school district leaders' focus and role changes emphasizing instructional leadership (Kowalski & Bjork, 2005). Researchers have provided multiple definitions for instructional leadership with teaching and learning resonating as its focus (Hallinger, 2005; Hallinger & Murphy, 1985; Lemoine et al., 2014). Supporting quality instruction, ensuring a conducive teaching and learning environment, aligning efforts to increase student achievement, and building instructional leadership capacity of other leaders are key elements of instructional leadership emphasized by researchers (Blase & Blase, 2000; Fink & Markholt, 2013; Hallinger, 2005; King, 2002).

Within the complex environment of leading public schools, principals' instructional leadership intentions are often marred by the daily bombardment of other essential tasks unrelated to instruction. Quelling parent and student concerns, and addressing personnel issues, management and operational tasks, resource allocations, and much more make up the plethora of daily responsibilities of principals (Meyer & Macmillan, 2001; Mitchell & Castle, 2005). Heck, Larsen, and Marcoulides (1990) conducted a research study to confirm the causal effect of instructional leadership on school achievement. The study sought to better understand the influence of principal leadership on student achievement while demonstrating various instructional leadership behaviors. Heck et al. (1990) developed a conceptual framework grounded in instructional leadership concepts developed by Bossert, Dwyer, Rowan, & Lee (1982), Hallinger and Murphy (1987), and Pitner and Hocevar (1987). Elements from each researchers' conceptual model were used to develop the model used in the study. Variables developed and used to directly affect student achievement included the following:

1. Governance: Systems, structures, and support strategies to align personnel and resources to the school mission.
2. School Climate: Ensuring an environment conducive to effective teaching and learning.
3. Instructional Organization: Goal setting, instructional program, and collaboration aligned to the school mission.

The research study conducted by Heck et al. (1990) focused on all public elementary schools in California that underperformed or outperformed schools within their comparison band. After controlling for certain variables, targeted schools were issued questionnaires to collect data that aligned to instructional leadership behaviors of the principal. The study concluded that instructional leadership behaviors impacted student achievement based on varied levels of implementation. The degree to which principals practiced instructional leadership behaviors influenced teacher instruction, school environment, and other essential elements that impact student learning. Heck et al. (1990) research supports that instructional leadership contributes to student achievement.

Instructional leadership has become a term synonymous with the current role of principals (Ismail et al., 2018). The objective of the school leader is to ultimately improve student achievement (Goldring et al., 2009). State and national accountability strategies accompanied by stringent student performance expectations has informed the role and responsibilities of modern principals. Hallinger (2005) stated that principals who willingly ignore state or national standards and linked accountability along with minimal use of instructional leadership strategies “do so at their own risk.”

Initial Instructional Leadership

Instructional leadership was not the mainstay of early school leaders with its conception initiated within the past 40 years. Early researchers such as Edmonds (1979) isolated specific behaviors of effective principals. Edmonds (1979) discovered that effective principals had a keen knowledge of pedagogy and used this to develop curriculum, facilitate professional development, observe and support classroom instruction, and create a culture of high expectations. Hallinger (2005) also identified similar behaviors of an effective principal concluding that instructional leadership encompassed defining school goals and the visibility of the leader, evaluating and supporting instruction, coordinating curriculum, and performing ongoing progress monitoring of student learning.

Instructional leadership as defined by the practitioners is relative to the context of the schools they lead (Goldring, Huff, May, & Camburn, 2008). School context can include a myriad of variables such as poverty levels, student demographics, low teacher capacity, and more that may lead to principals’ situational use of specific instructional leadership strategies. Instructional leadership practices differ per environment with specific leadership behaviors being amplified depending on context (Hallinger & Murphy, 1985). Vogel (2018) conducted a recent study examining the narrative responses of principals about instructional leadership practices that increased their capacity as an instructional leader. The list details the knowledge and skills principals concluded as enabling them to be instructional leaders:

> Teacher supervision and coaching; data analysis discussions; curriculum discussions; assessment data analysis; planning and implementing professional development; working with teacher teams; collaborating with teachers; resource allocation; implementing a vision; use of data to inform instruction; tracking student achievement; analyzing state student assessment data (Vogel, 2018).

Vogel’s (2018) conclusion aligns with early definitions of instructional leadership. Similar to other analysis of instructional leadership traits, the fundamental concept of instructional leadership is focused on teaching and learning. Robinson’s (2010) empirical research detailed instructional leadership behaviors which encompassed “leading through promoting and participating in teacher learning and development; establishing goals and expectations; planning, coordinating, and evaluating teaching and the curriculum; strategic resourcing and ensuring an orderly and supportive environment” (p. 2). Robinson’s research (2010) also contributes to a common theme of teaching and learning accompanied by developing school goals or missions.

Principals

The principal role is an essential part of the complex web of public education. The principals’ impact on student achievement only lags behind teachers (Davis & Darling-Hammond, 2012; Hallinger, 2003; Hitt & Meyers, 2018; McKibbon, 2013). Research suggests that instructional leadership leveraged by principals supports improved academic outcomes (Hallinger 2003; Hallinger 2005; Robinson, 2010). Principals are an essential part of the school community, ensuring the management of operations and human resources. Strategies that focus on student achievement as the core job functions for principals hves progressed in dominance in recent decades. Jenkins, Lock, & Lock, (2018) and Lemoine et al. (2014) stated that principals' duties involved administrative management prior to new initiatives focused on instructional leadership. Hallinger (2005) elaborated that principalships involved multiple functions with expectations of managing school operations while managing instructional programs as being the least of their duties. The public also viewed the principals as managers instead of instructional leaders prior to the shift in paradigm (Jenkins et al. 2018).

Principal leadership expectations changed over time, catalyzed by advancing education standards and accountability (Kowalski & Björk, 2005). School leadership eventually transformed into an intense focus on the academic outcomes of schools. Teaching and learning became the emphasis. A direct support for academic improvement and the instructional practice and program became the new mantra for district leaders and school leaders, causing a deliberate transformation of the principal role (Jenkins et al., 2018; Lemoine et al., 2014). The role change was more conceptual than concrete with researchers contributing to the definitions and job functions of instructional leadership. Lemoine et al. (2014) elaborated on research that focused on instructional leadership behaviors of effective principals:

> (a)The effective leader sets the direction and establishes a vision to reach academic goals. (b) Effective principals have high expectations for teacher and student performance, articulating performance standards for teaching and learning. (c) As an instructional leader, the principal works with curriculum and instruction; the school leader presents focused and on-going professional development, encourages instructional innovations, utilizes proactive change processes, and frequently monitors and evaluates teachers and

> student learning. (d) The effective school leader communicates and builds relationships with teachers who become part of the leadership team. Leadership is distributed among team members who are working collaboratively toward the same goal. (e) School leaders establish a safe, orderly, and positive environment and school culture in which learning can occur. (f) School leaders manage time wisely, promote the school in the community, attend school events, have a presence throughout the school interacting with students, faculty, staff, parents, and community members (Lemoine et al., 2014, pp 19-20).

Researchers have confirmed that principal effectiveness is a lever for increasing academic outcomes (Davis & Darling-Hammond, 2012; Hallinger, 2003; Hitt & Meyers, 2018; McKibbon, 2013). With the revisions of principals' leadership job functions, researchers sought to isolate specific elements that led to principal effectiveness and increased academic outcomes. Empirical research by Huan, Beachum, White, Kaimal, Fitzgerald, and Reed (2012) emphasized that principals significantly impacted academic outcomes. Principals indirect effect on academic outcomes was a result of building teacher capacity and creating a conducive learning environment (Huan et al., 2012). Research conveyed that effective principals established focus and vision and built the capacity of all faculty and staff (Huan et al., 2012). Research also concluded that effective principals were trusted by parents and the community (Huan et al., 2012). Furthermore, Huan et al. (2012) discussed the importance of ensuring student-centered or learner-centered learning environments, a focus that underscores the teaching and learning components of instructional leadership. Effectively building school leaders' capacity for aforementioned skills and practices requires purposeful support structures.

Principal Leadership Capacity

According to researchers (Lee, 2015; Nelson, De La Colina, & Boone, 2008), principals need professional development through direct coaching and support for ongoing improvement of leadership skills. Capacity building structures for school leaders are warranted with the advancement of accountability measures and public interest in school academic outcomes (Hallinger, 2005). Principals have lacked support structures that truly enhanced their instructional leadership capacity (Goldring et al., 2018). Hallam & Boren (2019) stated that building the leadership capacity of principals involved frequent support as schools became more complex. The diversity of schools' context was stressed as a variable that also required the varying skillsets of instructional leaders. Hallinger and Murphy (1985), Goldring et al. (2008), and Manasse (1985) discussed the varying context of school environments as a need for differentiated instructional leadership practices. The varying job functions or strategies within instructional leadership support situational implementation of specific strategies (Goldring et al., 2008).

According to research by Burgess and Dermott (1983), Chance and Lingren (1988), and Clarke & Wildly (2004), contextual challenges cause situational awareness for use of specific instructional leadership strategies to meet varied school needs. Transformational leadership is initiated due to variables, such as poverty, stagnate economic development, and low efficacy, that may lead to low achieving schools, as defined by state or federal accountability measures (Hallinger, 2003). Transformational leadership utilized comparable strategies that mainly emphasized developing a vision and mission while influencing faculty and staff to align practices to them (Burns, 1978; Bass, 1985). Principals with a task of turning around low performing schools required the common competencies of instructional leadership. Hitt, Woodruff, Meyers, & Zhu, (2018) developed a competency model for effective turnaround principals:

> (a) initiates and perseveres, (b) elicits intended responses, (c) builds capacity with accountability and support, (d) inspires and motivates others, (e) engages the team, (f) commits to student learning, (g) crystalizes problems and creates solutions, and (h) uses inquiry to frame and solve problems (pp. 67-68)

The competency model developed by Hitt et al. (2018) and other instructional leadership job functions and strategies are symptoms of robust state and federal accountability systems. The competency model developed by Hitt et al. (2018) encompasses common elements of instructional leadership with modernization rooted in capacity building and collaborative structures. Several of the elements listed in the model espouse transformational leadership strategies that focus on motivating, inspiring, and engaging teams or individuals. The model shifts the pendulum away from leaders' focus on managerial tasks and practice to leadership that involves engaging others to solve organizational problems.

Lemoine et al. (2014) highlighted a gap in instructional leadership capacity of principals due to most school district and leadership preparation programs focusing on managerial tasks. Research conducted by Nelson et al. (2008) concluded that new or novice principals had skill deficits that led to immense challenges. Jenkins et al. (2018) research supported substituting management of school operations with instructional leadership as a primary leadership practice. Addressing skill deficits or building the instructional leadership capacity of principals is a team effort by school district leaders and a primary function of principal supervisors (Goldring et al., 2018).

Research touts that effective school leaders are immersed in instructional leadership practices (Hallinger & Heck, 1996). Ohlson (2009) stated that instructional leadership is distinguished as an essential characteristic of school leaders. The review of literature expounds on the level of support needed by principals to ensure adequate capacity levels to influence positive academic outcomes. Lemoine et al. (2014) framed variables to consider from principals' plethora of responsibilities that involve budgeting, community engagement, managing infrastructure, and logistics as this whirlwind of additional responsibilities may easily counter efforts to build instructional leadership capacity. Hallinger (2005) also affirms the concerns of Lemoine et al. (2014) about the diversity of roles and responsibilities of principals. Hallinger (2005) boldly states that "principals again find themselves at the nexus of accountability and school improvement with an increasingly explicit expectation that they will function as instructional leaders" (p. 222).

It has been advocated that principals should be instructional leaders (Reitzug, 1997). The review of literature discovered minimal research that supports specific professional development or capacity building strategies to address desired skills. Hallam and Boren (2019) and Lemoine et al. (2014) detailed the need for training and professional development for principals but failed to delve into specific strategies that support developing instructional leadership capacity. According to Harper (2015) and Sinnema and Robinson (2012), leadership evaluations or leadership appraisals are utilized as mechanisms to build instructional leadership capacity of principals by many school districts. The review of literature also conveyed that principal supervisors are an essential component for developing principals' leadership capacity (Goldring et al. 2018).

Principal Supervisors

Principal Supervisors are the main support for principals (Goldring et al. 2018). The evolution of school accountability and principal expectations has redefined the role of principal supervisors (Saltzman, 2016a). Principal supervisors are expected to support, evaluate, coach, and advocate for principals while being immersed in schools' academic practices (Corcoran, Casserly, Price-Baugh, Walston, & Simon, 2013; Saltzman, 2016a). The role of principal supervisor in small school districts may contrast the role of principal supervisors in large school districts, especially those exceeding 100,000 students. Small school district principal supervisors may have other roles in their organizations that may minimize principal supervision duties. It is not uncommon for superintendents of small school districts and their immediate executive staff to have principal supervision duties along with the multitude of other responsibilities of operating the school district and interacting with school board members (Archer, 2005; Canales, Tejeda-Delgado, & Slate, 2008; Wright & Harris, 2010). In many small school districts, the superintendent is the lone district administrator with a plethora of responsibilities that include principal supervision (Canales et al., 2008). Large school district principal supervisors are mostly aligned to the duties of solely supporting principals and their schools. The number of schools in large school districts can easily exceed 100 schools and requires more direct support and monitoring to attain district and school goals. For many large school districts, large principal supervisor portfolio sizes or spans of control impede effective support of principals (Saltzman, 2016a).

Principal supervision should include a collaborative structure between principal supervisor and principal focused on instructional leadership (Vitcov & Bloom, 2010). The review of literature found minimal research about principal supervisors' impact on principal effectiveness and few studies that detailed direct support strategies for principals. Research expounds on the main responsibilities of principal supervisors as ensuring compliance and addressing managerial issues (Goldring et al., 2008; Miller, 2014; Saltzman, 2016b). Saltzman's (2016b) research also presents an overlooked difficulty in effectively building principals' instructional leadership capacity due to principal supervisors' large leadership portfolios or large spans of control. Saltzman (2016) and Vitcov and Bloom (2010) also noted that some large urban school districts' principal supervisor leadership portfolios can surpass 40 principals, decreasing support of principals to a secondary responsibility. Principal supervisor to principal ratios are variables that can have an impact on principal effectiveness and resulting academic outcomes due to school district current support and organizational structures (Goldring et al., 2018). Principal supervisors are often the sole or majority support system for principals (Goldring et al., 2018; Corcoran et al., 2013). The Council of the Great City Schools' and The Wallace Foundation's study of changing the role of principal supervisors detail several school districts' principal supervision structures that provide minimal support to principals, further lamenting compliance and operational task of the role (Corcoran et al., 2013).

Principal Supervisor Roles and Responsibilities

According to Miller (2014) principal supervisors' roles have been overlooked in many school districts. As a result, Miller's (2014) research contends that principal supervisors lack many of the overall experiences of instructional leadership, also compounded by the inconsistency in the role across different school districts. Furthermore, Saltzman's (2016) research details past practices of principal supervisors' lack of visiting schools and direct support of principals. The review of literature detailed many anecdotal experiences of ostensible principal supervisor support of principals leading to the need to revise the role of principal supervisors.

The Council of the Great City Schools and The Wallace Foundation conducted a study to create recommendations for school districts to change the role of principal supervisors to increase their impact on principal effectiveness (Corcoran et al., 2013). The study sought to address four research questions:

1. How do districts select, prepare, and provide professional development to principal supervisors?
2. To what extent are principal supervisors expected to assume an instructional leadership role within the district, and how are they supported in this role?
3. What levels of operational/instructional support are provided to principals?
4. How are principal supervisors and principals evaluated? (Corcoran et al., 2013, p. 9)

Researchers surveyed leaders in 69 urban school districts. Superintendents and administrative staff with principal supervision responsibilities were surveyed. Survey questions focused on roles and responsibilities of principal supervisors, development opportunities, and principal evaluation system effectiveness. Researchers would measure the change in principal supervisor roles and responsibilities over a two year period. Researchers conducted site visits to school districts to review documents, such as organizational charts and evaluation forms, and to interview leadership staff. Data collected was compiled and analyzed to create recommendations for principal supervisor structures that support a transition to instructional leadership as well as to increase the instructional leadership capacity of principals. Corcoran et al. (2013) stated the following as a result of conducting research on urban school districts' principal supervisor structures:

> As the role of school principal has been transformed from one of site management to one of instructional leadership, districts have sought to match these changes with principal

preparation, recruitment, support, and evaluation systems capable of strengthening school-based leadership and student achievement. In many school districts, this has meant a more robust instructional leadership role for principal supervisors as well. Staff in these new supervisor roles must now be equipped to identify, assess, and advance effective instruction.

Recommendations from the study were developed by topic area. Topic areas included are "prescribed role of principal supervisors; selection and deployment of principal supervisors; staffing, preparation, and professional development of principal supervisors; principal and principal supervisor evaluation; principal preparation and development" (Corcoran et al., 2013, pp. 39-48).

The recommendations from the staff emphasized the changing role of principal supervisors and underscored building their capacity to execute new expectations. Table 1 depicts the recommendations developed from the Council of the Great City Schools' and The Wallace Foundation's study.

Table 1: Council of the Great City Schools and The Wallace Foundation recommendations

Topic Area	Recommendation
1. Prescribed role of principal supervisors	a) Clearly define the role of principal supervisors. b) Develop a set of core competencies for principal supervisors based on their prescribed role and the district's strategic priorities. c) Communicate the roles and responsibilities of principal supervisors to staff throughout the district.
2. Selection and deployment	a) Select principal supervisors who are effective leaders with a proven track record of improving student and school outcomes. b) Align the selection and hiring process with the set of desired competencies identified for principal supervisors.

of principal supervisors	c) Narrow the responsibilities and number of schools under each supervisor's purview so that they can devote more time to providing principals with individualized support and oversight. d) Strategically match principal supervisors with principals, taking into account their background expertise and the specific needs of a school.
3. Staffing, preparation, and professional development of principal supervisors	a) Provide principal supervisors with an appropriate level of staffing and resources given their intended function. b) Design comprehensive, ongoing professional development programs targeted to the needs and desired competencies of principal supervisors. c) Provide professional learning opportunities for principal supervisors that promote a deep understanding of the instructional shifts required by the common core standards. Prepare principal supervisors to lead the process of change in the schools they oversee. d) Establish information-sharing policies or procedures to ensure communication and collaboration between principal supervisors and central office staff.
4. Principal and principal supervisor evaluation	a) Hold principals—and principal supervisors—accountable for the progress of their schools. b) Design and implement principal evaluation systems that support continuous improvement by providing timely, actionable data and establishing regular meetings between principals and their supervisors to discuss progress. c) Ensure alignment in the processes and measures used to assess teacher, principal, and principal supervisor performance. d) Incorporate teacher retention measures into the evaluations of principals.
5. Principal preparation and development	a) Provide early and sustained support to new principals in the form of coaches. b) Ensure that both home-grown and external principal preparation programs are closely aligned to district needs and priorities. c) Engage principal supervisors in the process of preparing and hiring school leaders. d) Provide internship and residency opportunities to prepare future principals for leadership in high-need, urban settings. e) Identify and support future school and district leaders early in their career.

Source. Corcoran et al., 2013, pp. 50-51

The Council of the Great City Schools' and The Wallace Foundation's study also concluded that school districts need to reduce principal supervisors' span of control and reduce responsibilities that counter instructional leadership activities, mainly emphasizing structured support of principals (Corcoran et al. 2013). Research conducted by Hvidson, Range, and McKim (2015) stated that principals expressed that supervisors required competencies in coaching and supervision to increase their capacity and performance. Bambrick-Santoyo (2012) stated that the transition of principal supervisor roles was a challenging task for school districts, referencing that core elements of the organizational structure would need to change. This would involve reassigning operational task to other leaders without principal supervisor duties to clear the path for enhanced and structured support of principals (Bambrick-Santoyo, 2012).

Instructional Leadership Frameworks

The concept of instructional leadership has evolved over the past few decades with researchers reconceptualizing their original definitions and modernizing job functions and other elements of the concept. The review of literature discovered that concepts of instructional leadership were either expressed in a few overt descriptive elements or in a detailed list of job functions, some stemming from appraisal or evaluation tools. Literature proceeding will expand on the concept of instructional leadership (Carbaugh, Marzano, & Tooth 2015; Hallinger, 2005; Hallinger & Murphy, 1985; Heck et al. 1990).

Hallinger and Murphy (1985) studied the behaviors of principals and operationalized the concept of instructional leadership. The research study provided valuable data to support job functions that led to student achievement. Hallinger and Murphy's (1985) Principal Instructional Management Rating Scale (PIMRS) comprises eleven main job functions that are assessed by 71 questions used to rate each job function. The PIMRS and encompassing elements are initiated from three main instructional leadership concepts or "dimensions:" "defines the mission; manages instructional program; promotes school climate"(Hallinger & Murphy, 1985, p. 221). The research was initiated as a result of a school district superintendent having a desire to understand the impact of job functions related to instructional leadership to support and evaluate principals (Hallinger & Murphy, 1985). Table 2 details the elements within Hallinger and Murphy's (1985, pp. 221-224) PIMRS.

Table 2: Principal Instructional Management Rating Scale

Dimension	Job Function
Defines the Mission ○ Creating shared purpose for school vision and goals among faculty and staff with effective communications.	Framing School Goals Communicating School Goals
Manages Instructional Program ○ Enhancing curriculum and instruction by collaborating with teachers; providing ongoing coaching and feedback of observed instruction, progress monitoring student learning, and coordinating curriculum.	Supervising and Evaluating Instruction Coordinating Curriculum Monitoring Student Progress
Promotes School Climate ○ Supporting school norms, values, and attitudes via communicated expectations with aligned strategies to support incentives, collaboration, and buy-in.	Protecting Instructional Time Promoting Professional Development Maintaining High Visibility Providing Incentives for Teachers Enforcing Academic Standards Providing Incentives for Students

Source. Hallinger and Murphy (1985)

Hallinger and Murphy (1985) distributed the instrument to teachers and principals. Participants ranked each job function with a rating scale ranging from "almost never" implementing to “almost always” implementing the specific job function. Mean scores were calculated for each job function to analyze variance in instructional leadership practices among principals. Hallinger and Murphy (1985) were able to collect data that assessed principal’s instructional leadership behaviors, further defining and initiating an early research-based conceptualization of instructional leadership. In addition, an appraisal system was developed for the participating district to use and evaluate principals.

Hallinger and Murphy (1986) developed a conceptual framework that encompassed a “two dimensional construct” of instructional leadership; leadership functions and leadership processes. Hallinger and Murphy’s (1986) conceptual framework was intended to address varying school contexts and leadership styles and included 14 total functions. School context has also been addressed in other research about instructional leadership, detailing its effect on chosen practices or strategies (Hallinger and Murphy, 1985; Hallinger, 2005; Manasse, 1985; Weber, 1989). The 14 functions include several functions from the PIMRS but also include functions that focused on implementation of instructional leadership strategies (Hallinger and Murphy, 1986).

Hallinger and Murphy’s (1986) initial leadership functions include framing and communicating school goals, stating that schools with effective instruction have clearly defined missions that focus on student achievement. School goals are few and correlated to the capabilities of the organization. The gathering of staff input and framing communication for interpretation are key for this function. Hallinger and Murphy’s (1986) leadership functions also include supervising and evaluating instruction, monitoring student progress, and coordinating curriculum. Supervising and evaluating instruction tasked school leaders with frequently observing teacher instruction and ensuring its alignment to school goals. Actionable feedback is also provided in formal and informal methods that lead to improving instructional practices. Principals monitor student progress by frequently monitoring student data to assess progress of students and overall impact of instructional programs. Data analyzed details evidence of student learning; quantitative or qualitative. Principals also coordinate curriculum by ensuring that curriculum, assessment items, and instructional objectives are aligned.

Leadership Functions of Instructional Leadership Frameworks

Additional leadership functions of Hallinger and Murphy's (1986) conceptual framework include protecting instructional time, promoting professional development and instructional improvement, developing high standards and expectations, and providing incentives for students and teachers. Principals protect instructional time through various methods. Methods include decreasing classroom disruptions, ensuring students are not expressing truant behaviors, developing teacher classroom management skills, and more. Principals also engage in activities that promote professional development and instructional improvement by providing teachers with a myriad of professional growth opportunities. Support includes various job-embedded and external professional development. Principals are also tasked with developing high standards and expectations. Principals must have high expectations embedded in all aspects of the school and in school policies. Student and adult behaviors should resonate the desired culture through daily actions. Principals also develop and implement student and adult incentives. Formal incentives, such as certificates and awards, or informal incentives, notes of praise, are utilized among other strategies of recognition.

Hallinger and Murphy's (1986) leadership processes encompassed in their "two dimensional construct" of instructional leadership include communication, conflict management, group process and decision making, change process, and environment interaction. Hallinger and

Murphy (1986) stated that frequent systematic communication should be implemented to support productive relationships between leadership, faculty and staff. Communication should emphasize school goals and aligned strategies. Principals engage in conflict management and must understand the diverse concerns from varied groups; teachers, parents, and students. Strategies to address conflict are implemented for cohesion and support of school goals. Stakeholders are empowered through group processing and decision making. Principals support the creation of common goals and common systems.

Collaboration with faculty and staff is emphasized to support inclusion in school decision-making and to maximize buy-in. Principals also clearly understand the barriers to organizational change during the change process. Deliberate collaboration to support changes in curriculum and instruction are implemented. Environment interaction supported by principals involves correlating curriculum and instruction to school environment needs, using school context to define the instructional program. The school leader ensures that faculty and staff do not waiver from commitments for curriculum and instruction.

Heck et al. (1990) conducted a research study, as detailed earlier in the literature review, that sought to better understand the effects of three leadership behaviors of instructional leadership; governance, school climate, and school instructional organization. They researched leadership behaviors influenced the overall instructional program and perception of school leaders (Heck et al. 1990). Data collected from the casual model contributed to the influence of the three leadership behaviors, supporting an additional conceptual model of instructional leadership.

The conceptual model developed by Heck et al. (1990) was anchored by concepts developed by Bossert et al. (1982), Hallinger and Murphy (1987), and Pitner and Hocevar

(1987). Research conducted by Bossert et al. (1982) emphasized schools' instructional organization and school climate to understand the principal's role as an instructional manager. Bossert et al. (1982) concluded that school climate focused on learning and instructional objectives emphasizing high expectations reflected in teacher instruction led to successful schools. Principals contribute to an instructional organization through multiple strategies that indirectly have an effect on student achievement and school success.

Bossert et al. (1982) elaborated about multiple elements that affected instructional practices while emphasizing the individual classroom as an instructional organization. Elements included time-on-task, class size and composition, instructional grouping, curriculum, evaluation, task characteristics, and time allotment for instruction. The research conducted by Bossert et al. (1982) also emphasized school climate as a strong lever for school effectiveness. Schools with orderly, yet flexible, learning environments contributed to better performing schools (Bossert et al., 1982). The school leader's ability to create structures that enhanced learning opportunities through common norms and beliefs fostered environments of commitment and collaboration among staff (Bossert et al., 1982).

Pitner and Hocevar (1987) encompassed some elements from the research of Bossert et al. (1982). Pitner and Hocevar (1987) sought to dismiss the common notion of a "unidimensional or bidimensional" measure of leadership effectiveness. Research involved utilizing a multidimensional instrument to capture data from teachers about principal leadership behaviors. The instrument entailed 23 elements of managerial or leadership behaviors developed by Yulk and Numeroff (1979). The concluding data from the survey confirmed that a multidimensional construct is best to assess principals' leadership effectives. Single and two dimensional measures were not completely rejected but a multidimensional measure provided more clarity for the numerous task and responsibilities of school leaders.

Hallinger and Murphy (1987) contributed to the conceptual model while focusing on school context by examining the influence of organizational and environmental factors of schools and its influence on leadership behaviors. The research delved into the complexities of varied school context with governance strategies being determined by the current environment of both the school and district. Hallinger and Murphy (1987) elaborated about several contextual concerns that would affect leadership styles; processes for accomplishing goals, district context, staff composition, school level, and school social context. The research sought to further define the instructional leadership actions of principals. Research conducted by Hallinger and Murphy (1987) also contributed to the findings of Pitner and Hocevar (1987), also concluding that instructional leadership is not one-dimensional. The leadership role is context dependent and requires leaders to implement instructional leadership styles that correlate to the needs of the organizational context.

Reconceptualization of Instructional Leadership Frameworks

Carbaugh, Marzano, and Toth (2015) developed a leader evaluation model anchored by instructional leadership that focused on four objectives: developing a systematic approach to evaluate school leaders; championing leadership growth and development with collaboration between school leaders and supervisor; desiring effects as the main focus; ensuring inter-rater reliability. Leadership influence is incorporated in these five domains.

I. A data-driven focus on student achievement
II. Continuous improvement of instruction
III. A guaranteed and viable curriculum
IV. Cooperation and collaboration
V. A positive school climate (Carbaugh, Marzano, & Tooth, 2015, p. 6)

Research conducted for the development of the five domains also spawned 24 elements that provide descriptive leadership behaviors (Carbaugh, Marzano, & Tooth 2015). In addition, a performance scale or rubric for each element detailed varied levels of implementation of the specific leadership behavior. Carbaugh, Marzano, and Tooth (2015) conceptualized and operationalized instructional leadership by providing a systematic approach to evaluating leadership behaviors and identifying gaps in instructional leadership practices for areas of improvement.

The research conducted by Carbaugh, Marzano, and Tooth (2015) to develop a conceptual model of instructional leadership through operationalizing it for use by practitioners mirrors the early research by Yukl and Nemeroff (1979) and Hallinger and Murphy (1985). Instruments were developed by the researchers that defined instructional leadership job functions accompanied by the ability to measure or assess each job function. Carbaugh, Marzano, and Tooth (2015) provide profound detail for each job function or element, scaffolding the degree of implementation based on a scale or rubric.

Bambrick-Santoyo (2012, 2018) conducted research of best practices implemented by many school and district leaders. Common themes were formalized to create seven levers that supported effective instructional leadership. The levers were grouped into two overall categories of instructional levers and cultural levers (Bambrick-Santoyo, 2012, 2018):

Table 3: Seven levers of effective instructional leadership

Instructional Levers	Description of Levers
Data-driven instruction	Define the roadmap for rigor and adapt teaching to meet students' needs
Observation and feedback	Give all teachers professional, one-on-one coaching that increases their effectiveness as instructors

Instructional planning	Guarantee every student well-structured lessons that teach the right content
Professional development	Strengthen both culture and instruction with hands-on training that sticks
Cultural Levers	**Description of Levers**
Student culture	Create a strong culture where learning thrives
Staff culture	Build and support the right team for your school
Managing school leadership teams	Train instructional leaders to expand your impact across the school

Source. Bambrick-Santoyo, 2012, p. 10, 2018, p. 5

According to Bambrick-Santoyo (2018), the seven levers provided a “pathway to instructional leadership.” Bambrick-Santoyo (2018) elaborates on the specific leadership strategies for principal and principal supervisors that lead to effective leadership practices.

Hallinger (2005) initiated a reconceptualization of instructional leadership, adding that school context affects the type of instructional leadership implemented. Hallinger’s (2005) reconceptualization was based on 25 years of research about instructional leadership while viewing the leadership role as both dependent and independent variables, detailing how school leaders’ behaviors can be influenced. Hallinger’s (2005) revised concept includes some elements that are reflected in research within the literature review with the addition of some modernization. Elements include developing a shared purpose aligned with goals focused on student learning, involving stakeholders in a continuous improvement process that involves ongoing planning and development, and fostering a culture and environment of high expectations anchored by effective and innovating teaching and learning practices (Hallinger, 2005).

Hallinger (2005) supplements with several additional elements that involve direct involvement by the principal while addressing the instructional organization of the school. The additional elements conceptualized by Hallinger (2005) include coordination of curriculum and progress monitoring student outcomes, aligning reward structures with the school's mission, developing the capacity of staff through various activities while monitoring its impact, and ensuring visibility of the principal while modeling organizational values and expectations.

The multiple frameworks of instructional leadership are multifaceted and mirror the complex tasks and responsibilities of educational leaders. Varied degrees of instructional leadership capacity can be measured with the operationalized conceptual models developed by several researchers. Knowledge of current school leaders' capacity can lead to next steps that may include development opportunities to maximize their effectiveness through deliberate opportunities that address areas for improvement (Carbaugh, Marzano, & Tooth, 2015).

Conceptual Framework

For this study a conceptual framework developed by Weber (1989) was implemented to better understand principals' instructional leadership activities supported by principal supervisors. Weber (1989) introduced a conceptual model of instructional leadership that focused on long-term implementation for continuous academic improvement. The model focused on leading schools' instructional programs through leadership activities that mirrored prior researchers' conceptual models. The instructional program includes coordinating curriculum, building teacher capacity, evaluating instructional practice, monitoring student progress, and managing instructional resources (Heck et al., 1990; Weber, 1989). Weber (1989) emphasized five "central activities" that directly influenced school outcomes. The influence of context on instructional leadership practices was also reiterated as with past research (Hallinger and Murphy, 1985; Hallinger and Murphy, 1986; Hallinger, 2005; Manasse, 1985). According to Weber (1989), the following activities directly influenced the instructional program with high frequency: defining the school's mission; managing curriculum and instruction; promoting a positive learning climate; observing teachers; assessing the instructional program.

Weber (1989) contends that defining the school's mission is a key component of instructional leadership. It is incumbent of principals to create shared goals and influence or motivate faculty and staff to buy-in and perform related duties. Evidence of defined missions and goals can be observed in curriculum and instruction. Principals are tasked with managing curriculum and instruction that is anchored with a firm understanding of instructional practices and strategies used by teachers. Instructional practices should be evidence of the progress towards mission and goals.

Principals are not merely evaluating instruction but are also providing teachers coaching and feedback to increase alignment towards desired goals. Observations of teacher instruction is a high leverage component of instructional leadership. Coupling this strategy with teacher feedback leads to improved instruction. Principals must have knowledge and skills in the areas of "planning," "recording useful data," and "collegial feedback" (Weber, 1989). Principals also engage in assessing the instructional program of their schools. Evaluating the instructional program is an essential activity to support student achievement. Effective school leaders frequently review teaching and learning activities and curriculum for goal attainment. Furthermore, utilizing guiding questions also assists in evaluating effectiveness of the instructional program in reaching desired outcomes.

Weber (1989) states, "Of all the important factors that appear to affect students' learning, perhaps having greatest influence is the set of beliefs, values, and attitudes teachers and students hold about learning" (p. 204). Promoting a positive learning climate involves institutional norms, beliefs, and attitudes that explicitly support and enhance student learning. Faculty and staff efficacy are important variables that leaders strategically address. Weber’s (1989) emphasis for leveraging a positive learning climate also aligns with early research by Hallinger and Murphy (1985), stressing common norms and values that align to school goals.

Principal Supervisor Initiative

The Wallace Foundation implemented an initiative to redefine the principal supervisor role in supporting principal effectiveness via instructional leadership practices (Goldring et al., 2018). Concurrently, Mathematica Policy Research and Vanderbilt University were conducting a research study about the initiative and its impact on principal effectiveness. The Principal Supervisor Initiative (PSI) was launched in 2014 in six large school districts with five core components driving the purpose of the initiative (Goldring et al., 2018):

I. Revising the principal supervisors’ job description to focus on instructional leadership
II. Reducing principal supervisors’ span of control and changing how principal supervisors are assigned to principals
III. Training supervisors and developing their capacity to support principals
IV. Developing systems to identify and train new supervisors
V. Strengthening central office structures to support and sustain changes in the principal supervisor’s role (Goldring et al., 2018, pp. 3-4)

The Wallace Foundation’s initial steps involved assisting districts in revising the job description of principal supervisors and initiating a reduction in principal supervisors’ span of control (Golding et al. 2018). Bambrick-Santoyo (2018) also elaborated on reducing principal supervisors’ span of control for better management and support of principals. According to Bambrick-Santoyo (2018), principal supervisors must have weekly or biweekly coaching sessions with principals, specifying that principal to principal supervisor ratios of 12:1 for bi-weekly visits and 6:1 for weekly visits would afford effective support. Saltzman (2016a) expressed the need for change in school districts for principal support via principal supervisors.

Saltzman (2016a) also chronicled a shift in organizational structures and practices of principal supervisors in two large school districts, Washington, D.C. and Tulsa. The school districts involved in the study implemented a reduction in principal supervisors' span of control that facilitated a primary focus on increasing principal effectiveness. Prior systems of principal support in the two school districts were marred by rare school visits and compliance issues (Saltzman, 2016a).

The Wallace Foundation also provided professional development to increase principal supervisors' instructional leadership capacity (Goldring et al., 2018). Professional development focused on instructional practice, technical assistance, curriculum and content, student achievement data analysis, and one-on-one coaching with constant feedback. Professional development delivered by the PSI facilitated a shift in principal supervisors' duties and changes in leadership behaviors resulting in increased time spent at schools; more meetings with principals to facilitate coaching and support, increased time spent working directly with principals, and a decrease in operational and managerial task (Goldring et al., 2018). Corcoran et al. (2013) examined the principal supervisor structures for six large school districts prior to the Wallace Foundation PSI and unrelated to this initiative. Contrary to the focused approach of professional development facilitated by the PSI, Corcoran et al. (2013) discovered that principal supervisor professional development was delivered by a blend of school district and professional organizations, but not aligned to professional learning goals, and did not enhance knowledge of curriculum and instruction.

Succession planning was also a target of the Wallace Foundation's initiative to restructure the role of principal supervisors. School districts were encouraged to prepare candidates for principal supervisor roles through various methods that included apprenticeship programs and professional development (Goldring et al., 2018). Districts that participated in these forms of preparation for upcoming principal supervisor positions reported palpable results, which also afforded district leaders the opportunity to observe candidates' performance prior to being assigned to the role (Goldring et al., 2018). Prior the implementation of the PSI, research conducted by Corcoran et al. (2013) of principal supervisors in six large school districts found that principal supervisors had short tenures, averaging three years, and the lack of deliberate succession planning strategies.

The Wallace Foundation's initiative also emphasized a shift in central office structures to support the new roles of principal supervisors. Noninstructional duties and responsibilities that often overshadowed support for instructional leadership would need to shift to central office personnel without principal supervision responsibilities (Goldring et al., 2018). Changes in central office structures should focus on fostering collaboration and coordination among different departments that assist principal supervisors in effectively supporting instructional leadership (Goldring et al., 2018). Essentially, the restructuring of principal supervisor roles also requires some changes in central office roles.

Summary

Increased national and state accountability measures and systems have affirmed the need for instructional leadership practices. Research conducted identifies instructional practices that may lead to increased academic outcomes (Carbaugh, Marzano, & Toth, 2015; Hallinger, 1985; Hallinger & Murphy, 1986; Weber, 1989). Numerous frameworks exist for the concept of instructional leadership and practices implemented. Most frameworks focus on supporting or building the school vision and mission, having knowledge of curriculum and instruction, building the capacity of staff, and ensuring a conducive learning environment or climate. The frameworks facilitate efforts to improve principal effectiveness and subsequently increase student achievement. Some instructional leadership frameworks have also been utilized as appraisal or evaluative instruments in many school districts. Current instruments that appraise or evaluate instructional leadership practices have operationalized efforts to understand current capacity of principals and to clarify support needs.

Some large school districts are changing organizational structures to support effectively principals' development needs. In these school districts principal supervisor roles have evolved to influence principal effectiveness. Principal supervisors' primary focus is to implement and cultivate instructional leadership practices. Researchers suggest several strategies to improve instructional leadership prowess. The focus of this study of measuring the reduction in principal supervisors' span of control is one of several strategies currently being implemented by a few school districts. Minimal research of principal supervisors' impact on principal effectiveness and resulting academic outcomes exists. Currently, the Wallace Foundation is the only organization that has initiated a project to support and study changes in principal supervisors' roles and responsibilities in large school districts. With a void in research and with few school districts initiating changes to affect principal supervisor roles and impact, the literature reviewed supported the rationale for conducting this study (Corcoran et al., 2013; Goldring et al., 2018).

CHAPTER 3: METHODOLOGY

Introduction

The intent of this study was to determine the impact of reducing principal supervisors' span of control on academic outcomes. Academic outcomes were measured by analyzing student achievement data from annual mathematics and English Language Arts assessments. Student achievement was defined by the percent of students passing the mathematics assessment and English Language Arts assessment of the Florida Standards Assessment (FSA). A passing score for these assessments is defined as achieving a level 3 or above from a range of level 1 to level 5. Reducing principal supervisors' span of control led to a reduced number of principals per principal supervisors' leadership portfolios. The purpose of this study was to examine if a correlation exists between the reduction of principal supervisors' span of control and school academic outcomes. Principal supervisors' support of principals was concerted on building instructional leadership capacity. Previous principal supervisor support strategies involved large leadership portfolios and various compliance duties and responsibilities. Based on the conclusions of this study, school districts may ascertain information to alter principal support strategies implemented by school districts in this study.

School district leaders may use findings from this study to assist with guiding initial steps for changing the roles and responsibilities of principal supervisors to amplify support of principals. Findings from this study can also help district leaders better understand the most effective principals to principal supervisor ratios. District leaders can make informed decisions within their budgets and better understand their current capabilities for long-term implementation. Furthermore, district leaders can strategically plan a timeline of implementation with better knowledge of effectiveness for specific timeframes from the study. Finally, this study contributes to the current body of knowledge about the practices and impact of principal supervisors in large school districts. The research for this study was guided by five research questions.

Research Questions

1. What impact does a reduced principal supervisors' span of control have on schools' percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment?

   h_{01}: There is no correlation in the reduction of principal supervisors' span of control and schools' percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment.

2. What impact does a reduced principal supervisors' span of control have on Florida Department of Education Differentiated Accountability schools' percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment?

   h_{02}: There is no correlation in the reduction of principal supervisors' span of control and percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment for the Florida Department of Education Differentiated Accountability schools.

3. What impact does a reduced principal supervisors' span of control have on Title I schools' percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment?

   h_{03}: There is no correlation in the reduction of principal supervisors' span of control and percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment for Title I schools.

4. What impact does a reduced principal supervisors' span of control have on schools' percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment for a period of three consecutive years?

   h_{04}: There is no correlation in the reduction of principal supervisors' span of control and percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment for a period of three consecutive years?

5. Which principal supervisors' leadership portfolio size has the greatest impact on schools' percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment?

   h_{05}: There is no correlation in the varied sizes of principal supervisors' leadership portfolios and percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment.

Research Design

The research method for this study included a quantitative research design. Correlational research design was used to determine the impact of reducing principal supervisors' span of control on state mathematics achievement and English Language Arts achievement by measuring the percent of students passing state assessments with a level 3 or above. The study included varying school types and context: elementary schools, middle schools, high schools, Title I schools, low-performing schools. This method was selected because it explores the correlation between principal supervisors and school outcomes. The research design served to investigate the relationship between multiple variables. Independent variables included changes in principal supervisors' span of control or size of portfolio of schools. Dependent variables included academic outcomes for various schools measured by state mathematics assessments and English Language Arts assessments. The research design aided in providing statistical analysis to measure the correlation of variables.

Population and Sample

Purposive sampling was used for this study. Few large school districts have implemented a reduction in principal supervisors' span of control. Therefore, school districts implementing a reduction in principal supervisors' span of control were targeted for this study. The population of this study included principal supervisors that supervise K-12 schools in two large school districts in the state of Florida. Schools within the purview of all principal supervisors were included in the study. Targeted school districts have implemented a reduction in the span of control for district leaders with principal supervision responsibilities within the past three or more years. The school districts implement a similar principal supervision model with schools and their principals being directly supervised, supported, and evaluated by principal supervisors. The targeted school districts have a total number of 29 principal supervisors that supervise a total of 360 comprehensive schools. The school districts selected also utilized the Florida Standards Assessment to determine annual student performance. Charter schools, alternative schools, and online or virtual schools within the school districts will be excluded from this study. Charter schools in Florida are not operated nor managed by their local school districts and are afforded autonomy that may conflict with school district practices. Alternative schools are usually alternate settings for students that did not adhere to the student code of conduct of traditional comprehensive schools and are sometimes used to facilitate student course recovery or grade level recovery. Furthermore, alternative schools regularly utilize a different state grading system than traditional comprehensive schools (Florida Department of Education, 2019). Online or virtual schools educate students outside of a traditional classroom by providing learning opportunities virtually via a computer or similar device. Multiple variables throughout a student's learning environment may impact achievement while participating in online or virtual school.

Instrumentation

Florida's K-12 statewide assessment program measures student mastery of state education standards taught throughout the year. The assessments are known as the Florida Standards Assessment (FSA) with some assessments measuring outcomes for specific courses known as End of Course (EOC) assessments. Student proficiency for standards taught in Algebra, Geometry, and Civics courses are measured by EOC assessments. All assessments are criterion-referenced and measure annual growth and proficiency of students. The English Language Arts assessment is comprised of several components; English-Language Arts, reading, and writing. Both mathematics and English Language Arts assessments have items with varied degrees of complexity. Webb's (2002) depth of knowledge (DOK) is used to categorize the cognitive complexities of assessment items. Universal design principles are employed to develop test questions to ensure the largest number of students can participate in the assessments without bias and ambiguity of assessment items. Assessments are also administered via multiple methods. Traditional paper-based versions are administered to some grade levels for either mathematics or English Language Arts. Computer-based test are also heavily utilized because of the advancement and reliability of technology by the Florida Department of Education.

The Florida Department of Education utilizes the internal consistency model to test the reliability of the FSA. The internal consistency model is mainly used due to the FSA being given in a single administration. Reliability coefficients for the internal consistency model were analyzed using Cronbach alpha, stratified alpha, and Feldt-Raju coefficient (Florida Department of Education, 2018). Mix assessment item types, such as multiple choice, short-response, and extended-response, required the use of the multiple statistical analysis methods (Florida Department of Education, 2018). The FSA writing assessment utilized inter-rater reliability while computing it using percentage of agreement. Depending on the grade level, responses to writing prompts were scored by two human raters or one human rater and an American Institutes for Research's scoring engine (Florida Department of Education, 2018). Florida Department of Education (2018) also ensured the validity of the FSA with various models ensuring that knowledge and skills assessed were representative of content standards. Several goodness-of-fit models were used to evaluate the students' responses to assessment items. Florida's reliability and validity of its assessments support high academic standards. Florida's achievement standards are the only ones in the nation that compare to the National Assessment of Education Progress achievement levels; as a result, these achievement standards are comparable to national college-ready standards (Phillips, 2016).

FSA scores are reported as achievement levels and scale scores. Performance on assessments are sorted into five achievement levels based on scale scores. Scale scores categorize student performance within a range of scores for specific assessments. Achievement level 3 is considered passing for all assessments. The lowest score for the range of scale scores for achievement level 3 is considered the threshold for passing. Tables 4 through 7 provide details about achievement levels and scale score ranges for each achievement level.

Table 4: Florida Standards Assessment achievement levels

Level 1	Level 2	Level 3	Level 4	Level 5
Inadequate: Highly likely to need substantial support for the next grade	Below Satisfactory: Likely to need substantial support for the next grade	Satisfactory: May need additional support for the next grade	Proficient: Likely to excel in the next grade	Mastery: Highly likely to excel in the next grade

Source. Florida Department of Education, 2019

Table 5: Florida Standards Assessment ELA scale scores and achievement level

Assessment	Level 1	Level 2	Level 3	Level 4	Level 5
Grade 3 ELA	240-284	285-299	**300**-314	315-329	330-360
Grade 4 ELA	251-296	297-310	**311**-324	325-339	340-372
Grade 5 ELA	257-296	304-320	**321**-335	336-351	352-385
Grade 6 ELA	257-303	309-325	**326**-338	336-351	356-391
Grade 7 ELA	267-317	318-332	**333**-345	339-355	360-397
Grade 8 ELA	274-321	322-336	**337**-351	346-359	366-403
Grade 9 ELA	276-327	328-342	**343**-354	352-365	370-407
Grade 10 ELA	284-333	334-349	**350**-361	362-377	378-412

Source. Florida Department of Education, 2019

Table 6: Florida Standards Assessment mathematics scale scores and achievement level

Assessment	Level 1	Level 2	Level 3	Level 4	Level 5
Grade 3 Math	240-284	285-296	**297**-310	311-326	327-360
Grade 4 Math	251-298	299-309	**310**-324	325-339	340-376
Grade 5 Math	256-305	306-319	**320**-333	334-349	350-388

Grade 6 Math	260-309	310-324	**325**-338	339-355	356-390
Grade 7 Math	269-315	3316-329	**330**-345	346-359	360-391
Grade 8 Math	273-321	322-336	**337**-352	353-364	365-393

Source. Florida Department of Education, 2019

Table 7: Florida Standards Assessment End of Course scale scores and achievement level

Assessment	Level 1	Level 2	Level 3	Level 4	Level 5
Algebra 1 EOC	425-486	487-496	**497**-517	518-531	532-575
Geometry EOC	425-485	486-498	**499**-520	521-532	533-575

Source. Florida Department of Education, 2019

Student performance on assessments also have implications for grade promotion and graduation requirements. Students in grade three must score an achievement level of two or above on the FSA ELA to be promoted to the next grade. In addition, high school students must score an achievement level of three or above on the grade 10 FSA ELA and Algebra I EOC to meet graduation requirements. Students can use national assessments such as the ACT or SAT to earn equivalent scores to meet state graduation requirements.

Data Collection

Steps were initiated to obtain approval from the Institutional Review Board at Florida Southern College to conduct the study. In addition, obtaining approval from selected school districts to gather data pertinent to the study was completed prior to initiating research.

Data was collected from two large school districts in the State of Florida and also from the Florida Department of Education. Information detailing principal supervisors' past and current span of control was obtained from school districts by open records request. Requested data included portfolio of schools per principal supervisor prior to the change in school districts' model of supervising principals and three years post change. Data also detailed school level for each school. Information collected from school districts focused only on traditional or comprehensive schools and exclude charter, virtual, and alternative schools.

School achievement data for the population of schools in the study was obtained from the Florida Department of Education's database. which is open to public access on their website. Data collected from this site is reported in excel spreadsheets and pdf documents detailing school performance for all administered state assessments in grades 3 through 12. School achievement data for all schools in both school districts was downloaded to include three years of data pre and post change of principal supervisors' span of control. Data for charter, virtual and alternative schools was omitted. Schools in past or current Differentiated Accountability (DA) or turnaround status was determined from school grades reported by the Florida Department of Education. Schools' Title I status will also be retrieved from the Florid Department of Education.

Low performing schools in DA status or turnaround status was determined by the Florida Department of Education rules and criteria based on annual school grade reports. Specific entry and exit criteria are determined by rules levied by the Florida department of education. Schools vary in degree of turnaround status with all having the threat of possible school closure, transitioning into a charter school, or being operated by an approved state external operator. The Florida department of education program for low performing schools in turnaround status is known as the DA Program. Schools are categorized for DA support by school grades earned from Florida's education accountability system. Schools that receive a D school grade and schools that receive an F school grade upon release of school grades are required to engage in the DA program. Schools with multiple years of a D or F school grade are engaged in full turnaround status with robust plans and other turnaround options if the school grade does not improve. Schools must earn a C or better school grade to exit out of the DA program. Schools with a previous F school grade are monitored for an additional three years by the Florida Department of Education.

The study targeted performance on mathematics and English Language Arts assessments of the Florida Standards Assessment. The Florida Department of Education determined that level three and above are considered passing scores for performance on mathematics and English Language Arts assessments. School achievement data concentrated on the percent of students passing or achieving a level three or above on mathematics and English Language Arts assessments of the Florida Standards Assessment.

Data collected regarding principal supervisors' portfolio of schools and school achievement data was further categorized to support analysis and reporting. Schools and related achievement data were categorized by principal supervisor leadership portfolios or number of schools and by individual school years of the study. Principal supervisor leadership portfolios detailed the following per school for each school year of the study: school grade, percent of students passing or achieving a level 3, Title I status, and DA turnaround status. Furthermore, the data collected was secured and stored on two external hard drives to decrease access from data breaches common to cloud-based storage and ensured availability of a backup drive.

Data Analysis

This study used a quantitative analysis to determine the relationship between principal supervisors' span of control or number of schools within their purview and school academic outcomes measured by schools' mathematics and English Language Arts achievement. Quantitative analysis included the use of a simple linear regression statistical analysis, multivariate analysis of variance (MANOVA), one-way analysis of variance (ANOVA), and

Tukey post hoc test. The IBM SPSS Statistics software platform was used to perform all statistical analysis. The following statistical analysis methods were used to answer research questions.

Research Question 1

What impact does a reduced principal supervisors' span of control have on schools' percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment?

In response to Research Question 1, data collected from school districts included principal supervisor portfolios of schools for three subsequent years prior and after the reduction of schools within their span of control. Mathematics and English Language Arts achievement data were collected from the assessment database of the Florida Department of Education. A simple linear regression statistical analysis was used to analyze the impact of principal supervisor portfolio sizes on school academic outcomes. The simple linear regression provided an analysis of the relationships of the two variables, principal supervisor portfolio sizes and school performance for this research question (Glass & Hopkins, 1996; Montgomery, Peck, & Vining, 2012). Data collected was analyzed by individual years of the study to correlate portfolio size and percent of students passing the mathematics assessments and English Language Arts assessments with a level three or above. The analysis was also conducted separately for both assessments. In addition, further analysis was conducted by school levels; elementary and secondary.

Research Question 2

What impact does a reduced principal supervisors' span of control have on Florida Department of Education Differentiated Accountability schools' percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment?

This research question explored potential relationships between the reduction of schools within principal supervisors' span of control and changes in academic outcomes for low performing schools in Differentiated Accountability (DA) status. Schools in DA Status were identified based on the rules and guidelines provided by the Florida Department of Education for entry into this category. Data collection and analysis similar to Research Question 1 were implemented. Data collected from school districts included principal supervisor portfolios of schools for three subsequent years prior and after the reduction of schools under their purview. Mathematics and English Language Arts achievement data were collected from the assessment database on the website of the Florida Department of Education. A simple linear regression statistical analysis was used to analyze the impact of changes in principal supervisors' portfolios on academic outcomes for low performing schools in DA status. The simple linear regression provided an analysis of the relationships of the two variables, principal supervisor portfolio sizes and performance of low performing schools for this research question (Glass & Hopkins, 1996; Montgomery, Peck, & Vining, 2012). Data collected were analyzed by individual years of the study to correlate portfolio size and percent of students passing the mathematics assessments and English Language Arts assessments with a level three or above. The analysis was conducted separately for both assessments. Analysis was also conducted by school levels, elementary and secondary.

Research Question 3

What impact does a reduced principal supervisors' span of control have on Title 1 schools' percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment?

This research question sought to correlate the reduction of schools within principal supervisors' span of control to changes in academic outcomes for Title I schools. Title I schools were identified from the public data base on the website of the Florida Department of Education. Schools participating in the schoolwide model that provides additional resources and services to all students enrolled were targeted for the study. Data collection and analysis similar to Research Question 1 was implemented for Research Question 3. Data collected from school districts included principal supervisor portfolios of schools for three subsequent years prior and after the reduction of schools under their purview. Mathematics and English Language Arts achievement data were collected from the assessment database on the website of the Florida Department of Education. A simple linear regression statistical analysis was used to analyze the impact of changes in principal supervisors' portfolios on academic outcomes for Title I schools. The simple linear regression provided an analysis of the relationships of the two variables, principal supervisor portfolio sizes and performance of Title I schools for this research question (Glass & Hopkins, 1996; Montgomery, Peck, & Vining, 2012). Data collected was analyzed by individual years of the study to correlate portfolio size and percent of students passing the mathematics assessments and English Language Arts assessments with a level three or above. The analysis was conducted separately for both assessments. Analysis was also conducted by school levels, elementary level, and secondary level.

Research Question 4

What impact does a reduced principal supervisors' span of control have on schools' percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment for a period of three consecutive years?

This research question measures the impact over time, three years, of the reduction of principal supervisors' span of control on academic outcomes. A simple linear regression statistical analysis was performed to analyze the impact of the independent variable of principal supervisors' portfolio sizes of schools on mathematics and English Language Arts. The simple linear regression provided an analysis of the relationships of the two variables, principal supervisor portfolio sizes and school performance for this research question (Glass & Hopkins, 1996; Montgomery, Peck, & Vining, 2012). The statistical analysis was performed separately for mathematics assessments and English Language Arts assessments and categorized by Title I schools, low-performing schools, elementary schools, and secondary schools. Data collected from school districts detailed schools by principal supervisor portfolios for three years prior to the change in spans of control and post change. Assessment data, schools' Title status, and schools' DA status were retrieved from the public database of the Florida Department of Education.

Research Question 5

Which principal supervisors' leadership portfolio size has the greatest impact on schools' percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment?

This research question sought to measure the impact of principal supervisors' varied leadership portfolio sizes. The research question clarified size intervals that had the greatest impact on academic outcomes among various size intervals of leadership portfolios of schools. A multivariate analysis of variance (MANOVA) statistical analysis was used to measure the impact of various portfolio sizes on both mathematics and English Language Arts performance simultaneously. The MANOVA facilitates the analysis of the effect of two or more independent variables on two or more dependent variables, comparing group means for multiple variables simultaneously (Bray, Maxwell, & Maxwell, 1985; Glass & Hopkins, 1996). A one-way analysis of variance (ANOVA) and a Tukey post hoc test were used to measure the impact of various portfolio sizes on mathematics and English Language Arts performance separately. A one-way ANOVA is utilized when multiple groups of an independent variable are present, testing whether the means of the dependent variable are the same for different groups of the independent variable (Glass & Hopkins, 1996). The Tukey post hoc test identified where the differences occurred between groups after a statistical significance was identified for group means (Glass & Hopkins, 1996). For both analysis, leadership portfolio sizes were clustered by size intervals to include 1-14, 15, 16 or more for elementary school principal supervisor portfolios and 1-11, 12-15, 16 or more for secondary school principal supervisor portfolios. The number of schools for elementary school portfolio size intervals 1-14, 15, 16 or more were 93, 89, and 59, respectively. The number of schools for secondary school portfolio size intervals 1-11, 12-15, 16 or more were 40, 42, and 37, respectively. Size intervals were chosen to correlate with current and past portfolio sizes of principal supervisors who were involved in the study. The portfolio size intervals also provided the best sample sizes without compromising leadership portfolios by removing schools from them. Since the study was focused on the number of schools within a principal supervisor's portfolio, removing schools from a portfolio to create an even distribution of schools for the analysis would skew results and alter the purpose of the study. The analysis was conducted by Title I status, DA status, elementary school level and secondary school level. Once more, data were collected from school districts that detailed schools by principal supervisor portfolios for three years prior to the change in spans of control and post change. Assessment data, schools'

Title I status, and schools' DA status were retrieved from the public database of the Florida Department of Education.

Summary

This chapter detailed the methods used to conduct the study. The research design was explained, providing clarification of the quantitative design that anchored the study. Population, sample, instrumentation, procedures for collecting data, and procedures for analyzing data were also reviewed. Statistical analysis was explained for each research question guiding the study.

CHAPTER 4:ANALYSIS OF THE DATA

Introduction

This study was performed to analyze the effects of reducing the number of schools within a principal supervisors' leadership portfolio or span of control in large school districts. The purpose of this study was to measure the impact of reducing principal supervisors' span of control on school academic outcomes. The impact on school academic outcomes by reducing leadership portfolio sizes of principal supervisors is measured by student achievement data from state assessments: mathematics assessments and English Language Arts assessments. Few school districts have reduced the span of control of principal supervisors for better support of schools and principals. The Wallace Foundation has supported five large school districts in restructuring principal supervisor models with reducing portfolio sizes of principal supervisors as one of several components (Goldring et al., 2018). Additional components include changes of principal supervisors' job descriptions, training to increase capacity to support principals, creating systems for succession planning, and changing central office structures to support principal supervisors (Goldring et al., 2018). Currently there is a lack of research detailing the impact of reducing principal supervisors' span of control.

The population of this study involved two large school districts in the state of Florida. The population sample included 360 schools and 29 principal supervisors with varied portfolio sizes. Schools ranged in levels from elementary to high school with varying degrees of complexities; Title I, non-Title I, low-performing or participating in the states Differentiated Accountability (DA) program, and non-DA. The demographic information for the population sample are displayed in Tables 8 to11.

Table 8: Number of principal supervisors and assigned portfolio size

	Principal Supervisor		
Principal Supervisor	Portfolio Size	Percent	Cumulative Percent
1	7	1.9	1.9
2	8	2.2	4.2
3	11	3.0	7.2
4	16	4.4	11.7
5	15	4.1	15.8
6	6	1.7	17.5
7	17	4.7	22.2
8	15	4.1	26.4
9	8	2.2	28.6
10	7	1.9	30.6
11	15	4.1	34.7
12	3	.8	35.6
13	7	1.9	37.5
14	11	3.0	40.6
15	15	4.1	44.7
16	15	4.1	48.9
17	12	3.3	52.2
18	14	3.9	56.1
19	13	3.6	59.7
20	15	4.1	63.9
21	15	4.1	68.1
22	14	3.9	71.9
23	12	3.3	75.3
24	11	3.0	78.3
25	14	3.9	82.2
26	14	3.9	86.1
27	14	3.9	90.0
28	18	5.0	95.0
29	18	5.0	100.0
Total Schools	360	100.0	

Table 9: Total number of schools by level

School Type

		Frequency	Percent	Cumulative Percent
	Elem School	241	66.9	66.9
	Middle School	67	18.6	85.6
	High School	50	13.9	99.4
	Multi-Level School	2	.6	100.0
Total		360	100.0	

Table 10: Total number of Title I schools

Title 1 Schools

		Frequency	Percent	Cumulative Percent
	Yes	230	63.9	63.9
	No	130	36.1	100.0
	Total	360	100.0	
Total		360	100.0	

Table 11: Total number of DA schools

DA Schools (Low Performing Schools)

		Frequency	Percent	Cumulative Percent
	Yes	54	15.0	15.0
	No	306	85.0	100.0
Total		360	100.0	

The results of data analysis are presented in this chapter for the five research questions that guided the study.

Data Analysis for Research Question 1

What impact does a reduced principal supervisors' span of control have on schools' percent of students passing mathematics assessments and English language arts assessments with a level or above on the Florida Standards Assessment?

h_{01}: There is no correlation in the reduction of principal supervisors' span of control and schools' percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment.

The first research question was analyzed using a simple linear regression. The relationships between the two variables, principal supervisor portfolio sizes and school performance, were measured for overall impact on student academic outcomes. The analysis was performed for three years prior to a reduction in principal supervisors' span of control and post reduction in principal supervisors' span of control. School years 2013-2014, 2014-2015, and 2015-2016 are the school years prior to school districts reducing principal supervisors' span of control. School years 2016-2017, 2017-2018, 2018-2019 are the three school years after the reduction in principal supervisors' span of control. The analysis was conducted for each school level, elementary and secondary, by year and also separately for mathematics and English Language Arts assessments.

The simple linear regression involves several assumptions: having a continuous dependent and independent variable, a linear relationship between variables, independence of observations, no significant outliers, homoscedasticity, a normal distribution of residuals along the regression line. Preliminary analysis conducted for the first research question determined no assumptions were violated. A visual inspection of scatterplots of both variables confirmed linearity. The Durbin-Watson statistic, reported below for each analysis, was used to confirm independence of observations. Minimal outliers were observed for some analysis. The linear regression was performed with and without the outliers with no substantial differences in the results. Consequently, the analysis was performed with the outliers. Homoscedasticity was confirmed by a visual inspection of scatterplots of standard residuals and predicted values. Based on the visual inspection of histograms and normal probability plots residuals were normally distributed.

Elementary Schools 2013-2014

For elementary schools in school year 2013-2014, there was independence of residuals as assessed by a Durbin-Watson statistic of 2.050 and 2.021 for mathematics and English Language Arts, respectively. Principal supervisor portfolio sizes accounted for 2.2% of variation in mathematics achievement with an adjusted R^2 = 1.8% and 0.0% variation in English Language Arts achievement with an adjusted R^2 = -0.4%. In the regression model principal supervisor portfolio sizes were statistically significant in predicting mathematics achievement, F(1, 239) = 5.469, p = .020. Principal supervisor portfolio sizes were not statistically significant in predicting English Language Arts achievement, F(1, 239) = .013, p = .908. Moreover, the slope coefficient was statistically significant for mathematics achievement, p = .020, and not statistically significant for English Language Arts achievement, p = .908. Tables 12 to16 illustrate the results of the statistical analyses.

Table 12: Durbin-Watson statistic of elementary mathematics achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.150[a]	.022	.018	5.887	2.050

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff Math Ach FY14-13

Table 13: ANOVA of elementary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	189.526	1	189.526	5.469	.020[b]
	Residual	8281.793	239	34.652		
	Total	8471.320	240			

a. Dependent Variable: Diff Math Ach FY14-13

b. Predictors: (Constant), Portfolio Size

Table 13: Slope coefficient of elementary mathematics achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-4.586	1.933		-2.373	.018	-8.394	-.778
	Portfolio Size	.157	.067	.150	2.339	.020	.025	.290

a. Dependent Variable: Diff Math Ach FY14-13

Table 14: Durbin-Watson statistic for elementary English Language Arts achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.007[a]	.000	-.004	4.270	2.021

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff ELA Ach FY14-13

Table 15: ANOVA for elementary English Language Arts achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.242	1	.242	.013	.908[b]
	Residual	4357.734	239	18.233		
	Total	4357.975	240			

a. Dependent Variable: Diff ELA Ach FY14-13

b. Predictors: (Constant), Portfolio Size

Table 16: Slope coefficient for elementary English Language Arts achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	1.046	1.402		.746	.456	-1.716	3.808
	Portfolio Size	-.006	.049	-.007	-.115	.908	-.102	.091

a. Dependent Variable: Diff ELA Ach FY14-13

Elementary Schools 2014-2015

For elementary schools in school year 2014-2015, there was independence of residuals as assessed by a Durbin-Watson statistic of 2.097 and 2.185 for mathematics and English Language Arts, respectively. Principal supervisor portfolio sizes accounted for 1.2% of variation in mathematics achievement with an adjusted R^2 = 0.8% and 2.7% variation in English Language Arts achievement with an adjusted R^2 = 2.3%. In the regression model principal supervisor portfolio sizes were not statistically significant in predicting mathematics achievement, F(1, 239) = 2.889, p = .090. Principal supervisor portfolio sizes were statistically significant in predicting English Language Arts achievement, F(1, 239) = 6.627, p = .011. Moreover, the slope coefficient was not statistically significant for mathematics achievement, p = .090, and statistically significant for English Language Arts achievement, p = .011. Tables 17 to 22 illustrate the results of the statistical analyses.

Table 17: Durbin-Watson statistic for elementary mathematics achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.109[a]	.012	.008	6.995	2.097

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff Math Ach FY15-14

Table 18: ANOVA for elementary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	141.347	1	141.347	2.889	.090[b]
	Residual	11693.151	239	48.925		
	Total	11834.498	240			

a. Dependent Variable: Diff Math Ach FY15-14

b. Predictors: (Constant), Portfolio Size

Table 19: Slope coefficient for elementary mathematics achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	2.783	2.297		1.211	.227	-1.742	7.307
	Portfolio Size	-.136	.080	-.109	-1.700	.090	-.294	.022

a. Dependent Variable: Diff Math Ach FY15-14

Table 20: Durbin-Watson statistic for elementary English Language Arts achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.164[a]	.027	.023	4.963	2.185

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff ELA Ach FY15-14

Table 21: ANOVA for elementary English Language Arts achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	163.221	1	163.221	6.627	.011[b]
	Residual	5886.339	239	24.629		
	Total	6049.560	240			

a. Dependent Variable: Diff ELA Ach FY15-14

b. Predictors: (Constant), Portfolio Size

Table 22: Slope coefficient for elementary English Language Arts achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-10.861	1.630		-6.664	.000	-14.071	-7.650
	Portfolio Size	.146	.057	.164	2.574	.011	.034	.258

a. Dependent Variable: Diff ELA Ach FY15-14

Elementary School 2015-2016

For elementary schools in school year 2015-2016, there was independence of residuals as assessed by a Durbin-Watson statistic of 2.203 and 2.072 for mathematics and English Language Arts, respectively. Principal supervisor portfolio sizes accounted for 4.9% of variation in mathematics achievement with an adjusted R^2 = 4.5% and 0.3% variation in English Language Arts achievement with an adjusted R^2 = -0.1%. In the regression model principal supervisor portfolio sizes were statistically significant in predicting mathematics achievement, F(1, 239) = 12.298, p = .001. Principal supervisor portfolio sizes were not statistically significant in predicting English Language Arts achievement, F(1, 239) = .778, p = .379. Moreover, the slope coefficient was statistically significant for mathematics achievement, p = .001, and not statistically significant for English Language Arts achievement, p = .379. Tables 23 to 28 illustrate the results of the statistical analyses.

Table 23: Durbin-Watson statistic for elementary mathematics achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.221[a]	.049	.045	5.922	2.203

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff Math Ach FY16-15

Table 24: ANOVA for elementary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	431.270	1	431.270	12.298	.001[b]
	Residual	8381.128	239	35.067		
	Total	8812.398	240			

a. Dependent Variable: Diff Math Ach FY16-15

b. Predictors: (Constant), Portfolio Size

Table 25: Slope coefficient for elementary mathematics achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-4.367	1.945		-2.246	.026	-8.198	-.537
	Portfolio Size	.238	.068	.221	3.507	.001	.104	.371

a. Dependent Variable: Diff Math Ach FY16-15

Table 26: Durbin-Watson statistic for elementary English Language Arts achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.057[a]	.003	-.001	4.433	2.072

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff ELA Ach FY16-15

Table 27: ANOVA for elementary English Language Arts achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.277	1	15.277	.778	.379[b]
	Residual	4695.968	239	19.648		
	Total	4711.245	240			

a. Dependent Variable: Diff ELA Ach FY16-15

b. Predictors: (Constant), Portfolio Size

Table 28: Slope coefficient for elementary English Language Arts achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	1.972	1.456		1.355	.177	-.895	4.840
	Portfolio Size	-.045	.051	-.057	-.882	.379	-.145	.055

a. Dependent Variable: Diff ELA Ach FY16-15

Elementary Schools 2016-2017

For elementary schools in school year 2016-2017, there was independence of residuals as assessed by a Durbin-Watson statistic of 1.888 and 1.880 for mathematics and English Language Arts, respectively. Principal supervisor portfolio sizes accounted for 2.7% of variation in mathematics achievement with an adjusted R^2 = 2.3% and 0.4% variation in English Language Arts achievement with an adjusted R^2 = 0.0%. In the regression model principal supervisor portfolio sizes were statistically significant in predicting mathematics achievement, $F(1, 239) = 6.741$, $p = .010$. Principal supervisor portfolio sizes were not statistically significant in predicting English Language Arts achievement, $F(1, 239) = .951$, $p = .330$. Moreover, the slope coefficient was statistically significant for mathematics achievement, $p = 0.010$, and not statistically significant for English Language Arts achievement, $p = .330$. Tables 29 to 34 illustrate the results of the statistical analyses.

Table 29: Durbin-Watson statistic for elementary mathematics achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.166[a]	.027	.023	6.551	1.888

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff Math Ach FY17-16

Table 30: ANOVA for elementary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	289.322	1	289.322	6.741	.010[b]
	Residual	10257.640	239	42.919		
	Total	10546.963	240			

a. Dependent Variable: Diff Math Ach FY17-16

b. Predictors: (Constant), Portfolio Size

Table 31: Slope coefficient for elementary mathematics achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	7.257	2.073		3.501	.001	3.173	11.340
	Portfolio Size	-.380	.146	-.166	-2.596	.010	-.667	-.092

a. Dependent Variable: Diff Math Ach FY17-16

Table 32: Durbin-Watson statistic for elementary English Language Arts achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.063[a]	.004	.000	4.663	1.880

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff ELA Ach FY17-16

Table 33: ANOVA for elementary English Language Arts achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	20.674	1	20.674	.951	.330[b]
	Residual	5195.700	239	21.739		
	Total	5216.373	240			

a. Dependent Variable: Diff ELA Ach FY17-16

b. Predictors: (Constant), Portfolio Size

Table 34: Slope coefficient for elementary English Language Arts achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.870	1.475		.589	.556	-2.037	3.776
	Portfolio Size	.101	.104	.063	.975	.330	-.103	.306

a. Dependent Variable: Diff ELA Ach FY17-16

Elementary Schools 2017-2018

For elementary schools in school year 2017-2018, there was independence of residuals as assessed by a Durbin-Watson statistic of 2.16 and 2.041 for mathematics and English Language Arts, respectively. Principal supervisor portfolio sizes accounted for 0.9% of variation in mathematics achievement with an adjusted R^2 = 0.5% and 2.6% variation in English Language Arts achievement with an adjusted R^2 = 2.2%. In the regression model principal supervisor portfolio sizes were not statistically significant in predicting mathematics achievement, F(1, 239) = 2.093, p = .149. Principal supervisor portfolio sizes were statistically significant in predicting English Language Arts achievement, F(1, 239) = 6.289, p = .013. Moreover, the slope coefficient was not statistically significant for mathematics achievement, p = .149, and statistically significant for English Language Arts achievement, p = .013. Tables 35 to 40 illustrate the results of the statistical analyses.

Table 35: Durbin-Watson statistic for elementary mathematics achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.093[a]	.009	.005	5.806	2.016

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff Math Ach FY18-17

Table 36: ANOVA for elementary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	70.540	1	70.540	2.093	.149[b]
	Residual	8056.099	239	33.708		
	Total	8126.639	240			

a. Dependent Variable: Diff Math Ach FY18-17

b. Predictors: (Constant), Portfolio Size

Table 37: Slope coefficient for elementary mathematics achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	3.979	1.837		2.166	.031	.361	7.598
	Portfolio Size	-.187	.130	-.093	-1.447	.149	-.443	.068

a. Dependent Variable: Diff Math Ach FY18-17

Table 38: Durbin-Watson statistic for elementary English Language Arts achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.160[a]	.026	.022	4.776	2.041

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff ELA Ach FY18-17

Table 39: ANOVA for elementary English Language Arts achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	143.450	1	143.450	6.289	.013[b]
	Residual	5451.803	239	22.811		
	Total	5595.253	240			

a. Dependent Variable: Diff ELA Ach FY18-17

b. Predictors: (Constant), Portfolio Size

Table 40: Slope coefficient for elementary English Language Arts achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	6.146	1.511		4.067	.000	3.169	9.123
	Portfolio Size	-.267	.107	-.160	-2.508	.013	-.477	-.057

a. Dependent Variable: Diff ELA Ach FY18-17

Elementary Schools 2018-2019

For elementary schools in school year 2018-2019, there was independence of residuals as assessed by a Durbin-Watson statistic of 1.930 and 1.953 for mathematics and English Language Arts, respectively. Principal supervisor portfolio sizes accounted for 2.1% of variation in mathematics achievement with an adjusted R^2 = 1.7% and 3.1% variation in English Language Arts achievement with an adjusted R^2 = 2.7%. In the regression model principal supervisor portfolio sizes were statistically significant in predicting mathematics achievement, $F(1, 239) = 5.220$, $p = .023$. Principal supervisor portfolio sizes were statistically significant in predicting English Language Arts achievement, $F(1, 239) = 7.627$, $p = .006$. Moreover, the slope coefficient was statistically significant for mathematics achievement, $p = .023$, and statistically significant for English Language Arts achievement, $p = .006$. Tables 41 to 46 illustrate the results of the statistical analyses.

Table 41: Durbin-Watson statistic for elementary mathematics achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.146[a]	.021	.017	5.224	1.930

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff Math Ach FY19-18

Table 42: ANOVA for elementary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	142.463	1	142.463	5.220	.023[b]
	Residual	6522.741	239	27.292		
	Total	6665.203	240			

a. Dependent Variable: Diff Math Ach FY19-18

b. Predictors: (Constant), Portfolio Size

Table 43: Slope coefficient for elementary mathematics achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	6.556	1.653		3.966	.000	3.300	9.812
	Portfolio Size	-.266	.117	-.146	-2.285	.023	-.496	-.037

a. Dependent Variable: Diff Math Ach FY19-18

Table 44: Durbin-Watson statistic for elementary English Language Arts achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.176[a]	.031	.027	4.284	1.953

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff ELA Ach FY19-18

Table 45: ANOVA for elementary English Language Arts achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	139.961	1	139.961	7.627	.006[b]
	Residual	4386.022	239	18.352		
	Total	4525.983	240			

a. Dependent Variable: Diff ELA Ach FY19-18

b. Predictors: (Constant), Portfolio Size

Table 46: Slope coefficient for elementary English Language Arts achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	5.656	1.355		4.173	.000	2.986	8.327
	Portfolio Size	-.264	.096	-.176	-2.762	.006	-.452	-.076

a. Dependent Variable: Diff ELA Ach FY19-18

Secondary Schools 2013-2014

For secondary schools in school year 2013-2014, there was independence of residuals as assessed by a Durbin-Watson statistic of 2.090 and 1.739 for mathematics and English Language Arts, respectively. Principal supervisor portfolio sizes accounted for 0.3% of variation in mathematics achievement with an adjusted R^2 = -0.6% and 0.8% variation in English Language Arts achievement with an adjusted R^2 = 0.0%. In the regression model principal supervisor portfolio sizes were not statistically significant in predicting mathematics achievement, $F(1, 119) = .319$, $p = .573$. Principal supervisor portfolio sizes were not statistically significant in predicting English Language Arts achievement, $F(1, 119) = 1.011$, $p = .317$. Moreover, the slope coefficient was not statistically significant for mathematics achievement, $p = .573$, and not statistically significant for English Language Arts achievement, $p = .317$. Tables 47 to 52 illustrate the results of the statistical analyses.

Table 47: Durbin-Watson statistic for secondary mathematics achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.052[a]	.003	-.006	6.328	2.090

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff Math Ach FY14-13

Table 48: ANOVA for secondary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.779	1	12.779	.319	.573[b]
	Residual	4765.221	119	40.044		
	Total	4778.000	120			

a. Dependent Variable: Diff Math Ach FY14-13

b. Predictors: (Constant), Portfolio Size

Table 49: Slope coefficient for secondary mathematics achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-.683	1.787		-.382	.703	-4.222	2.856
	Portfolio Size	.038	.067	.052	.565	.573	-.095	.170

a. Dependent Variable: Diff Math Ach FY14-13

Table 50: Durbin-Watson statistic for secondary English Language Arts achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.092[a]	.008	.000	5.172	1.739

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff ELA Ach FY14-13

Table 51: ANOVA for secondary English Language Arts achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	27.036	1	27.036	1.011	.317[b]
	Residual	3183.411	119	26.751		
	Total	3210.446	120			

a. Dependent Variable: Diff ELA Ach FY14-13

b. Predictors: (Constant), Portfolio Size

Table 52: Slope coefficient for secondary English Language Arts achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	1.109	1.461		.759	.449	-1.783	4.002
	Portfolio Size	-.055	.055	-.092	-1.005	.317	-.163	.053

a. Dependent Variable: Diff ELA Ach FY14-13

Secondary Schools 2014-2015

For secondary schools in school year 2014-2015, there was independence of residuals as assessed by a Durbin-Watson statistic of 1.981 and 1.913 for mathematics and English Language Arts, respectively. Principal supervisor portfolio sizes accounted for 1.4% of variation in mathematics achievement with an adjusted R^2 = 0.6% and 0.1% variation in English Language Arts achievement with an adjusted R^2 = -0.7%. In the regression model principal supervisor portfolio sizes were not statistically significant in predicting mathematics achievement, F(1, 119) = 1.669, p = .199. Principal supervisor portfolio sizes were not statistically significant in predicting English Language Arts achievement, F(1, 119) = .113, p = .737. Moreover, the slope coefficient was not statistically significant for mathematics achievement, p = .199, and not statistically significant for English Language Arts achievement, p = .737. Tables 53 to 58 illustrate the results of the statistical analyses.

Table 53: Durbin-Watson statistic for secondary mathematics achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.118[a]	.014	.006	11.580	1.981

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff Math Ach FY15-14

Table 54: ANOVA for secondary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	223.811	1	223.811	1.669	.199[b]
	Residual	15956.387	119	134.087		
	Total	16180.198	120			

a. Dependent Variable: Diff Math Ach FY15-14

b. Predictors: (Constant), Portfolio Size

Table 55: Slope coefficient for secondary mathematics achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-13.480	3.271		-4.122	.000	-19.956	-7.004
	Portfolio Size	.158	.122	.118	1.292	.199	-.084	.401

a. Dependent Variable: Diff Math Ach FY15-14

Table 56: Durbin-Watson statistic for secondary English Language Arts achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.031[a]	.001	-.007	4.251	1.913

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff ELA Ach FY15-14

Table 57: ANOVA for secondary English Language Arts achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.050	1	2.050	.113	.737[b]
	Residual	2149.950	119	18.067		
	Total	2152.000	120			

a. Dependent Variable: Diff ELA Ach FY15-14

b. Predictors: (Constant), Portfolio Size

Table 58: Slope coefficient for secondary English Language Arts achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-2.799	1.201		-2.331	.021	-5.176	-.422
	Portfolio Size	-.015	.045	-.031	-.337	.737	-.104	.074

a. Dependent Variable: Diff ELA Ach FY15-14

Secondary Schools 2015-2016

For secondary schools in school year 2015-2016, there was independence of residuals as assessed by a Durbin-Watson statistic of 2.145 and 2.010 for mathematics and English Language Arts, respectively. Principal supervisor portfolio sizes accounted for 4.3% of variation in mathematics achievement with an adjusted R^2 = 3.5% and 0.7% variation in English Language Arts achievement with an adjusted R^2 = -0.1%. In the regression model principal supervisor portfolio sizes were statistically significant in predicting mathematics achievement, F(1, 119) = 5.321, p = .023. Principal supervisor portfolio sizes were not statistically significant in predicting English Language Arts achievement, F(1, 119) = .855, p = .357. Moreover, the slope coefficient was statistically significant for mathematics achievement, p = .023, and not statistically significant for English Language Arts achievement, p = .357. Tables 59 to 64 illustrate the results of the statistical analyses.

Table 59: Durbin-Watson statistic for secondary mathematics achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.207[a]	.043	.035	4.719	2.145

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff Math Ach FY16-15

Table 60: ANOVA for secondary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	118.466	1	118.466	5.321	.023[b]
	Residual	2649.551	119	22.265		
	Total	2768.017	120			

a. Dependent Variable: Diff Math Ach FY16-15

b. Predictors: (Constant), Portfolio Size

Table 61: Slope coefficient for secondary mathematics achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-3.068	1.333		-2.302	.023	-5.707	-.429
	Portfolio Size	.115	.050	.207	2.307	.023	.016	.214

a. Dependent Variable: Diff Math Ach FY16-15

Table 62: Durbin-Watson statistic for secondary English Language Arts achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.084[a]	.007	-.001	2.958	2.010

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff ELA Ach FY16-15

Table 63: ANOVA for secondary English Language Arts achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.480	1	7.480	.855	.357[b]
	Residual	1040.933	119	8.747		
	Total	1048.413	120			

a. Dependent Variable: Diff ELA Ach FY16-15

b. Predictors: (Constant), Portfolio Size

Table 64: Slope coefficient for secondary English Language Arts achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-.946	.835		-1.133	.260	-2.600	.708
	Portfolio Size	.029	.031	.084	.925	.357	-.033	.091

a. Dependent Variable: Diff ELA Ach FY16-15

Secondary 2016-2017

For secondary schools in school year 2016-2017, there was independence of residuals as assessed by a Durbin-Watson statistic of 2.003 and 2.201 for mathematics and English Language Arts, respectively. Principal supervisor portfolio sizes accounted for 1.9% of variation in mathematics achievement with an adjusted R^2 = 1.0% and 1.2% variation in English Language Arts achievement with an adjusted R^2 = 0.4%. In the regression model principal supervisor portfolio sizes were not statistically significant in predicting mathematics achievement, $F(1, 117) = 2.232$, $p = .138$. Principal supervisor portfolio sizes were not statistically significant in predicting English Language Arts achievement, $F(1, 117) = 1.461$, $p = .229$. Moreover, the slope coefficient was not statistically significant for mathematics achievement, $p = .138$, and not statistically significant for English Language Arts achievement, $p = .229$. Tables 65 to 70 illustrate the results of the statistical analyses.

Table 65: Durbin-Watson statistic for secondary mathematics achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.137[a]	.019	.010	5.521	2.003

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff Math Ach FY17-16

Table 66: ANOVA for secondary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	68.021	1	68.021	2.232	.138[b]
	Residual	3565.828	117	30.477		
	Total	3633.849	118			

a. Dependent Variable: Diff Math Ach FY17-16

b. Predictors: (Constant), Portfolio Size

Table 67: Slope coefficient for secondary mathematics achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	5.692	1.958		2.906	.004	1.813	9.570
	Portfolio Size	-.200	.134	-.137	-1.494	.138	-.464	.065

a. Dependent Variable: Diff Math Ach FY17-16

Table 68: Durbin-Statistic for secondary English Language Arts achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.111[a]	.012	.004	3.058	2.201

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff ELA Ach FY17-16

Table 69: ANOVA for secondary English Language Arts achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.666	1	13.666	1.461	.229[b]
	Residual	1094.065	117	9.351		
	Total	1107.731	118			

a. Dependent Variable: Diff ELA Ach FY17-16

b. Predictors: (Constant), Portfolio Size

Table 70: Slope coefficient for secondary English Language Arts achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-.637	1.085		-.587	.558	-2.785	1.512
	Portfolio Size	.090	.074	.111	1.209	.229	-.057	.236

a. Dependent Variable: Diff ELA Ach FY17-16

Secondary Schools 2013-2014

For secondary schools in school year 2013-2014, there was independence of residuals as assessed by a Durbin-Watson statistic of 1.743 and 1.728 for mathematics and English Language Arts, respectively. Principal supervisor portfolio sizes accounted for 0.1% of variation in mathematics achievement with an adjusted R^2 = -0.8% and 0.5% variation in English Language Arts achievement with an adjusted R^2 = -0.3%. In the regression model principal supervisor portfolio sizes were not statistically significant in predicting mathematics achievement, F(1, 117) = .072, p = .790. Principal supervisor portfolio sizes were not statistically significant in predicting English Language Arts achievement, F(1, 117) = .635, p = .427. Moreover, the slope coefficient was not statistically significant for mathematics achievement, p = .790, and not statistically significant for English Language Arts achievement, p = .427. Tables 71 to 76 illustrate the results of the statistical analyses.

Table 71: Durbin-Watson statistic for secondary mathematics achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.025[a]	.001	-.008	5.924	1.743

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff Math Ach FY18-17

Table 72: ANOVA for secondary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.510	1	2.510	.072	.790[b]
	Residual	4106.061	117	35.095		
	Total	4108.571	118			

a. Dependent Variable: Diff Math Ach FY18-17

b. Predictors: (Constant), Portfolio Size

Table 73: Slope coefficient for secondary mathematics achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.400	2.101		.190	.849	-3.762	4.562
	Portfolio Size	-.038	.143	-.025	-.267	.790	-.322	.246

a. Dependent Variable: Diff Math Ach FY18-17

Table 74: Durbin-Watson statistic for secondary English Language Arts achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.073[a]	.005	-.003	2.801	1.728

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff ELA Ach FY18-17

Table 75: ANOVA for secondary English Language Arts achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.980	1	4.980	.635	.427[b]
	Residual	918.012	117	7.846		
	Total	922.992	118			

a. Dependent Variable: Diff ELA Ach FY18-17

b. Predictors: (Constant), Portfolio Size

Table 76: Slope coefficient for secondary English Language Arts achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	1.773	.994		1.784	.077	-.195	3.741
	Portfolio Size	-.054	.068	-.073	-.797	.427	-.188	.080

a. Dependent Variable: Diff ELA Ach FY18-17

Secondary 2018-2019

For secondary schools in school year 2018-2019, there was independence of residuals as assessed by a Durbin-Watson statistic of 1.884 and 1.859 for mathematics and English Language Arts, respectively. Principal supervisor portfolio sizes accounted for 0.2% of variation in mathematics achievement with an adjusted R^2 = -0.7% and 0% variation in English Language Arts achievement with an adjusted R^2 = -0.9%. In the regression model principal supervisor portfolio sizes were not statistically significant in predicting mathematics achievement, F(1, 117) = .236, p = .628. Principal supervisor portfolio sizes were not statistically significant in predicting English Language Arts achievement, F(1, 117) = 0.00, p = .990. Moreover, the slope coefficient was not statistically significant for mathematics achievement, p = .628, and not statistically significant for English Language Arts achievement, p = .990. Tables 77 to 82 illustrate the results of the statistical analyses.

Table 77: Durbin-Watson statistic for secondary mathematics achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.045[a]	.002	-.007	4.794	1.884

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff Math Ach FY19-FY18

Table 78: ANOVA for secondary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.420	1	5.420	.236	.628[b]
	Residual	2688.865	117	22.982		
	Total	2694.286	118			

a. Dependent Variable: Diff Math Ach FY19-FY18

b. Predictors: (Constant), Portfolio Size

Table 79: Slope coefficient for secondary mathematics achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	1.084	1.701		.637	.525	-2.284	4.451
	Portfolio Size	-.056	.116	-.045	-.486	.628	-.286	.174

a. Dependent Variable: Diff Math Ach FY19-FY18

Table 80: Durbin-Watson statistic for secondary English Language Arts achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.001[a]	.000	-.009	2.576	1.859

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff ELA Ach FY19-18

Table 81: ANOVA for secondary English Language Arts achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.001	1	.001	.000	.990[b]
	Residual	776.318	117	6.635		
	Total	776.319	118			

a. Dependent Variable: Diff ELA Ach FY19-18

b. Predictors: (Constant), Portfolio Size

Table 82: Slope coefficient for secondary English Language Arts achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.087	.914		.095	.924	-1.723	1.897
	Portfolio Size	-.001	.062	-.001	-.013	.990	-.124	.123

a. Dependent Variable: Diff ELA Ach FY19-18

A simple linear regression was conducted to analyze the impact of reducing principal supervisors' span of control on school academic outcomes. 67% of the individual analyses conducted for school years post change in reducing principal supervisors' span of control was not statistically significant, $p > 0.05$. Additionally, 67% of the individual analyses conducted for school years prior to changes in principal supervisors' span of control was not statistically significant, $p > 0.05$. The null hypothesis proposed that no correlation exist in the reduction of principal supervisors' span of control and schools' academic outcomes measured by student achievement on mathematics and English Language Arts assessments. The null hypothesis is accepted since no significant relationship exists between reducing principal supervisors span of control and school academic outcomes. Tables 83 and 84 summarize the statistical significance of the analyses performed.

Table 83: Summary of Statistical Significance for Research Question 1 Elementary Schools

Elementary Schools	Statistically Significant	
School Year	**Math**	**ELA**
2013-2014	Yes	No
2014-2015	No	Yes
2015-2016	Yes	No
2016-2017	Yes	No
2017-2018	No	Yes
2018-2019	Yes	Yes

Table 84: Summary of Statistical Significance for Research Question 1 Secondary School

Secondary Schools	Statistically Significant	
School Year	**Math**	**ELA**
2013-2014	No	No
2014-2015	No	No
2015-2016	Yes	No
2016-2017	No	No
2017-2018	No	No
2018-2019	No	No

Data Analysis for Research Question 2

What impact does a reduced principal supervisors' span of control have on Florida Department of Education Differentiated Accountability schools' percent of students passing mathematics assessments and English language arts assessments with a level 3 or above on the Florida Standards Assessment?

h_{02}: There is no correlation in the reduction of principal supervisors' span of control and percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment for the Florida Department of Education Differentiated Accountability schools.

The second research question was analyzed using a simple linear regression. The relationships between the two variables, principal supervisor portfolio sizes and school performance, were measured for overall impact on student academic outcomes in low performing schools or schools in the state's Differentiated Accountability (DA) program. The analysis was performed for three years prior to a reduction in principal supervisors' span of control and post reduction in principal supervisors' span of control. School years 2013-2014, 2014-2015, and 2015-2016 are the school years prior to school districts reducing principal supervisors' span of control. School years 2016-2017, 2017-2018, 2018-2019 are the three school years after the reduction in principal supervisors' span of control. The analysis was conducted for each school level, elementary and secondary, by year and also separately for mathematics and English Language Arts assessments. The school districts had a minimal amount of schools (n = 54; 46 elementary schools, 8 secondary schools) participate in the DA program over the span of school years of the study. All school years were omitted from analysis and reporting for secondary schools due to a small sample size or no schools participating in the DA program. Two post change school years for elementary schools were also omitted from analysis and reporting due to a small sample size: school years 2017-2018 and 2018-2019.

The simple linear regression involves several assumptions: having a continuous dependent and independent variable, a linear relationship between variables, independence of observations, no significant outliers, homoscedasticity, and a normal distribution of residuals along the regression line. Preliminary analysis conducted for the first research question determined no assumptions were violated. A visual inspection of scatterplots of both variables confirmed linearity. The Durbin-Watson statistic, reported below for each analysis, was used to confirm independence of observations. Minimal outliers were observed for some analysis. The linear regression was performed with and without the outliers with no substantial differences in the results. Consequently, the analysis was performed with the outliers. Homoscedasticity was confirmed by a visual inspection of scatterplots of standard residuals and predicted values. Based on the visual inspection of histograms and normal probability plots residuals were normally distributed.

Elementary Schools 2013-2014

For elementary schools in school year 2013-2014, there was independence of residuals as assessed by a Durbin-Watson statistic of 2.166 and 2.214 for mathematics and English Language Arts, respectively. Principal supervisor portfolio sizes accounted for 18.3% of variation in mathematics achievement with an adjusted R^2 = 16.1% and 0.1% variation in English Language Arts achievement with an adjusted R^2 = -2.6%. In the regression model principal supervisor portfolio sizes were statistically significant in predicting mathematics achievement, $F(1, 38) = 8.501$, $p = .006$. Principal supervisor portfolio sizes were not statistically significant in predicting English Language Arts achievement, $F(1, 38) = .029$, $p = .867$. Moreover, the slope coefficient was statistically significant for mathematics achievement, $p = .006$, and not statistically significant for English Language Arts achievement, p = .867. Tables 85 to 90 illustrate the results of the statistical analyses.

Table 85: Durbin-Watson statistic for elementary mathematics achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.428[a]	.183	.161	7.015	2.166

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff Math Ach FY14-13

Table 86: ANOVA for elementary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	418.344	1	418.344	8.501	.006[b]
	Residual	1870.031	38	49.211		
	Total	2288.375	39			

a. Dependent Variable: Diff Math Ach FY14-13

b. Predictors: (Constant), Portfolio Size

Table 87: Slope coefficient for elementary mathematics achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-16.360	6.014		-2.720	.010	-28.535	-4.184
	Portfolio Size	.659	.226	.428	2.916	.006	.201	1.117

a. Dependent Variable: Diff Math Ach FY14-13

Table 88: Durbin-Watson statistic for elementary English Language Arts achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.027[a]	.001	-.026	5.252	2.214

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff ELA Ach FY14-13

Table 89: ANOVA for elementary English Language Arts achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.788	1	.788	.029	.867[b]
	Residual	1047.987	38	27.579		
	Total	1048.775	39			

a. Dependent Variable: Diff ELA Ach FY14-13

b. Predictors: (Constant), Portfolio Size

Table 90: Slope coefficient for elementary English Language Arts achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.673	4.502		.149	.882	-8.441	9.788
	Portfolio Size	-.029	.169	-.027	-.169	.867	-.371	.314

a. Dependent Variable: Diff ELA Ach FY14-13

Elementary 2014-2015

For elementary schools in school year 2014-2015, there was independence of residuals as assessed by a Durbin-Watson statistic of 1.996 and 2.173 for mathematics and English Language Arts, respectively. Principal supervisor portfolio sizes accounted for 0.0% of variation in mathematics achievement with an adjusted R^2 = -2.8% and 0.6% variation in English Language Arts achievement with an adjusted R^2 = -2.1%. In the regression model, principal supervisor portfolio sizes were not statistically significant in predicting mathematics achievement, F(1, 36) = 0.0, p = .989. Principal supervisor portfolio sizes were not statistically significant in predicting English Language Arts achievement, F(1, 36) = .235, p = .631. Moreover, the slope coefficient was not statistically significant for mathematics achievement, p = .989, and not statistically significant for English Language Arts achievement, p = .631. Tables 91 to 96 illustrate the results of the statistical analyses.

Table 91: Durbin-Watson statistic for elementary mathematics achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.002[a]	.000	-.028	8.390	1.996

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff Math Ach FY15-14

Table 92: ANOVA for elementary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.013	1	.013	.000	.989[b]
	Residual	2534.197	36	70.394		
	Total	2534.211	37			

a. Dependent Variable: Diff Math Ach FY15-14

b. Predictors: (Constant), Portfolio Size

Table 93: Slope coefficient for elementary mathematics achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-.215	7.391		-.029	.977	-15.205	14.775
	Portfolio Size	-.004	.276	-.002	-.014	.989	-.564	.557

a. Dependent Variable: Diff Math Ach FY15-14

Table 94: Durbin-Watson statistic for elementary English Language Arts achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.081[a]	.006	-.021	6.012	2.173

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff ELA Ach FY15-14

Table 95: ANOVA for elementary English Language Arts achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.497	1	8.497	.235	.631[b]
	Residual	1301.003	36	36.139		
	Total	1309.500	37			

a. Dependent Variable: Diff ELA Ach FY15-14

b. Predictors: (Constant), Portfolio Size

Table 96: Slope coefficient for elementary English Language Arts achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-8.024	5.296		-1.515	.138	-18.765	2.717
	Portfolio Size	.096	.198	.081	.485	.631	-.306	.498

a. Dependent Variable: Diff ELA Ach FY15-14

Elementary Schools 2015-2016

For elementary schools in school year 2015-2016, there was independence of residuals as assessed by a Durbin-Watson statistic of 1.711 and 1.998 for mathematics and English Language Arts, respectively. Principal supervisor portfolio sizes accounted for 1.3% of variation in mathematics achievement with an adjusted R^2 = -0.2% and 0.3% variation in English Language Arts achievement with an adjusted R^2 = -1.3%. In the regression model, principal supervisor portfolio sizes were not statistically significant in predicting mathematics achievement, F(1, 65) =.888, p = .349. Principal supervisor portfolio sizes were not statistically significant in predicting English Language Arts achievement, F(1, 65) = .171, p = .681. Moreover, the slope coefficient was not statistically significant for mathematics achievement, p = .349, and not statistically significant for English Language Arts achievement, p = .681. Tables 97 to 102 illustrate the results of the statistical analyses.

Table 97: Durbin-Watson statistic for elementary mathematics achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.116[a]	.013	-.002	7.762	1.711

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff Math Ach FY16-15

Table 98: ANOVA for elementary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	53.515	1	53.515	.888	.349[b]
	Residual	3916.664	65	60.256		
	Total	3970.179	66			

a. Dependent Variable: Diff Math Ach FY16-15

b. Predictors: (Constant), Portfolio Size

Table 99: Slope coefficients for elementary mathematics achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-.190	4.794		-.040	.969	-9.764	9.384
	Portfolio Size	.159	.169	.116	.942	.349	-.178	.495

a. Dependent Variable: Diff Math Ach FY16-15

Table 100: Durbin-Watson statistic for elementary English Language Arts achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.051[a]	.003	-.013	5.608	1.998

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff ELA Ach FY16-15

Table 101: ANOVA for elementary English Language Arts achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.377	1	5.377	.171	.681[b]
	Residual	2044.265	65	31.450		
	Total	2049.642	66			

a. Dependent Variable: Diff ELA Ach FY16-15

b. Predictors: (Constant), Portfolio Size

Table 102: Slope coefficient for elementary English Language Arts achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	2.180	3.463		.629	.531	-4.737	9.097
	Portfolio Size	-.050	.122	-.051	-.413	.681	-.294	.193

a. Dependent Variable: Diff ELA Ach FY16-15

Elementary Schools 2016-2017

For elementary schools in school year 2016-2017, there was independence of residuals as assessed by a Durbin-Watson statistic of 2.306 and 1.483 for mathematics and English Language Arts, respectively. Principal supervisor portfolio sizes accounted for 11.8% of variation in mathematics achievement with an adjusted R^2 = 9.0% and 10.6% variation in English Language Arts achievement with an adjusted R^2 = 7.8%. In the regression model principal supervisor portfolio sizes were statistically significant in predicting mathematics achievement, $F(1, 32) = 4.283$, $p = .047$. Principal supervisor portfolio sizes were not statistically significant in predicting English Language Arts achievement, $F(1, 32) = 3.807$, $p = .060$. Moreover, the slope coefficient was statistically significant for mathematics achievement, $p = .047$, and not statistically significant for English Language Arts achievement, $p = .060$. Tables 103 to 108 illustrate the results of the statistical analyses.

Table 103: Durbin-Statistic for elementary mathematics achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.344[a]	.118	.090	6.486	2.306

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff Math Ach FY17-16

Table 104: ANOVA for elementary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	180.206	1	180.206	4.283	.047[b]
	Residual	1346.265	32	42.071		
	Total	1526.471	33			

a. Dependent Variable: Diff Math Ach FY17-16

b. Predictors: (Constant), Portfolio Size

Table 105: Slope coefficient for elementary mathematics achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-3.153	5.725		-.551	.586	-14.815	8.509
	Portfolio Size	1.000	.483	.344	2.070	.047	.016	1.985

a. Dependent Variable: Diff Math Ach FY17-16

Table 106: Durbin-Watson statistic for elementary English Language Arts achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.326[a]	.106	.078	4.321	1.483

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff ELA Ach FY17-16

Table 107: ANOVA for elementary English Language Arts achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	71.075	1	71.075	3.807	.060[b]
	Residual	597.396	32	18.669		
	Total	668.471	33			

a. Dependent Variable: Diff ELA Ach FY17-16

b. Predictors: (Constant), Portfolio Size

Table 108: Slope coefficient for elementary English Language Arts achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-2.829	3.814		-.742	.464	-10.598	4.939
	Portfolio Size	.628	.322	.326	1.951	.060	-.028	1.284

a. Dependent Variable: Diff ELA Ach FY17-16

A simple linear regression was conducted to analyze the impact of reducing principal supervisors' span of control on school academic outcomes. All secondary schools achievement and elementary schools achievement for school year 2017-2018 and 2018-2019 were excluded from the analyses. 50% of the remaining individual analyses conducted for school years post change in reducing principal supervisors' span of control were statistically significant, $p < 0.05$. Additionally, 83% of the individual analyses conducted for school years prior to changes in principal supervisors' span of control were not statistically significant, $p > 0.05$. The null hypothesis proposed that no correlation exist in the reduction of principal supervisors' span of control and schools' academic outcomes measured by student achievement on mathematics and English Language Arts assessments. The null hypothesis is accepted since no significant relationship exists between reducing principal supervisors span of control and school academic outcomes. Tables 109 and 110 summarize the statistical significance of the analyses performed.

Table 109: Summary of Statistical Significance for Research Question 2 DA Elementary Schools

Elementary Schools	Statistically Significant	
School Year	Math	ELA
2013-2014	Yes	No
2014-2015	No	No
2015-2016	No	No
2016-2017	Yes	No

Data Analysis for Research Question 3

What impact does a reduced principal supervisors' span of control have on Title 1 schools' percent of students passing mathematics assessments and English language arts assessments with a level 3 or above on the Florida Standards Assessment?

h_{03}: There is no correlation in the reduction of principal supervisors' span of control and percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment for Title I schools.

The third research question was analyzed using a simple linear regression. The relationships between the two variables, principal supervisor portfolio sizes and school performance, were measured for overall impact on student academic outcomes in Title I schools (n = 230). The analysis was performed for three years prior to a reduction in principal supervisors' span of control and post reduction in principal supervisors' span of control. School years 2013-2014, 2014-2015, and 2015-2016 are the school years prior to school districts reducing principal supervisors' span of control. School years 2016-2017, 2017-2018, 2018-2019 are the three school years after the reduction in principal supervisors' span of control. The analysis was conducted for each school level, elementary and secondary, by year and also separately for mathematics and English Language Arts assessments.

The simple linear regression involves several assumptions: having a continuous dependent and independent variable, a linear relationship between variables, independence of observations, no significant outliers, homoscedasticity, a normal distribution of residuals along the regression line. Preliminary analysis conducted for the first research question determined no assumptions were violated. A visual inspection of scatterplots of both variables confirmed linearity. The Durbin-Watson statistic, reported below for each analysis, was used to confirm independence of observations. Minimal outliers were observed for some analysis. The linear regression was performed with and without the outliers with no substantial differences in the results. Consequently, the analysis was performed with the outliers. Homoscedasticity was confirmed by a visual inspection of scatterplots of standard residuals and predicted values. Based on the visual inspection of histograms and normal probability, plots residuals were normally distributed.

Elementary Schools 2013-2014

For elementary schools in school year 2013-2014, there was independence of residuals as assessed by a Durbin-Watson statistic of 1.979 and 1.924 for mathematics and English Language Arts, respectively. Principal supervisor portfolio sizes accounted for 2.8% of variation in mathematics achievement with an adjusted R^2 = 2.2% and 0% variation in English Language Arts achievement with an adjusted R^2 = -0.6%. In the regression model principal supervisor portfolio sizes were statistically significant in predicting mathematics achievement, F(1, 163) = 4.653, p = .032. Principal supervisor portfolio sizes were not statistically significant in predicting English Language Arts achievement, F(1, 163) = .079, p = .778. Moreover, the slope coefficient was statistically significant for mathematics achievement, p = .032, and not statistically significant for English Language Arts achievement, p = .778. Tables 110 to 115illustrate the results of the statistical analyses.

Table 110: Durbin-Watson statistic for elementary mathematics achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.167[a]	.028	.022	6.437	1.979

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff Math Ach FY14-13

Table 111: ANOVA for elementary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	192.778	1	192.778	4.653	.032[b]
	Residual	6753.670	163	41.434		
	Total	6946.448	164			

a. Dependent Variable: Diff Math Ach FY14-13

b. Predictors: (Constant), Portfolio Size

Table 112: Slope coefficient for elementary mathematics achievement

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	95.0% Confidence Interval for B Lower Bound	95.0% Confidence Interval for B Upper Bound
1	(Constant)	-5.754	2.579		-2.231	.027	-10.846	-.661
	Portfolio Size	.197	.091	.167	2.157	.032	.017	.377

a. Dependent Variable: Diff Math Ach FY14-13

Table 113: Durbin-Watson statistic for elementary English Language Arts achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.022[a]	.000	-.006	4.663	1.924

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff ELA Ach FY14-13

Table 114: ANOVA for elementary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.726	1	1.726	.079	.778[b]
	Residual	3544.067	163	21.743		
	Total	3545.794	164			

a. Dependent Variable: Diff ELA Ach FY14-13

b. Predictors: (Constant), Portfolio Size

Table 115: Slope coefficient for elementary mathematics achievement

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	95.0% Confidence Interval for B Lower Bound	95.0% Confidence Interval for B Upper Bound
1	(Constant)	1.110	1.868		.594	.553	-2.579	4.799
	Portfolio Size	-.019	.066	-.022	-.282	.778	-.149	.112

a. Dependent Variable: Diff ELA Ach FY14-13

Elementary 2014-2015

For elementary schools in school year 2014-2015, there was independence of residuals as assessed by a Durbin-Watson statistic of 1.838 and 1.960 for mathematics and English Language Arts, respectively. Principal supervisor portfolio sizes accounted for 3.0% of variation in mathematics achievement with an adjusted R^2 = 2.4% and 2.0% variation in English Language Arts achievement with an adjusted R^2 = 1.4%. In the regression model, principal supervisor portfolio sizes were statistically significant in predicting mathematics achievement, $F(1, 163) = 4.966$, $p = .027$. Principal supervisor portfolio sizes were not statistically significant in predicting English Language Arts achievement, $F(1, 163) = 3.244$, $p = .074$. Moreover, the slope coefficient was statistically significant for mathematics achievement, $p = .027$, and not statistically significant for English Language Arts achievement, $p = .074$. Tables 116 to 120 illustrate the results of the statistical analyses.

Table 116: Durbin-Watson statistic for elementary mathematics achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.172[a]	.030	.024	7.522	1.838

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff Math Ach FY15-14

Table 117: ANOVA for elementary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	280.943	1	280.943	4.966	.027[b]
	Residual	9222.306	163	56.579		
	Total	9503.248	164			

a. Dependent Variable: Diff Math Ach FY15-14

b. Predictors: (Constant), Portfolio Size

Table 118: Durbin-Watkins statistic for elementary English Language Arts achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.140[a]	.020	.014	5.378	1.960

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff ELA Ach FY15-14

Table 119: ANOVA for elementary English Language Arts achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	93.822	1	93.822	3.244	.074[b]
	Residual	4713.572	163	28.918		
	Total	4807.394	164			

a. Dependent Variable: Diff ELA Ach FY15-14

b. Predictors: (Constant), Portfolio Size

Table 120: Slope coefficient for elementary English Language Arts achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-10.867	2.155		-5.044	.000	-15.122	-6.613
	Portfolio Size	.137	.076	.140	1.801	.074	-.013	.288

a. Dependent Variable: Diff ELA Ach FY15-14

Elementary Schools 2015-2016

For elementary schools in school year 2015-2016, there was independence of residuals as assessed by a Durbin-Watson statistic of 2.308 and 2.237 for mathematics and English Language Arts, respectively. Principal supervisor portfolio sizes accounted for 5.3% of variation in mathematics achievement with an adjusted R^2 = 4.7% and 0.4% variation in English Language Arts achievement with an adjusted R^2 = -0.2%. In the regression model principal supervisor portfolio sizes were statistically significant in predicting mathematics achievement, F(1, 163) = 9.154, p = .003. Principal supervisor portfolio sizes were not statistically significant in predicting English Language Arts achievement, F(1, 163) = .679, p = .411 Moreover, the slope coefficient was statistically significant for mathematics achievement, p = .003, and not statistically significant for English Language Arts achievement, p = .411. Tables 121 to 127 illustrate the results of the statistical analyses.

Table 121: Durbin-Watson statistic for elementary mathematics achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.231[a]	.053	.047	6.740	2.308

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff Math Ach FY16-15

Table 122: ANOVA for elementary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	415.885	1	415.885	9.154	.003[b]
	Residual	7405.061	163	45.430		
	Total	7820.945	164			

a. Dependent Variable: Diff Math Ach FY16-15

b. Predictors: (Constant), Portfolio Size

Table 123: Slope coefficient for elementary mathematics achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	4.690	3.014		1.556	.122	-1.260	10.641
	Portfolio Size	-.238	.107	-.172	-2.228	.027	-.448	-.027

a. Dependent Variable: Diff Math Ach FY15-14

Table 124: Slope coefficient for elementary mathematics achievement

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	95.0% Confidence Interval for B Lower Bound	95.0% Confidence Interval for B Upper Bound
1	(Constant)	-5.397	2.700		-1.998	.047	-10.729	-.064
	Portfolio Size	.289	.096	.231	3.026	.003	.100	.478

a. Dependent Variable: Diff Math Ach FY16-15

Table 125: Durbin-Statistic for elementary English Language Arts achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.064[a]	.004	-.002	4.912	2.237

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff ELA Ach FY16-15

Table 126: ANOVA for elementary English Language Arts achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	16.389	1	16.389	.679	.411[b]
	Residual	3932.339	163	24.125		
	Total	3948.727	164			

a. Dependent Variable: Diff ELA Ach FY16-15

b. Predictors: (Constant), Portfolio Size

Table 127: Slope coefficient for elementary English Language Arts achievement

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	95.0% Confidence Interval for B Lower Bound	95.0% Confidence Interval for B Upper Bound
1	(Constant)	2.318	1.968		1.178	.240	-1.568	6.204
	Portfolio Size	-.057	.070	-.064	-.824	.411	-.195	.080

a. Dependent Variable: Diff ELA Ach FY16-15

Elementary Schools 2016-2017

For elementary schools in school year 2016-2017, there was independence of residuals as assessed by a Durbin-Watson statistic of 1.585 and 1.872 for mathematics and English Language Arts, respectively. Principal supervisor portfolio sizes accounted for 1.1% of variation in mathematics achievement with an adjusted R^2 = 0.5% and 0.6% variation in English Language Arts achievement with an adjusted R^2 = 0.0%. In the regression model principal supervisor portfolio sizes were not statistically significant in predicting mathematics achievement, $F(1, 171) = 1.948$, $p = .165$. Principal supervisor portfolio sizes were not statistically significant in predicting English Language Arts achievement, $F(1, 171) = 1.008$, $p = .317$. Moreover, the slope coefficient was not statistically significant for mathematics achievement, $p = .165$, and not statistically significant for English Language Arts achievement, $p = .317$. Tables 128 to 133 illustrate the results of the statistical analyses.

Table 128: Durbin-Watson statistic for elementary mathematics achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.106[a]	.011	.005	7.312	1.585

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff Math Ach FY17-16

Table 129: ANOVA for elementary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	104.148	1	104.148	1.948	.165[b]
	Residual	9141.771	171	53.461		
	Total	9245.919	172			

a. Dependent Variable: Diff Math Ach FY17-16

b. Predictors: (Constant), Portfolio Size

Table 130: Slope coefficient for elementary mathematics achievement

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	95.0% Confidence Interval for B Lower Bound	95.0% Confidence Interval for B Upper Bound
1	(Constant)	6.098	2.429		2.510	.013	1.303	10.893
	Portfolio Size	-.249	.179	-.106	-1.396	.165	-.602	.103

a. Dependent Variable: Diff Math Ach FY17-16

Table 131: Durbin-Watson statistic for elementary English Language Arts achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.077[a]	.006	.000	5.161	1.872

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff ELA Ach FY17-16

Table 132: ANOVA for elementary English Language Arts achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	26.839	1	26.839	1.008	.317[b]
	Residual	4554.964	171	26.637		
	Total	4581.803	172			

a. Dependent Variable: Diff ELA Ach FY17-16

b. Predictors: (Constant), Portfolio Size

Table 133: Slope coefficient for elementary English Language Arts achievement

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	95.0% Confidence Interval for B Lower Bound	95.0% Confidence Interval for B Upper Bound
1	(Constant)	.567	1.715		.331	.741	-2.817	3.952
	Portfolio Size	.127	.126	.077	1.004	.317	-.122	.375

a. Dependent Variable: Diff ELA Ach FY17-16

Elementary Schools 2017-2018

For elementary schools in school year 2017-2018, there was independence of residuals as assessed by a Durbin-Watson statistic of 2.233 and 2.041 for mathematics and English Language Arts, respectively. Principal supervisor portfolio sizes accounted for 0.9% of variation in mathematics achievement with an adjusted R^2 = 0.3% and 1.8% variation in English Language Arts achievement with an adjusted R^2 = 1.2%. In the regression model principal supervisor portfolio sizes were not statistically significant in predicting mathematics achievement, F(1, 171) = 1.541, p = .216. Principal supervisor portfolio sizes were not statistically significant in predicting English Language Arts achievement, F(1, 171) = 3.109, p = .080. Moreover, the slope coefficient was not statistically significant for mathematics achievement, p = .216, and not statistically significant for English Language Arts achievement, p = .080. Tables 134 to139 illustrate the results of the statistical analyses.

Table 134: Durbin-Watson statistic for elementary mathematics achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.095[a]	.009	.003	6.439	2.233

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff Math Ach FY18-17

Table 135: ANOVA for elementary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	63.895	1	63.895	1.541	.216[b]
	Residual	7089.966	171	41.462		
	Total	7153.861	172			

a. Dependent Variable: Diff Math Ach FY18-17

b. Predictors: (Constant), Portfolio Size

Table 136: Slope coefficient for elementary mathematics achievement

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	95.0% Confidence Interval for B Lower Bound	95.0% Confidence Interval for B Upper Bound
1	(Constant)	4.175	2.139		1.952	.053	-.048	8.397
	Portfolio Size	-.195	.157	-.095	-1.241	.216	-.506	.115

a. Dependent Variable: Diff Math Ach FY18-17

Table 137: Durbin-Watson statistic for elementary English Language Arts achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.134[a]	.018	.012	5.324	2.041

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff ELA Ach FY18-17

Table 138: ANOVA for elementary English Language Arts achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	88.138	1	88.138	3.109	.080[b]
	Residual	4847.550	171	28.348		
	Total	4935.688	172			

a. Dependent Variable: Diff ELA Ach FY18-17

b. Predictors: (Constant), Portfolio Size

Table 139: Slope coefficient for elementary English Language Arts achievement

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	95.0% Confidence Interval for B Lower Bound	95.0% Confidence Interval for B Upper Bound
1	(Constant)	5.921	1.769		3.347	.001	2.429	9.412
	Portfolio Size	-.229	.130	-.134	-1.763	.080	-.486	.027

a. Dependent Variable: Diff ELA Ach FY18-17

Elementary Schools 2018-2019

For elementary schools in school year 2018-2019, there was independence of residuals as assessed by a Durbin-Watson statistic of 1.897 and 1.972 for mathematics and English Language Arts, respectively. Principal supervisor portfolio sizes accounted for 1.1% of variation in mathematics achievement with an adjusted R^2 = 0.5% and 0.6% variation in English Language Arts achievement with an adjusted R^2 = 0.0%. In the regression model principal supervisor portfolio sizes were not statistically significant in predicting mathematics achievement, F(1, 171) = 2.000, p = .159. Principal supervisor portfolio sizes were not statistically significant in predicting English Language Arts achievement, F(1, 171) = 3.793, p = .053. Moreover, the slope coefficient was not statistically significant for mathematics achievement, p = .159, and not statistically significant for English Language Arts achievement, p = .053. Tables 140 to 145 illustrate the results of the statistical analyses.

Table 140: Durbin-Watson statistic for elementary mathematics achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.108[a]	.012	.006	5.863	1.897

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff Math Ach FY19-18

Table 141: ANOVA for elementary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	68.750	1	68.750	2.000	.159[b]
	Residual	5877.932	171	34.374		
	Total	5946.682	172			

a. Dependent Variable: Diff Math Ach FY19-18

b. Predictors: (Constant), Portfolio Size

Table 142: Slope coefficient for elementary mathematics achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	5.959	1.948		3.059	.003	2.114	9.804
	Portfolio Size	-.203	.143	-.108	-1.414	.159	-.485	.080

a. Dependent Variable: Diff Math Ach FY19-18

Table 143: Durbin-Watson statistic for elementary English Language Arts achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.147[a]	.022	.016	4.743	1.972

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff ELA Ach FY19-18

Table 144: ANOVA for elementary English Language Arts achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	85.329	1	85.329	3.793	.053[b]
	Residual	3846.637	171	22.495		
	Total	3931.965	172			

a. Dependent Variable: Diff ELA Ach FY19-18

b. Predictors: (Constant), Portfolio Size

Table 145: Slope coefficient for elementary English Language Arts achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	5.282	1.576		3.352	.001	2.172	8.392
	Portfolio Size	-.226	.116	-.147	-1.948	.053	-.454	.003

a. Dependent Variable: Diff ELA Ach FY19-18

Secondary Schools 2013-2014

For secondary schools in school year 2013-2014, there was independence of residuals as assessed by a Durbin-Watson statistic of 1.890 and 2.004 for mathematics and English Language Arts, respectively. Principal supervisor portfolio sizes accounted for 0.3% of variation in mathematics achievement with an adjusted R^2 = -1.6% and 2.2% variation in English Language Arts achievement with an adjusted R^2 = 0.3%. In the regression model principal supervisor portfolio sizes were not statistically significant in predicting mathematics achievement, F(1, 53) = .163, p = .688. Principal supervisor portfolio sizes were not statistically significant in predicting English Language Arts achievement, F(1, 53) = 1.178, p = .283. Moreover, the slope coefficient was not statistically significant for mathematics achievement, p = .688, and not statistically significant for English Language Arts achievement, p = .283. Tables 146 to 151 illustrate the results of the statistical analyses.

Table 146: Durbin-Watson statistic for secondary mathematics achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.055[a]	.003	-.016	7.456	1.890

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff Math Ach FY14-13

Table 147: ANOVA for secondary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.036	1	9.036	.163	.688[b]
	Residual	2946.673	53	55.598		
	Total	2955.709	54			

a. Dependent Variable: Diff Math Ach FY14-13

b. Predictors: (Constant), Portfolio Size

Table 148: Slope coefficient for secondary mathematics achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-2.468	3.952		-.625	.535	-10.394	5.458
	Portfolio Size	.057	.142	.055	.403	.688	-.227	.341

a. Dependent Variable: Diff Math Ach FY14-13

Table 149: Durbin-Watson statistic for secondary English Language Arts Achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.147[a]	.022	.003	6.506	2.004

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff ELA Ach FY14-13

Table 150: ANOVA for secondary English Language Arts Achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	49.883	1	49.883	1.178	.283[b]
	Residual	2243.462	53	42.329		
	Total	2293.345	54			

a. Dependent Variable: Diff ELA Ach FY14-13

b. Predictors: (Constant), Portfolio Size

Table 151: Slope coefficient for secondary English Language Arts Achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	2.329	3.448		.675	.502	-4.587	9.244
	Portfolio Size	-.134	.124	-.147	-1.086	.283	-.382	.114

a. Dependent Variable: Diff ELA Ach FY14-13

Secondary 2014-2015

For secondary schools in school year 2014-2015, there was independence of residuals as assessed by a Durbin-Watson statistic of 2.360 and 2.086 for mathematics and English Language Arts, respectively. Principal supervisor portfolio sizes accounted for 22.5% of variation in mathematics achievement with an adjusted R^2 = 21.0% and 17.1% variation in English Language Arts achievement with an adjusted R^2 = 15.5%. In the regression model principal supervisor portfolio sizes were statistically significant in predicting mathematics achievement, $F(1, 53)$ = 15.352, $p < .0005$. Principal supervisor portfolio sizes were statistically significant in predicting English Language Arts achievement, $F(1, 53)$ = 10.934, $p = .002$. Moreover, the slope coefficient was statistically significant for mathematics achievement, $p < .0005$, and statistically significant for English Language Arts achievement, $p = .002$. Tables 152 to 157 illustrate the results of the statistical analyses.

Table 152: Durbin-Watson statistic for secondary mathematics achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.474[a]	.225	.210	9.488	2.360

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff Math Ach FY15-14

Table 153: ANOVA for secondary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1382.110	1	1382.110	15.352	.000[b]
	Residual	4771.526	53	90.029		
	Total	6153.636	54			

a. Dependent Variable: Diff Math Ach FY15-14

b. Predictors: (Constant), Portfolio Size

Table 154: Slope coefficient for secondary mathematics achievement

Coefficients[a]

		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
Model		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	12.599	5.028		2.506	.015	2.513	22.684
	Portfolio Size	-.707	.180	-.474	-3.918	.000	-1.068	-.345

a. Dependent Variable: Diff Math Ach FY15-14

Table 155: Durbin-Watson statistic for secondary English Language Arts achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.414[a]	.171	.155	4.270	2.086

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff ELA Ach FY15-14

Table 156: ANOVA for secondary English Language Arts achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	199.367	1	199.367	10.934	.002[b]
	Residual	966.342	53	18.233		
	Total	1165.709	54			

a. Dependent Variable: Diff ELA Ach FY15-14

b. Predictors: (Constant), Portfolio Size

Table 157: Slope coefficient for secondary English Language Arts achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-12.309	2.263		-5.440	.000	-16.848	-7.770
	Portfolio Size	.268	.081	.414	3.307	.002	.106	.431

a. Dependent Variable: Diff ELA Ach FY15-14

Secondary 2015-2016

For secondary schools in school year 2015-2016, there was independence of residuals as assessed by a Durbin-Watson statistic of 1.882 and 1.814 for mathematics and English Language Arts, respectively. Principal supervisor portfolio sizes accounted for 2.0% of variation in mathematics achievement with an adjusted R^2 = 0.2% and 0.6% variation in English Language Arts achievement with an adjusted R^2 = -1.3%. In the regression model principal supervisor portfolio sizes were not statistically significant in predicting mathematics achievement, F(1, 53) = 1.107, p = .297. Principal supervisor portfolio sizes were not statistically significant in predicting English Language Arts achievement, F(1, 53) = .318, p = .575. Moreover, the slope coefficient was not statistically significant for mathematics achievement, p = .297, and not statistically significant for English Language Arts achievement, p = .575. Tables 158 to 163 illustrate the results of the statistical analyses.

Table 158: Durbin-Watson statistic for secondary mathematics achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.143[a]	.020	.002	4.853	1.882

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff Math Ach FY16-15

Table 159: ANOVA for secondary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	26.083	1	26.083	1.107	.297[b]
	Residual	1248.354	53	23.554		
	Total	1274.436	54			

a. Dependent Variable: Diff Math Ach FY16-15

b. Predictors: (Constant), Portfolio Size

Table 160: Slope coefficient for secondary mathematics achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	3.272	2.572		1.272	.209	-1.887	8.431
	Portfolio Size	-.097	.092	-.143	-1.052	.297	-.282	.088

a. Dependent Variable: Diff Math Ach FY16-15

Table 161: Durbin-Watson statistic for secondary English-Language Arts achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.077[a]	.006	-.013	2.862	1.814

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff ELA Ach FY16-15

Table 162: ANOVA for secondary English-Language Arts achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.604	1	2.604	.318	.575[b]
	Residual	434.233	53	8.193		
	Total	436.836	54			

a. Dependent Variable: Diff ELA Ach FY16-15

b. Predictors: (Constant), Portfolio Size

Table 163: Slope Coefficient for secondary English-Language Arts achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.882	1.517		.581	.564	-2.161	3.924
	Portfolio Size	-.031	.054	-.077	-.564	.575	-.140	.078

a. Dependent Variable: Diff ELA Ach FY16-15

Secondary Schools 2016-2017

For secondary schools in school year 2016-2017, there was independence of residuals as assessed by a Durbin-Watson statistic of 2.139 and 2.350 for mathematics and English Language Arts, respectively. Principal supervisor portfolio sizes accounted for 1.4% of variation in mathematics achievement with an adjusted R^2 = -0.4% and 2.9% variation in English Language Arts achievement with an adjusted R^2 = 1.1%. In the regression model principal supervisor portfolio sizes were not statistically significant in predicting mathematics achievement, F(1, 55) = .791, p = .378. Principal supervisor portfolio sizes were not statistically significant in predicting English Language Arts achievement, F(1, 55) = 1.637, p = .206. Moreover, the slope coefficient was not statistically significant for mathematics achievement, p = .378, and not statistically significant for English Language Arts achievement, p = .206. Tables 164 to 169 illustrate the results of the statistical analyses.

Table 164: Durbin-Watson statistic for secondary mathematics achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.119[a]	.014	-.004	4.335	2.139

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff Math Ach FY17-16

Table 165: ANOVA for secondary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.859	1	14.859	.791	.378[b]
	Residual	1033.808	55	18.797		
	Total	1048.667	56			

a. Dependent Variable: Diff Math Ach FY17-16

b. Predictors: (Constant), Portfolio Size

Table 166: Slope coefficient for secondary mathematics achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	2.393	2.025		1.182	.242	-1.665	6.451
	Portfolio Size	-.114	.129	-.119	-.889	.378	-.372	.143

a. Dependent Variable: Diff Math Ach FY17-16

Table 167: Durbin-Watson statistic for secondary English Language Arts achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.170[a]	.029	.011	2.942	2.350

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff ELA Ach FY17-16

Table 168: ANOVA for secondary English Language Arts achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.169	1	14.169	1.637	.206[b]
	Residual	476.076	55	8.656		
	Total	490.246	56			

a. Dependent Variable: Diff ELA Ach FY17-16

b. Predictors: (Constant), Portfolio Size

Table 169: Slope coefficient for secondary English Language Arts achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-1.511	1.374		-1.099	.276	-4.264	1.243
	Portfolio Size	.112	.087	.170	1.279	.206	-.063	.286

a. Dependent Variable: Diff ELA Ach FY17-16

Secondary Schools 2017-2018

For secondary schools in school year 2017-2018, there was independence of residuals as assessed by a Durbin-Watson statistic of 2.240 and 2.004 for mathematics and English Language Arts, respectively. Principal supervisor portfolio sizes accounted for 0.0% of variation in mathematics achievement with an adjusted R^2 = -1.8% and 0.6% variation in English Language Arts achievement with an adjusted R^2 = -1.2%. In the regression model, principal supervisor portfolio sizes were not statistically significant in predicting mathematics achievement, F(1, 55) = .020, p = .887. Principal supervisor portfolio sizes were not statistically significant in predicting English Language Arts achievement, F(1, 55) = .328, p = .569. Moreover, the slope coefficient was not statistically significant for mathematics achievement, p = .887, and not statistically significant for English Language Arts achievement, p = .569. Tables 170 to 175 illustrate the results of the statistical analyses.

Table 170: Durbin-Watson statistic for secondary mathematics achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.019[a]	.000	-.018	5.815	2.240

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff Math Ach FY18-17

Table 171: ANOVA for secondary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.689	1	.689	.020	.887[b]
	Residual	1859.977	55	33.818		
	Total	1860.667	56			

a. Dependent Variable: Diff Math Ach FY18-17

b. Predictors: (Constant), Portfolio Size

Table 172: Slope coefficient for secondary mathematics achievement

Coefficients[a]

		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
Model		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	1.039	2.716		.382	.704	-4.405	6.482
	Portfolio Size	-.025	.172	-.019	-.143	.887	-.370	.321

a. Dependent Variable: Diff Math Ach FY18-17

Table 173: Durbin-Watson statistic for secondary English Language Arts achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.077[a]	.006	-.012	3.118	2.045

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff ELA Ach FY18-17

Table 174: ANOVA for secondary English Language Arts achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.187	1	3.187	.328	.569[b]
	Residual	534.742	55	9.723		
	Total	537.930	56			

a. Dependent Variable: Diff ELA Ach FY18-17

b. Predictors: (Constant), Portfolio Size

Table 175: Slope coefficient for secondary English Language Arts achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	1.835	1.456		1.260	.213	-1.084	4.753
	Portfolio Size	-.053	.092	-.077	-.573	.569	-.238	.132

a. Dependent Variable: Diff ELA Ach FY18-17

Secondary Schools 2018-2019

For secondary schools in school year 2018-2019, there was independence of residuals as assessed by a Durbin-Watson statistic of 1.771 and 1.784 for mathematics and English Language Arts, respectively. Principal supervisor portfolio sizes accounted for 0.1% of variation in mathematics achievement with an adjusted R^2 = -1.7% and 0.1% variation in English Language Arts achievement with an adjusted R^2 = -1.7%. In the regression model principal supervisor portfolio sizes were not statistically significant in predicting mathematics achievement, F(1, 55) = .043, p = .837. Principal supervisor portfolio sizes were not statistically significant in predicting English Language Arts achievement, F(1, 55) = .046, p = .831. Moreover, the slope coefficient was not statistically significant for mathematics achievement, p = .837, and not statistically significant for English Language Arts achievement, p = .831. Tables 176 to 181 illustrate the results of the statistical analyses.

Table 176: Durbin-Watson statistic for secondary mathematics achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.028[a]	.001	-.017	5.216	1.771

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff Math Ach FY19-FY18

Table 177: ANOVA for secondary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.163	1	1.163	.043	.837[b]
	Residual	1496.206	55	27.204		
	Total	1497.368	56			

a. Dependent Variable: Diff Math Ach FY19-FY18

b. Predictors: (Constant), Portfolio Size

Table 178: Slope coefficient for secondary mathematics achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-.378	2.436		-.155	.877	-5.260	4.504
	Portfolio Size	.032	.155	.028	.207	.837	-.278	.342

a. Dependent Variable: Diff Math Ach FY19-FY18

Table 179: Durbin-Watson statistic for secondary English Language Arts achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.029[a]	.001	-.017	2.835	1.784

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff ELA Ach FY19-18

Table 180: ANOVA for secondary English Language Arts achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.370	1	.370	.046	.831[b]
	Residual	442.191	55	8.040		
	Total	442.561	56			

a. Dependent Variable: Diff ELA Ach FY19-18

b. Predictors: (Constant), Portfolio Size

Table 181: Slope coefficient for secondary English Language Arts achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	1.027	1.324		.775	.441	-1.627	3.681
	Portfolio Size	-.018	.084	-.029	-.215	.831	-.187	.150

a. Dependent Variable: Diff ELA Ach FY19-18

A simple linear regression was conducted to analyze the impact of reducing principal supervisors' span of control on school academic outcomes for Title I schools. 100% of the individual analyses conducted for school years post change in reducing principal supervisors' span of control were not statistically significant, $p > 0.05$. Additionally, 58% of the individual analyses conducted for school years prior to changes in principal supervisors' span of control was not statistically significant, $p > 0.05$. The null hypothesis proposed that no correlation exists in the reduction of principal supervisors' span of control and schools' academic outcomes for Title I schools measured by student achievement on mathematics and English Language Arts assessments. The null hypothesis is accepted since no significant relationship exists between reducing principal supervisors span of control and school academic outcomes for Title I schools. Tables 182 and 83 summarize the statistical significance of the analyses performed.

Table 182: Summary of Statistical Significance for Research Question 3 Title I Elementary Schools

Elementary Schools	Statistically Significant	
School Year	**Math**	**ELA**
2013-2014	Yes	No
2014-2015	Yes	No
2015-2016	Yes	No
2016-2017	No	No
2017-2018	No	No
2018-2019	No	No

Table 183: Summary of Statistical Significance for Research Question 3 Title I Secondary Schools

Secondary Schools	Statistically Significant	
School Year	**Math**	**ELA**
2013-2014	No	No
2014-2015	Yes	Yes
2015-2016	No	No
2016-2017	No	No
2017-2018	No	No
2018-2019	No	No

Data Analysis for Research Question 4

What impact does a reduced principal supervisors' span of control have on schools' percent of students passing mathematics assessments and English language arts assessments with a level 3 or above on the Florida Standards Assessment for a period of three consecutive years?

h_{04}: There is no correlation in the reduction of principal supervisors' span of control and percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment for a period of three consecutive years?

The fourth research question was analyzed using a simple linear regression. The relationships between the two variables, principal supervisor portfolio sizes and school performance, were measured for overall impact on student academic outcomes for a period of three consecutive years. The analysis was performed for the three years post reduction in principal supervisors' span of control. School years 2016-2017, 2017-2018, 2018-2019 are the three school years after the reduction in principal supervisors' span of control. The outcome variable was comprised of the difference between academic outcomes from the initial reduction in principal supervisors' span of control and the last school year of the study. The analysis was conducted for each school level, elementary and secondary, DA schools, Title I schools, and also separately for mathematics and English Language Arts assessments. Reporting of secondary DA schools was excluded due to an inadequate sample size.

The simple linear regression involves several assumptions: having a continuous dependent and independent variable, a linear relationship between variables, independence of observations, no significant outliers, homoscedasticity, a normal distribution of residuals along the regression line. Preliminary analysis conducted for the first research question determined no assumptions were violated. A visual inspection of scatterplots of both variables confirmed linearity. The Durbin-Watson statistic, reported below for each analysis, was used to confirm independence of observations. Minimal outliers were observed for some analysis. The linear regression was performed with and without the outliers with no substantial differences in the results. Consequently, the analysis was performed with the outliers. Homoscedasticity was confirmed by a visual inspection of scatterplots of standard residuals and predicted values. Based on the visual inspection of histograms and normal probability plots residuals were normally distributed.

Elementary Schools Post-Change

For elementary schools, there was independence of residuals as assessed by a Durbin-Watson statistic of 1.539 and 1.894 for mathematics and English Language Arts, respectively. Principal supervisor portfolio sizes accounted for 7.7% of variation in mathematics achievement with an adjusted R^2 = 7.3% and 3.9% variation in English Language Arts achievement with an adjusted R^2 = 3.5%. In the regression model principal supervisor portfolio sizes were statistically significant in predicting mathematics achievement, $F(1, 239) = 19.933$, $p < .0005$. Principal supervisor portfolio sizes were statistically significant in predicting English Language Arts achievement, $F(1, 239) = 9.768$, $p = .002$. Moreover, the slope coefficient was statistically significant for mathematics achievement, $p < .0005$, and statistically significant for English Language Arts achievement, $p = .002$. Tables 183 to 188 illustrate the results of the statistical analyses.

Table 183: Durbin-Watson statistic for elementary mathematics achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.277[a]	.077	.073	8.364	1.539

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff 3yr Math Ach

Table 184: ANOVA for elementary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1394.580	1	1394.580	19.933	.000[b]
	Residual	16721.320	239	69.964		
	Total	18115.900	240			

a. Dependent Variable: Diff 3yr Math Ach

b. Predictors: (Constant), Portfolio Size

Table 185: Slope coefficient for elementary mathematics achievement

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	95.0% Confidence Interval for B Lower Bound	95.0% Confidence Interval for B Upper Bound
1	(Constant)	17.792	2.647		6.723	.000	12.579	23.006
	Portfolio Size	-.833	.187	-.277	-4.465	.000	-1.201	-.466

a. Dependent Variable: Diff 3yr Math Ach

Table 186: Durbin-Watson statistic of elementary English Language Arts achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.198[a]	.039	.035	6.163	1.894

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff 3yr ELA Ach

Table 187: ANOVA of elementary English Language Arts achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	370.977	1	370.977	9.768	.002[b]
	Residual	9077.106	239	37.980		
	Total	9448.083	240			

a. Dependent Variable: Diff 3yr ELA Ach

b. Predictors: (Constant), Portfolio Size

Table 188: Slope coefficient of elementary English Language Arts achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	12.672	1.950		6.499	.000	8.831	16.513
	Portfolio Size	-.430	.138	-.198	-3.125	.002	-.701	-.159

a. Dependent Variable: Diff 3yr ELA Ach

DA Elementary Schools Post-Change

For elementary schools in the DA program, there was independence of residuals as assessed by a Durbin-Watson statistic of 1.629 and 1.921 for mathematics and English Language Arts, respectively. Principal supervisor portfolio sizes accounted for 1.6% of variation in mathematics achievement with an adjusted R^2 = -0.6% and 0.0% variation in English Language Arts achievement with an adjusted R^2 = -2.2%. In the regression model principal supervisor portfolio sizes were not statistically significant in predicting mathematics achievement, $F(1, 45) = .716$, $p = .402$. Principal supervisor portfolio sizes were not statistically significant in predicting English Language Arts achievement, $F(1, 45) = .003$, $p = .956$. Moreover, the slope coefficient was not statistically significant for mathematics achievement, $p = .402$, and not statistically significant for English Language Arts achievement, p = .956. Tables 189 to 194 illustrate the results of the statistical analyses.

Table 189: Durbin-Watson statistic for elementary mathematics achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.125[a]	.016	-.006	9.788	1.629

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff 3yr Math Ach

Table 190: ANOVA for elementary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	68.569	1	68.569	.716	.402[b]
	Residual	4311.303	45	95.807		
	Total	4379.872	46			

a. Dependent Variable: Diff 3yr Math Ach

b. Predictors: (Constant), Portfolio Size

Table 191: Slope coefficient for elementary mathematics achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	8.713	6.165		1.413	.164	-3.704	21.131
	Portfolio Size	.446	.527	.125	.846	.402	-.615	1.507

a. Dependent Variable: Diff 3yr Math Ach

Table 192: Durbin-Watson statistic for elementary English Language Arts achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.008[a]	.000	-.022	8.294	1.921

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff 3yr ELA Ach

Table 193: ANOVA for elementary English Language Arts achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.213	1	.213	.003	.956[b]
	Residual	3095.489	45	68.789		
	Total	3095.702	46			

a. Dependent Variable: Diff 3yr ELA Ach

b. Predictors: (Constant), Portfolio Size

Table 194: Slope coefficient for elementary English Language Arts achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	10.185	5.224		1.950	.057	-.337	20.707
	Portfolio Size	.025	.446	.008	.056	.956	-.874	.924

a. Dependent Variable: Diff 3yr ELA Ach

Title I Elementary Schools Post-Change

For Title I elementary schools, there was independence of residuals as assessed by a Durbin-Watson statistic of 1.555 and 1.889 for mathematics and English Language Arts, respectively. Principal supervisor portfolio sizes accounted for 4.5% of variation in mathematics achievement with an adjusted R^2 = 3.9% and 2.2% variation in English Language Arts achievement with an adjusted R^2 = 1.6%. In the regression model principal supervisor portfolio sizes were statistically significant in predicting mathematics achievement, F(1, 171) = 7.991, p = .005. Principal supervisor portfolio sizes were not statistically significant in predicting English Language Arts achievement, F(1, 171) = 3.820, p = .052. Moreover, the slope coefficient was statistically significant for mathematics achievement, p = .005, and not statistically significant for English Language Arts achievement, p = .052. Tables 195 to 200 illustrate the results of the statistical analyses.

Table 195: Durbin-Watson statistic for elementary mathematics achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.211[a]	.045	.039	9.371	1.555

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff 3yr Math Ach

Table 196: ANOVA for elementary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	701.737	1	701.737	7.991	.005[b]
	Residual	15016.818	171	87.818		
	Total	15718.555	172			

a. Dependent Variable: Diff 3yr Math Ach

b. Predictors: (Constant), Portfolio Size

Table 197: Slope coefficient for elementary mathematics achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	16.232	3.113		5.214	.000	10.086	22.377
	Portfolio Size	-.647	.229	-.211	-2.827	.005	-1.099	-.195

a. Dependent Variable: Diff 3yr Math Ach

Table 198: Durbin-Watson statistic for elementary English Language Arts achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.148[a]	.022	.016	6.879	1.889

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff 3yr ELA Ach

Table 199: ANOVA for elementary English Language Arts achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	180.764	1	180.764	3.820	.052[b]
	Residual	8091.433	171	47.318		
	Total	8272.197	172			

a. Dependent Variable: Diff 3yr ELA Ach

b. Predictors: (Constant), Portfolio Size

Table 200: Slope coefficient for elementary English Language Arts achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	11.770	2.285		5.150	.000	7.259	16.281
	Portfolio Size	-.328	.168	-.148	-1.955	.052	-.660	.003

a. Dependent Variable: Diff 3yr ELA Ach

Secondary Schools Post-Change

For secondary schools, there was independence of residuals as assessed by a Durbin-Watson statistic of 2.159 and 1.894 for mathematics and English Language Arts, respectively. Principal supervisor portfolio sizes accounted for 2.5% of variation in mathematics achievement with an adjusted R^2 = 1.7% and 3.9% variation in English Language Arts achievement with an adjusted R^2 = 3.5%. In the regression model principal supervisor portfolio sizes were not statistically significant in predicting mathematics achievement, $F(1, 117) = 2.980$, $p = .087$. Principal supervisor portfolio sizes were statistically significant in predicting English Language Arts achievement, $F(1, 117) = 9.768$, $p = .002$. Moreover, the slope coefficient was not statistically significant for mathematics achievement, $p = .087$, and statistically significant for English Language Arts achievement, $p = .002$. Tables 201 to 206 illustrate the results of the statistical analyses.

Table 201: Durbin-Watson statistic for secondary mathematics achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.158[a]	.025	.017	7.044	2.159

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff 3yr Math Ach

Table 202: ANOVA for secondary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	147.868	1	147.868	2.980	.087[b]
	Residual	5805.124	117	49.616		
	Total	5952.992	118			

a. Dependent Variable: Diff 3yr Math Ach

b. Predictors: (Constant), Portfolio Size

Table 203: Slope coefficient for secondary mathematics achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	7.176	2.499		2.872	.005	2.227	12.124
	Portfolio Size	-.294	.171	-.158	-1.726	.087	-.632	.043

a. Dependent Variable: Diff 3yr Math Ach

Table 204: Durbin-Watson statistic for secondary English Language Arts achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.198[a]	.039	.035	6.163	1.894

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff 3yr ELA Ach

Table 205: ANOVA for secondary English Language Arts achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	370.977	1	370.977	9.768	.002[b]
	Residual	9077.106	239	37.980		
	Total	9448.083	240			

a. Dependent Variable: Diff 3yr ELA Ach

b. Predictors: (Constant), Portfolio Size

Table 206: Slope coefficient for secondary English Language Arts achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	12.672	1.950		6.499	.000	8.831	16.513
	Portfolio Size	-.430	.138	-.198	-3.125	.002	-.701	-.159

a. Dependent Variable: Diff 3yr ELA Ach

Title I Secondary Schools Post-Change

For Title I schools, there was independence of residuals as assessed by a Durbin-Watson statistic of 1.840 and 1.781 for mathematics and English Language Arts, respectively. Principal supervisor portfolio sizes accounted for 0.5% of variation in mathematics achievement with an adjusted R^2 = -1.3% and 0.3% variation in English Language Arts achievement with an adjusted R^2 = -1.5%. In the regression model principal supervisor portfolio sizes were not statistically significant in predicting mathematics achievement, F(1, 55) = .294, p = .590. Principal supervisor portfolio sizes were not statistically significant in predicting English Language Arts achievement, F(1, 55) = .167, p = .685. Moreover, the slope coefficient was not statistically significant for mathematics achievement, p = .590, and not statistically significant for English Language Arts achievement, p = .685. Tables 207 to 212 illustrate the results of the statistical analyses.

Table 207: Durbin-Watson statistic for secondary mathematics achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.073[a]	.005	-.013	6.648	1.840

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff 3yr Math Ach

Table 208: ANOVA for secondary mathematics achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.007	1	13.007	.294	.590[b]
	Residual	2431.028	55	44.201		
	Total	2444.035	56			

a. Dependent Variable: Diff 3yr Math Ach

b. Predictors: (Constant), Portfolio Size

Table 209: Slope coefficient for secondary mathematics achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	3.054	3.105		.983	.330	-3.169	9.277
	Portfolio Size	-.107	.197	-.073	-.542	.590	-.502	.288

a. Dependent Variable: Diff 3yr Math Ach

Table 210: Durbin-Watson statistic for secondary English Language Arts achievement

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.055[a]	.003	-.015	3.358	1.781

a. Predictors: (Constant), Portfolio Size

b. Dependent Variable: Diff 3yr ELA Ach

Table 211: ANOVA for secondary English Language Arts achievement

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.878	1	1.878	.167	.685[b]
	Residual	620.052	55	11.274		
	Total	621.930	56			

a. Dependent Variable: Diff 3yr ELA Ach

b. Predictors: (Constant), Portfolio Size

Table 212: Slope coefficient for secondary English Language Arts achievement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	1.351	1.568		.862	.393	-1.792	4.494
	Portfolio Size	.041	.100	.055	.408	.685	-.159	.240

a. Dependent Variable: Diff 3yr ELA Ach

A simple linear regression was conducted to analyze the impact of reducing principal supervisors' span of control on school academic outcomes over a span of three years. 60% of the individual analyses conducted was not statistically significant, $p > 0.05$. The null hypothesis proposed that no correlation exist in the reduction of principal supervisors' span of control and schools' academic outcomes over a period of three years measured by student achievement on mathematics and English Language Arts assessments. The null hypothesis is accepted since no significant relationship exists between reducing principal supervisors span of control and school academic outcomes over a period of three consecutive years. Tables 213 and 214 summarize the statistical significance of the analyses performed.

Table 213: Summary of Statistical Significance for Research Question 4 Post Change Elementary Schools

Elementary Schools	Statistically Significant	
School Type	**Math**	**ELA**
All	Yes	Yes
DA	No	No
Title 1	Yes	No

Table 214: Summary of Statistical Significance for Research Question 4 Post Change Secondary Schools

Secondary Schools	Statistically Significant	
School Type	**Math**	**ELA**
All	No	Yes
Title 1	No	No

Data Analysis for Research Question 5

Which principal supervisors' leadership portfolio size has the greatest impact on schools' percent of students passing mathematics assessments and English language arts assessments with a level 3 or above on the Florida Standards Assessment?

h_{05}: There is no correlation in the varied sizes of principal supervisors' leadership portfolios and percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment.

The fifth research question was analyzed using a multivariate analysis of variance (MANOVA), a one-way analysis of variance (ANOVA), and Tukey post hoc test. The MANOVA was used to analyze the impact of various principal supervisor portfolio size groups on mathematics and English Language Arts performance simultaneously. The ANOVA and Tukey post hoc test were used to analyze the impact of various principal supervisor portfolio size groups on mathematics and English Language Arts separately. The Tukey post hoc test further analyzed the differences between group means when the ANOVA was statistically significant. Portfolio size groups used for the analyses were 1-14, 15, 16 or more for elementary school principal supervisor portfolios and 1-11, 12-15, 16 or more for secondary school principal supervisor portfolios. The number of schools for elementary school portfolio size intervals 1-14, 15, 16 or more were 93, 89, and 59, respectively. The number of schools for secondary school portfolio size intervals 1-11, 12-15, 16 or more were 40, 42, and 37, respectively. Size intervals were chosen to correlate with current and past portfolio sizes of principal supervisors that were involved in the study. The portfolio size intervals also provided the best sample sizes without compromising leadership portfolios by removing schools from them. Since the study was focused on the number of schools within a principal supervisor's portfolio, removing schools from a portfolio to create an even distribution of schools for the analysis would skew results and alter the purpose of the study. Principal supervisors' portfolios also included non-Title I and non-DA schools as well as Title I and DA schools. Title I and DA schools within principal supervisor portfolios were analyzed separate within the same group size intervals.

The analysis was performed for the three years post reduction in principal supervisors' span of control. School years 2016-2017, 2017-2018, 2018-2019 are the three school years after the reduction in principal supervisors' span of control. The outcome variables were comprised of the difference between academic outcomes from the initial reduction in principal supervisors' span of control and the last school year of the study. The analysis was conducted for school level, elementary and secondary, DA schools, Title I schools, mathematics, and English Language Arts assessments. The reporting of elementary and secondary DA schools were excluded due to inadequate sample sizes that violated assumptions for analysis.

The MANOVA involves several assumptions: having two or more continuous dependent variables, a categorical independent variable with two or more independent groups, independence of variance, no univariate or multivariate outliers, multivariate normality, no multicollinearity, linear relationships between dependent variables for each group of the independent variable, an adequate sample size, similar variances and covariances, homogeneity of variances. The ANOVA involves several assumptions some similar the MANOVA: a continuous dependent variable, a categorical independent variable with two or more groups, no significant outliers, an approximately normally distributed dependent variable for each group of the dependent variable, homogeneity of variances. Assumptions for both the MANOVA and ANOVA were reported by the analyses below. Linearity for the MANOVA was confirmed by a visual inspection of scatterplots of both variables. Minimal outliers were observed for some analysis. Analysis were performed with and without the outliers with no substantial differences in the results. Consequently, the analysis was performed with the outliers. Some tests, Box's test and Levene's test, violated one or two assumptions but analysis was still conducted since these tests did not significantly alter results (Glass & Hopkins, 1996; Montgomery, Peck, & Vining, 2012).

Elementary Schools MANOVA

For elementary schools, Box's test determined there was no homogeneity of variance-covariances matrices due to the test being statistically significant ($p < .05$). There was not homogeneity of variances based on Levene's test being statistically significant ($p < .05$). Student achievement increases for both mathematics and English Language Arts were the highest for schools in portfolio size group 1-14 (n = 93; M = 8.67, SD = 7.147; M = 10.05, SD 10.11, respectively). Portfolio size group 15 had the second highest student achievement increases for English Language Arts and the third highest for Mathematics (n = 89; M = 5.61, SD = 5.443; M = 3.90, SD = 6.461, respectively). Portfolio size group 16 or more had the third highest student achievement increase for English Language Arts and the second highest achievement for mathematics (n = 59; M = 5.27, SD = 5.179; M = 3.76, SD = 6.794, respectively). There was a statistically significant difference between the portfolio size groups on the combined dependent variables, $F(4, 474) = 8.268$, $p < .0005$; Wilks' $\Lambda = .874$; partial $n^2 = .065$. There was a statistically significant difference in student achievement for mathematics between the portfolio size groups, $F(2,238) = 16.634$, $p < .0005$; partial $n^2 = .123$. There was also statistically significant difference in student achievement increases for English Language Arts between the portfolio size groups, $F(2, 238) = 7.876$, $p < .0005$; partial $n^2 = .062$. Tables 215 to 220 illustrate the results of the statistical analyses.

Table 215: Box's test for portfolio size groups and combined achievement for elementary schools

Box's Test of Equality of Covariance Matrices[a]

Box's M	31.789
F	5.231
df1	6
df2	597551.869
Sig.	.000

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a. Design: Intercept + Group

Table 216: Levene's test for homogeneity of variances for elementary schools

Levene's Test of Equality of Error Variances[a]

		Levene Statistic	df1	df2	Sig.
Diff 3yr ELA Ach	Based on Mean	6.276	2	238	.002
	Based on Median	6.208	2	238	.002
	Based on Median and with adjusted df	6.208	2	227.815	.002
	Based on trimmed mean	6.271	2	238	.002
Dif 3yr Math Ach	Based on Mean	9.251	2	238	.000
	Based on Median	9.109	2	238	.000
	Based on Median and with adjusted df	9.109	2	212.472	.000
	Based on trimmed mean	9.214	2	238	.000

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Group

Table 217: Descriptive statistics for mean achievement increases per principal supervisor group for elementary schools

Descriptive Statistics

	Portfolio Size Range	Mean	Std. Deviation	N
Diff 3yr ELA Ach	Portfolio Size 1-14	8.67	7.147	93
	Portfolio Size 15	5.61	5.443	89
	Portfolio Size 16 or More	5.27	5.179	59
	Total	6.71	6.274	241
Dif 3yr Math Ach	Portfolio Size 1-14	10.05	10.114	93
	Portfolio Size 15	3.76	6.794	89
	Portfolio Size 16 or More	3.90	6.461	59
	Total	6.22	8.688	241

Table 218: Mean achievement increases per principal supervisor group for elementary schools

Portfolio Size Range

				95% Confidence Interval	
Dependent Variable	Portfolio Size Range	Mean	Std. Error	Lower Bound	Upper Bound
Diff 3yr ELA Ach	Portfolio Size 1-14	8.667	.633	7.420	9.913
	Portfolio Size 15	5.607	.647	4.333	6.881
	Portfolio Size 16 or More	5.271	.794	3.706	6.836
Dif 3yr Math Ach	Portfolio Size 1-14	10.054	.847	8.384	11.723
	Portfolio Size 15	3.764	.866	2.058	5.471
	Portfolio Size 16 or More	3.898	1.064	1.802	5.994

Table 219: Wilks' Lambda test for principal supervisor groups and combined achievement increases for elementary schools

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.531	134.138[b]	2.000	237.000	.000	.531
	Wilks' Lambda	.469	134.138[b]	2.000	237.000	.000	.531
	Hotelling's Trace	1.132	134.138[b]	2.000	237.000	.000	.531
	Roy's Largest Root	1.132	134.138[b]	2.000	237.000	.000	.531
Group	Pillai's Trace	.126	8.021	4.000	476.000	.000	.063
	Wilks' Lambda	.874	8.268[b]	4.000	474.000	.000	.065
	Hotelling's Trace	.144	8.512	4.000	472.000	.000	.067
	Roy's Largest Root	.143	17.060[c]	2.000	238.000	.000	.125

a. Design: Intercept + Group

b. Exact statistic

c. The statistic is an upper bound on F that yields a lower bound on the significance level.

Table 220: Univariate test for principal supervisor groups and achievement increases for elementary schools

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	Diff 3yr ELA Ach	586.519[a]	2	293.260	7.876	.000	.062
	Dif 3yr Math Ach	2221.734[b]	2	1110.867	16.634	.000	.123
Intercept	Diff 3yr ELA Ach	9810.293	1	9810.293	263.481	.000	.525
	Dif 3yr Math Ach	8060.566	1	8060.566	120.699	.000	.336
Group	Diff 3yr ELA Ach	586.519	2	293.260	7.876	.000	.062
	Dif 3yr Math Ach	2221.734	2	1110.867	16.634	.000	.123
Error	Diff 3yr ELA Ach	8861.564	238	37.233			
	Dif 3yr Math Ach	15894.166	238	66.782			
Total	Diff 3yr ELA Ach	20284.000	241				
	Dif 3yr Math Ach	27452.000	241				
Corrected Total	Diff 3yr ELA Ach	9448.083	240				
	Dif 3yr Math Ach	18115.900	240				

a. R Squared = .062 (Adjusted R Squared = .054)

b. R Squared = .123 (Adjusted R Squared = .115)

Title I Elementary Schools MANOVA

For Title I elementary schools, Box's test determined there was homogeneity of variance-covariances matrices due to the test not being statistically significant ($p = .226$). For dependent variables mathematics achievement and English Language Arts achievement there was homogeneity of variances based on Levene's test not being statistically significant ($p = .262$; $p = 269$, respectively). Student achievement increases for both mathematics and English Language Arts were the highest for schools in portfolio size group 1-14 ($n = 89$; $M = 10.36$, $SD = 10.223$; $M = 8.78$, SD 7.52, respectively). Portfolio size group 15 had the third highest student achievement increases for mathematics and English Language Arts ($n = 54$; $M = 4.37$, $SD = 8.173$; $M = 5.80$, $SD = 6.609$, respectively). Portfolio size group 16 or more had the second highest student achievement increase for mathematics and English Language Arts ($n = 30$; $M = 5.60$, $SD = 7.477$; $M = 6.33$, $SD = 5.839$, respectively). There was a statistically significant difference between the portfolio size groups on the combined dependent variables, $F(4, 338) = 3.990$, $p = .004$; Wilks' $\Lambda = .912$; partial $n^2 = .045$. There was a statistically significant difference in student achievement for mathematics between the portfolio size groups, $F(2, 170) = 8.053$, $p < .0005$; partial $n^2 = .087$. There was also statistically significant difference in student achievement increases for English Language Arts between the portfolio size groups, $F(2, 170) = 3.658$, $p = .028$; partial $n^2 = .041$. Tables 221 to 226 illustrate the results of the statistical analyses.

Table 221: Box's test for portfolio size groups and combined achievement for Title I elementary schools

Box's Test of Equality of Covariance Matrices[a]

Box's M	8.348
F	1.362
df1	6
df2	84046.856
Sig.	.226

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a. Design: Intercept + Group

Table 222: Levene's test for homogeneity of variances for Title I elementary schools

Levene's Test of Equality of Error Variances[a]

		Levene Statistic	df1	df2	Sig.
Diff 3yr ELA Ach	Based on Mean	1.322	2	170	.269
	Based on Median	1.404	2	170	.248
	Based on Median and with adjusted df	1.404	2	168.147	.248
	Based on trimmed mean	1.351	2	170	.262
Dif 3yr Math Ach	Based on Mean	2.178	2	170	.116
	Based on Median	2.230	2	170	.111
	Based on Median and with adjusted df	2.230	2	159.840	.111
	Based on trimmed mean	2.185	2	170	.116

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Group

Table 223: Descriptive statistics for mean achievement increases per principal supervisor group for Title I elementary schools

Descriptive Statistics

	Portfolio Size Range	Mean	Std. Deviation	N
Diff 3yr ELA Ach	Portfolio Size 1-14	8.78	7.252	89
	Portfolio Size 15	5.80	6.609	54
	Portfolio Size 16 or More	6.33	5.839	30
	Total	7.42	6.935	173
Dif 3yr Math Ach	Portfolio Size 1-14	10.36	10.223	89
	Portfolio Size 15	4.37	8.173	54
	Portfolio Size 16 or More	5.60	7.477	30
	Total	7.66	9.560	173

Table 224: Mean achievement increases per principal supervisor group for Title I elementary schools

Portfolio Size Range

				95% Confidence Interval	
Dependent Variable	Portfolio Size Range	Mean	Std. Error	Lower Bound	Upper Bound
Diff 3yr ELA Ach	Portfolio Size 1-14	8.775	.724	7.346	10.204
	Portfolio Size 15	5.796	.929	3.961	7.631
	Portfolio Size 16 or More	6.333	1.247	3.872	8.795
Dif 3yr Math Ach	Portfolio Size 1-14	10.360	.974	8.437	12.283
	Portfolio Size 15	4.370	1.251	1.902	6.839
	Portfolio Size 16 or More	5.600	1.678	2.288	8.912

Table 225: Wilks' Lambda test for principal supervisor groups and combined achievement increases for Title I elementary schools

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.476	76.787[b]	2.000	169.000	.000	.476
	Wilks' Lambda	.524	76.787[b]	2.000	169.000	.000	.476
	Hotelling's Trace	.909	76.787[b]	2.000	169.000	.000	.476
	Roy's Largest Root	.909	76.787[b]	2.000	169.000	.000	.476
Group	Pillai's Trace	.088	3.919	4.000	340.000	.004	.044
	Wilks' Lambda	.912	3.990[b]	4.000	338.000	.004	.045
	Hotelling's Trace	.097	4.060	4.000	336.000	.003	.046
	Roy's Largest Root	.097	8.215[c]	2.000	170.000	.000	.088

a. Design: Intercept + Group

b. Exact statistic

c. The statistic is an upper bound on F that yields a lower bound on the significance level.

Table 226: Univariate test for principal supervisor groups and achievement increases for Title I elementary schools

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	Diff 3yr ELA Ach	341.265[a]	2	170.632	3.658	.028	.041
	Dif 3yr Math Ach	1360.268[b]	2	680.134	8.053	.000	.087
Intercept	Diff 3yr ELA Ach	6927.096	1	6927.096	148.483	.000	.466
	Dif 3yr Math Ach	6551.277	1	6551.277	77.566	.000	.313
Group	Diff 3yr ELA Ach	341.265	2	170.632	3.658	.028	.041
	Dif 3yr Math Ach	1360.268	2	680.134	8.053	.000	.087
Error	Diff 3yr ELA Ach	7930.932	170	46.653			
	Dif 3yr Math Ach	14358.287	170	84.461			
Total	Diff 3yr ELA Ach	17802.000	173				
	Dif 3yr Math Ach	25882.000	173				
Corrected Total	Diff 3yr ELA Ach	8272.197	172				
	Dif 3yr Math Ach	15718.555	172				

a. R Squared = .041 (Adjusted R Squared = .030)

b. R Squared = .087 (Adjusted R Squared = .076)

Secondary Schools MANOVA

For secondary schools, Box's test determined there was homogeneity of variance-covariances matrices due to the test not being statistically significant ($p = .251$). For dependent variables mathematics achievement and English Language Arts achievement there was homogeneity of variances based on Levene's test not being statistically significant ($p = .749$; $p = .083$, respectively). Student achievement increases for mathematics were the highest for schools in portfolio size group 12-15 ($n = 42$; $M = 4.67$, $SD = 7.261$). Student achievement increases for English Language Arts were the highest for schools in portfolio size group 16 or more ($n = 37$; $M = 1.89$, $SD = 3.134$). Portfolio size group 1-11 had the second highest student achievement increases for mathematics and third highest achievement for English Language Arts ($n = 40$; $M = 3.49$, $SD = 7.092$; $M = 1.58$, $SD = 4.094$, respectively). Portfolio size group 12-15 had the second highest student achievement increase for English Language Arts ($n = 42$; $M = 1.69$, $SD = 3.516$). Portfolio size group 16 or more had the third highest student achievement increases for mathematics ($n = 37$; $M = .70$, $SD = 6.480$). There was not a statistically significant difference between the portfolio size groups on the combined dependent variables, $F(4, 230) = 2.005$, $p = .095$; Wilks' $\Lambda = .934$; partial $n^2 = .034$. There was a statistically significant difference in student achievement for mathematics between the portfolio size groups, $F(2, 116) = 3.277$, $p = .041$; partial $n^2 = .053$. There was not a statistically significant difference in student achievement increases for English Language Arts between the portfolio size groups, $F(2, 116) = .075$, $p = .927$; partial $n^2 = .001$. Tables 227 to 232 illustrate the results of the statistical analyses.

Table 227: Box's test for portfolio size groups and combined achievement for secondary schools

Box's Test of Equality of Covariance Matrices[a]

Box's M	8.026
F	1.304
df1	6
df2	311966.119
Sig.	.251

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a. Design: Intercept + Group

Table 228: Levene's test for homogeneity of variances for secondary schools

Levene's Test of Equality of Error Variances[a]

		Levene Statistic	df1	df2	Sig.
Diff 3yr ELA Ach	Based on Mean	2.545	2	116	.083
	Based on Median	2.241	2	116	.111
	Based on Median and with adjusted df	2.241	2	111.154	.111
	Based on trimmed mean	2.555	2	116	.082
Diff 3yr Math Ach	Based on Mean	.289	2	116	.749
	Based on Median	.273	2	116	.762
	Based on Median and with adjusted df	.273	2	115.532	.762
	Based on trimmed mean	.293	2	116	.747

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Group

Table 229: Descriptive statistics for mean achievement increases per principal supervisor group for secondary schools

Descriptive Statistics

	Portfolio Size Range	Mean	Std. Deviation	N
Diff 3yr ELA Ach	Portfolio Size 1-11	1.58	4.094	40
	Portfolio Size 12-15	1.69	3.516	42
	Portfolio Size 16 or More	1.89	3.134	37
	Total	1.71	3.585	119
Diff 3yr Math Ach	Portfolio Size 1-11	3.40	7.092	40
	Portfolio Size 12-15	4.67	7.261	42
	Portfolio Size 16 or More	.70	6.480	37
	Total	3.01	7.103	119

Table 230: Mean achievement increases per principal supervisor group for secondary schools

Portfolio Size Range

				95% Confidence Interval	
Dependent Variable	Portfolio Size Range	Mean	Std. Error	Lower Bound	Upper Bound
Diff 3yr ELA Ach	Portfolio Size 1-11	1.575	.571	.444	2.706
	Portfolio Size 12-15	1.690	.558	.586	2.795
	Portfolio Size 16 or More	1.892	.594	.715	3.068
Diff 3yr Math Ach	Portfolio Size 1-11	3.400	1.102	1.217	5.583
	Portfolio Size 12-15	4.667	1.075	2.537	6.797
	Portfolio Size 16 or More	.703	1.146	-1.567	2.972

Table 231: Wilks' Lambda test for principal supervisor groups and combined achievement increases for secondary schools

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.235	17.627[b]	2.000	115.000	.000	.235
	Wilks' Lambda	.765	17.627[b]	2.000	115.000	.000	.235
	Hotelling's Trace	.307	17.627[b]	2.000	115.000	.000	.235
	Roy's Largest Root	.307	17.627[b]	2.000	115.000	.000	.235
Group	Pillai's Trace	.066	1.988	4.000	232.000	.097	.033
	Wilks' Lambda	.934	2.005[b]	4.000	230.000	.095	.034
	Hotelling's Trace	.071	2.021	4.000	228.000	.092	.034
	Roy's Largest Root	.070	4.084[c]	2.000	116.000	.019	.066

a. Design: Intercept + Group

b. Exact statistic

c. The statistic is an upper bound on F that yields a lower bound on the significance level.

Table 232 : Univariate test for principal supervisor groups and achievement increases for secondary schools

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	Diff 3yr ELA Ach	1.967[a]	2	.983	.075	.927	.001
	Diff 3yr Math Ach	318.329[b]	2	159.164	3.277	.041	.053
Intercept	Diff 3yr ELA Ach	350.734	1	350.734	26.867	.000	.188
	Diff 3yr Math Ach	1014.047	1	1014.047	20.876	.000	.153
Group	Diff 3yr ELA Ach	1.967	2	.983	.075	.927	.001
	Diff 3yr Math Ach	318.329	2	159.164	3.277	.041	.053
Error	Diff 3yr ELA Ach	1514.319	116	13.054			
	Diff 3yr Math Ach	5634.663	116	48.575			
Total	Diff 3yr ELA Ach	1866.000	119				
	Diff 3yr Math Ach	7030.000	119				
Corrected Total	Diff 3yr ELA Ach	1516.286	118				
	Diff 3yr Math Ach	5952.992	118				

a. R Squared = .001 (Adjusted R Squared = -.016)

b. R Squared = .053 (Adjusted R Squared = .037)

Title I Secondary Schools MANOVA

For secondary schools, Box's test determined there was homogeneity of variance-covariances matrices due to the test not being statistically significant ($p = .133$). For dependent variable mathematics achievement, there was homogeneity of variances based on Levene's test not being statistically significant ($p = .316$). For dependent variable English Language Arts achievement, there was not homogeneity of variances based on Levene's test being statistically significant ($p = .027$). Student achievement increases for mathematics were the highest for schools in portfolio size group 12-15 ($n = 10$; $M = 5.70$, $SD = 8.744$). Student achievement increases for English Language Arts were the highest for schools in portfolio size group 16 or more ($n = 30$; $M = 2.07$, $SD = 3.118$). Portfolio size group 1-11 had the second highest student achievement increases for mathematics and third highest achievement for English Language Arts ($n = 17$; $M = 1.12$, $SD = 5.633$; $M = 1.76$, $SD = 4.309$, respectively). Portfolio size group 12-15 had the second highest student achievement increase for English Language Arts ($n = 10$; $M = 2.00$, $SD = 2.160$). Portfolio size group 16 or more had the third highest student achievement increases for mathematics ($n = 37$; $M = .20$, $SD = 5.927$). There was not a statistically significant difference between the portfolio size groups on the combined dependent variables, $F(4, 106) = 1.475$, $p = .215$; Wilks' $\Lambda = .897$; partial $n^2 = .053$. There was not a statistically significant difference in student achievement for mathematics between the portfolio size groups, $F(2, 54) = 2.796$, $p = .070$; partial $n^2 = .094$. There was not a statistically significant difference in student achievement increases for English Language Arts between the portfolio size groups, $F(2, 54) = .044$, $p = .957$; partial $n^2 = .002$. Tables 233 to 238 illustrate the results of the statistical analyses.

Table 233: Box's test for portfolio size groups and combined achievement for Title I secondary schools

Box's Test of Equality of Covariance Matrices[a]

Box's M	10.549
F	1.637
df1	6
df2	7898.226
Sig.	.133

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a. Design: Intercept + Group

Table 234: Levene's test for homogeneity of variances for Title I secondary schools

Levene's Test of Equality of Error Variances[a]

		Levene Statistic	df1	df2	Sig.
Diff 3yr ELA Ach	Based on Mean	3.883	2	54	.027
	Based on Median	3.134	2	54	.052
	Based on Median and with adjusted df	3.134	2	51.530	.052
	Based on trimmed mean	3.764	2	54	.029
Diff 3yr Math Ach	Based on Mean	1.178	2	54	.316
	Based on Median	.792	2	54	.458
	Based on Median and with adjusted df	.792	2	39.921	.460
	Based on trimmed mean	1.104	2	54	.339

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Group

Table 235: Descriptive statistics for mean achievement increases per principal supervisor group for Title I secondary schools

Descriptive Statistics

	Portfolio Size Range	Mean	Std. Deviation	N
Diff 3yr ELA Ach	Portfolio Size 1-11	1.76	4.309	17
	Portfolio Size 12-15	2.00	2.160	10
	Portfolio Size 16 or More	2.07	3.118	30
	Total	1.96	3.333	57
Diff 3yr Math Ach	Portfolio Size 1-11	1.12	5.633	17
	Portfolio Size 12-15	5.70	8.744	10
	Portfolio Size 16 or More	.20	5.927	30
	Total	1.44	6.606	57

Table 236: Mean achievement increases per principal supervisor group for Title I secondary schools

Portfolio Size Range

				95% Confidence Interval	
Dependent Variable	Portfolio Size Range	Mean	Std. Error	Lower Bound	Upper Bound
Diff 3yr ELA Ach	Portfolio Size 1-11	1.765	.822	.116	3.414
	Portfolio Size 12-15	2.000	1.072	-.150	4.150
	Portfolio Size 16 or More	2.067	.619	.825	3.308
Diff 3yr Math Ach	Portfolio Size 1-11	1.118	1.553	-1.996	4.232
	Portfolio Size 12-15	5.700	2.025	1.640	9.760
	Portfolio Size 16 or More	.200	1.169	-2.144	2.544

Table 237: Wilks' Lambda test for principal supervisor groups and combined achievement increases for Title I secondary schools

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.246	8.635[b]	2.000	53.000	.001	.246
	Wilks' Lambda	.754	8.635[b]	2.000	53.000	.001	.246
	Hotelling's Trace	.326	8.635[b]	2.000	53.000	.001	.246
	Roy's Largest Root	.326	8.635[b]	2.000	53.000	.001	.246
Group	Pillai's Trace	.103	1.464	4.000	108.000	.218	.051
	Wilks' Lambda	.897	1.475[b]	4.000	106.000	.215	.053
	Hotelling's Trace	.114	1.485	4.000	104.000	.212	.054
	Roy's Largest Root	.113	3.042[c]	2.000	54.000	.056	.101

a. Design: Intercept + Group

b. Exact statistic

c. The statistic is an upper bound on F that yields a lower bound on the significance level.

Table 238: Univariate test for principal supervisor groups and achievement increases for Title I secondary schools

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	Diff 3yr ELA Ach	1.004[a]	2	.502	.044	.957	.002
	Diff 3yr Math Ach	229.370[b]	2	114.685	2.796	.070	.094
Intercept	Diff 3yr ELA Ach	176.964	1	176.964	15.390	.000	.222
	Diff 3yr Math Ach	256.287	1	256.287	6.249	.015	.104
Group	Diff 3yr ELA Ach	1.004	2	.502	.044	.957	.002
	Diff 3yr Math Ach	229.370	2	114.685	2.796	.070	.094
Error	Diff 3yr ELA Ach	620.925	54	11.499			
	Diff 3yr Math Ach	2214.665	54	41.012			
Total	Diff 3yr ELA Ach	842.000	57				
	Diff 3yr Math Ach	2562.000	57				
Corrected Total	Diff 3yr ELA Ach	621.930	56				
	Diff 3yr Math Ach	2444.035	56				

a. R Squared = .002 (Adjusted R Squared = -.035)

b. R Squared = .094 (Adjusted R Squared = .060)

Elementary Schools ANOVA & Tukey Post Hoc Test

For elementary schools, mathematics achievement was statistically significantly different for different portfolio group sizes, F(2, 238) = 16.634, p < .0005; partial n^2 = .123. English Language Arts achievement was also statistically significantly different for different portfolio group sizes, F(2, 238) = 7.876, p < .0005; partial n^2 = .062. According to the Tukey post hoc test for mathematics achievement increases, there was a mean increase of 6.290, SE = 1.212, from portfolio size group 15 (n = 89; M = 3.76, SD = 6.794) to portfolio size group 1- 14 (n = 93; M = 10.05, SD = 10.114), which was statistically significant (p < .0005). There was a mean increase of .134, SE = 1.372, from portfolio size group 15 (n = 89; M = 3.76, SD = 6.794) to portfolio size group 16 or more (n = 59; M = 59, SD = 6.461), which was not statistically significant (p = .995). For English Language Arts achievement increases, there was a mean increase of 3.060, SE = .905, from portfolio size group 15 (n = 89; M = 5.61, SD = 5.443) to portfolio size group 1-14 (n = 93; M = 8.67, SD = 7.147), which was statistically significant (p = .002). There was a mean increase of increase of -.336, SE = 1.024, from portfolio size group 15 (n = 89; M = 5.61 , SD = 5.443) to portfolio size group 16 or more (n = 59; M = 5.27, SD = 5.179), which was not statistically significant (p = .943). Tables 239 to 244 illustrate the results of the statistical analyses.

Table 239: ANOVA for elementary mathematics achievement

ANOVA

Dif 3yr Math Ach

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2221.734	2	1110.867	16.634	.000
Within Groups	15894.166	238	66.782		
Total	18115.900	240			

Table 240: Tukey post hoc test for portfolio size groups and mean differences in achievement increases for elementary math achievement

Multiple Comparisons

Dependent Variable: Dif 3yr Math Ach

	(I) Portfolio Size Range	(J) Portfolio Size Range	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Tukey HSD	Portfolio Size 1-14	Portfolio Size 15	6.290*	1.212	.000	3.43	9.15
		Portfolio Size 16 or More	6.155*	1.360	.000	2.95	9.36
	Portfolio Size 15	Portfolio Size 1-14	-6.290*	1.212	.000	-9.15	-3.43
		Portfolio Size 16 or More	-.134	1.372	.995	-3.37	3.10
	Portfolio Size 16 or More	Portfolio Size 1-14	-6.155*	1.360	.000	-9.36	-2.95
		Portfolio Size 15	.134	1.372	.995	-3.10	3.37
Games-Howell	Portfolio Size 1-14	Portfolio Size 15	6.290*	1.272	.000	3.28	9.30
		Portfolio Size 16 or More	6.155*	1.344	.000	2.97	9.34
	Portfolio Size 15	Portfolio Size 1-14	-6.290*	1.272	.000	-9.30	-3.28
		Portfolio Size 16 or More	-.134	1.107	.992	-2.76	2.49
	Portfolio Size 16 or More	Portfolio Size 1-14	-6.155*	1.344	.000	-9.34	-2.97
		Portfolio Size 15	.134	1.107	.992	-2.49	2.76

*. The mean difference is significant at the 0.05 level.

Table 241: Univariate test for principal supervisor groups and mathematics achievement for elementary schools

Tests of Between-Subjects Effects

Dependent Variable: Dif 3yr Math Ach

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	2221.734[a]	2	1110.867	16.634	.000	.123
Intercept	8060.566	1	8060.566	120.699	.000	.336
Group	2221.734	2	1110.867	16.634	.000	.123
Error	15894.166	238	66.782			
Total	27452.000	241				
Corrected Total	18115.900	240				

a. R Squared = .123 (Adjusted R Squared = .115)

Table 242: ANOVA elementary English Language Arts achievement for elementary schools

ANOVA

Diff 3yr ELA Ach

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	586.519	2	293.260	7.876	.000
Within Groups	8861.564	238	37.233		
Total	9448.083	240			

Table 243: Tukey post hoc test for portfolio size groups and mean differences in achievement increases for elementary English Language Arts achievement

Multiple Comparisons

Dependent Variable: Diff 3yr ELA Ach

	(I) Portfolio Size Range	(J) Portfolio Size Range	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	Portfolio Size 1-14	Portfolio Size 15	3.060*	.905	.002	.93	5.19
		Portfolio Size 16 or More	3.395*	1.016	.003	1.00	5.79
	Portfolio Size 15	Portfolio Size 1-14	-3.060*	.905	.002	-5.19	-.93
		Portfolio Size 16 or More	.336	1.024	.943	-2.08	2.75
	Portfolio Size 16 or More	Portfolio Size 1-14	-3.395*	1.016	.003	-5.79	-1.00
		Portfolio Size 15	-.336	1.024	.943	-2.75	2.08
Games-Howell	Portfolio Size 1-14	Portfolio Size 15	3.060*	.939	.004	.84	5.28
		Portfolio Size 16 or More	3.395*	1.002	.003	1.02	5.77
	Portfolio Size 15	Portfolio Size 1-14	-3.060*	.939	.004	-5.28	-.84
		Portfolio Size 16 or More	.336	.887	.924	-1.77	2.44
	Portfolio Size 16 or More	Portfolio Size 1-14	-3.395*	1.002	.003	-5.77	-1.02
		Portfolio Size 15	-.336	.887	.924	-2.44	1.77

*. The mean difference is significant at the 0.05 level.

Table 244: Univariate test for principal supervisor groups and English Language Arts achievement for elementary schools

Tests of Between-Subjects Effects

Dependent Variable: Diff 3yr ELA Ach

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	586.519[a]	2	293.260	7.876	.000	.062
Intercept	9810.293	1	9810.293	263.481	.000	.525
Group	586.519	2	293.260	7.876	.000	.062
Error	8861.564	238	37.233			
Total	20284.000	241				
Corrected Total	9448.083	240				

a. R Squared = .062 (Adjusted R Squared = .054)

Title I Elementary Schools ANOVA & Tukey Post Hoc Test

For Title I elementary schools, mathematics achievement was statistically significantly different for different portfolio group sizes, $F(2, 170) = 8.053$, $p < .0005$; partial $n^2 = .087$. English Language Arts achievement was also statistically significantly different for different portfolio group sizes, $F(2, 170) = 3.658$, $p = .028$; partial $n^2 = .041$. According to the Tukey post hoc test for mathematics achievement increases, there was a mean increase of 5.989, SE = 1.585, from portfolio size group 15 (n = 54; M = 4.37, SD = 8.173) to portfolio size group 1- 14 (n = 89; M = 10.36, SD = 10.223), which was statistically significant (p = .001). There was a mean increase of .1.230, SE = 2.093, from portfolio size group 15 (n = 54; M = 4.37, SD = 8.173) to portfolio size group 16 or more (n = 30; M = 5.60, SD = 7.477), which was not statistically significant (p = .827). For English Language Arts achievement increases, there was a mean increase of 2.979, SE = 1.178, from portfolio size group 15 (n = 54; M = 5.80, SD = 6.609) to portfolio size group 1-14 (n = 89; M = 8.78, SD = 7.252), which was statistically significant (p = .033). There was a mean increase of increase of .537, SE = 1.555, from portfolio size group 15 (n = 54; M = 5.80, SD =

6.609) to portfolio size group 16 or more (n = 30; M = 6.33, SD = 5.839), which was not statistically significant (p = .936). Tables 245 to 250 illustrate the results of the statistical analyses.

Table 245: ANOVA for Title I elementary mathematics achievement

ANOVA

Dif 3yr Math Ach

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1360.268	2	680.134	8.053	.000
Within Groups	14358.287	170	84.461		
Total	15718.555	172			

Table 246: Tukey post hoc test for portfolio size groups and mean differences in achievement increases for Title I elementary mathematics achievement

Multiple Comparisons

Dependent Variable: Dif 3yr Math Ach

	(I) Portfolio Size Range	(J) Portfolio Size Range	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Tukey HSD	Portfolio Size 1-14	Portfolio Size 15	5.989*	1.585	.001	2.24	9.74
		Portfolio Size 16 or More	4.760*	1.940	.040	.17	9.35
	Portfolio Size 15	Portfolio Size 1-14	-5.989*	1.585	.001	-9.74	-2.24
		Portfolio Size 16 or More	-1.230	2.093	.827	-6.18	3.72
	Portfolio Size 16 or More	Portfolio Size 1-14	-4.760*	1.940	.040	-9.35	-.17
		Portfolio Size 15	1.230	2.093	.827	-3.72	6.18
Games-Howell	Portfolio Size 1-14	Portfolio Size 15	5.989*	1.553	.001	2.31	9.67
		Portfolio Size 16 or More	4.760*	1.743	.022	.58	8.94
	Portfolio Size 15	Portfolio Size 1-14	-5.989*	1.553	.001	-9.67	-2.31
		Portfolio Size 16 or More	-1.230	1.761	.765	-5.45	2.99
	Portfolio Size 16 or More	Portfolio Size 1-14	-4.760*	1.743	.022	-8.94	-.58
		Portfolio Size 15	1.230	1.761	.765	-2.99	5.45

*. The mean difference is significant at the 0.05 level.

Table 247: Univariate test for principal supervisor groups and mathematics achievement for Title I elementary schools

Tests of Between-Subjects Effects

Dependent Variable: Dif 3yr Math Ach

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1360.268[a]	2	680.134	8.053	.000	.087
Intercept	6551.277	1	6551.277	77.566	.000	.313
Group	1360.268	2	680.134	8.053	.000	.087
Error	14358.287	170	84.461			
Total	25882.000	173				
Corrected Total	15718.555	172				

a. R Squared = .087 (Adjusted R Squared = .076)

Table 248: ANOVA for Title I elementary mathematics achievement

ANOVA

Diff 3yr ELA Ach

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	341.265	2	170.632	3.658	.028
Within Groups	7930.932	170	46.653		
Total	8272.197	172			

Table 249: Tukey post hoc test for portfolio size groups and mean differences in achievement increases for Title I elementary English Language Arts achievement

Multiple Comparisons

Dependent Variable: Diff 3yr ELA Ach

	(I) Portfolio Size Range	(J) Portfolio Size Range	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Tukey HSD	Portfolio Size 1-14	Portfolio Size 15	2.979*	1.178	.033	.19	5.76
		Portfolio Size 16 or More	2.442	1.442	.211	-.97	5.85
	Portfolio Size 15	Portfolio Size 1-14	-2.979*	1.178	.033	-5.76	-.19
		Portfolio Size 16 or More	-.537	1.555	.936	-4.21	3.14
	Portfolio Size 16 or More	Portfolio Size 1-14	-2.442	1.442	.211	-5.85	.97
		Portfolio Size 15	.537	1.555	.936	-3.14	4.21
Games-Howell	Portfolio Size 1-14	Portfolio Size 15	2.979*	1.183	.035	.17	5.79
		Portfolio Size 16 or More	2.442	1.314	.160	-.71	5.60
	Portfolio Size 15	Portfolio Size 1-14	-2.979*	1.183	.035	-5.79	-.17
		Portfolio Size 16 or More	-.537	1.395	.922	-3.88	2.81
	Portfolio Size 16 or More	Portfolio Size 1-14	-2.442	1.314	.160	-5.60	.71
		Portfolio Size 15	.537	1.395	.922	-2.81	3.88

*. The mean difference is significant at the 0.05 level.

Table 250: Univariate test for principal supervisor groups and English Language Arts achievement for Title I elementary schools

Tests of Between-Subjects Effects

Dependent Variable: Diff 3yr ELA Ach

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	341.265[a]	2	170.632	3.658	.028	.041
Intercept	6927.096	1	6927.096	148.483	.000	.466
Group	341.265	2	170.632	3.658	.028	.041
Error	7930.932	170	46.653			
Total	17802.000	173				
Corrected Total	8272.197	172				

a. R Squared = .041 (Adjusted R Squared = .030)

Secondary ANOVA & Tukey Post Hoc Test

For secondary schools, mathematics achievement was statistically significantly different for different portfolio group sizes, $F(2, 116) = 3.277$, $p = .041$; partial $n^2 = .053$. English

Language Arts achievement was not statistically significantly different for different portfolio group sizes, $F(2, 116) = .075$, $p = .927$; partial $n^2 = .001$. As a result of the ANOVA not being statistically significant for English Language Arts achievement, the Tukey post hoc test will not be reported. According to the Tukey post hoc test for mathematics achievement increases, there was a mean increase of 1.267, SE = 1.540, from portfolio size group 1-11 (n = 17; M = 3.40, SD = 7.092) to portfolio size group 12-15 (n = 10; M = 4.67, SD = 7.261), which was not statistically significant (p = .690). There was a mean increase of -2.697, SE = 1.590, from portfolio size group 1-11 (n = 17; M = 3.40, SD = 7.092) to portfolio size group 16 or more (n = 30; M = .70, SD = 6.480), which was not statistically significant (p = .211). Tables 251 to 255 illustrate the results of the statistical analyses.

Table 251: ANOVA for secondary mathematics achievement

ANOVA

Diff 3yr Math Ach

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	318.329	2	159.164	3.277	.041
Within Groups	5634.663	116	48.575		
Total	5952.992	118			

Table 252: Tukey post hoc test for portfolio size groups and mean differences in achievement increases for secondary mathematics achievement

Multiple Comparisons

Dependent Variable: Diff 3yr Math Ach

	(I) Portfolio Size Range	(J) Portfolio Size Range	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Tukey HSD	Portfolio Size 1-11	Portfolio Size 12-15	-1.267	1.540	.690	-4.92	2.39
		Portfolio Size 16 or More	2.697	1.590	.211	-1.08	6.47
	Portfolio Size 12-15	Portfolio Size 1-11	1.267	1.540	.690	-2.39	4.92
		Portfolio Size 16 or More	3.964*	1.571	.034	.23	7.69
	Portfolio Size 16 or More	Portfolio Size 1-11	-2.697	1.590	.211	-6.47	1.08
		Portfolio Size 12-15	-3.964*	1.571	.034	-7.69	-.23
Games-Howell	Portfolio Size 1-11	Portfolio Size 12-15	-1.267	1.585	.705	-5.05	2.52
		Portfolio Size 16 or More	2.697	1.547	.196	-1.00	6.40
	Portfolio Size 12-15	Portfolio Size 1-11	1.267	1.585	.705	-2.52	5.05
		Portfolio Size 16 or More	3.964*	1.546	.033	.27	7.66
	Portfolio Size 16 or More	Portfolio Size 1-11	-2.697	1.547	.196	-6.40	1.00
		Portfolio Size 12-15	-3.964*	1.546	.033	-7.66	-.27

*. The mean difference is significant at the 0.05 level.

Table 253: Univariate test for principal supervisor groups and mathematics achievement for secondary schools

Tests of Between-Subjects Effects

Dependent Variable: Diff 3yr Math Ach

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	318.329[a]	2	159.164	3.277	.041	.053
Intercept	1014.047	1	1014.047	20.876	.000	.153
GroupNumber	318.329	2	159.164	3.277	.041	.053
Error	5634.663	116	48.575			
Total	7030.000	119				
Corrected Total	5952.992	118				

a. R Squared = .053 (Adjusted R Squared = .037)

Table 254: ANOVA for secondary English Language Arts achievement for secondary schools

ANOVA

Diff 3yr ELA Ach

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.967	2	.983	.075	.927
Within Groups	1514.319	116	13.054		
Total	1516.286	118			

Table 255: Univariate test for principal supervisor groups and English Language Arts achievement for secondary schools

Tests of Between-Subjects Effects

Dependent Variable: Diff 3yr ELA Ach

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1.967[a]	2	.983	.075	.927	.001
Intercept	350.734	1	350.734	26.867	.000	.188
GroupNumber	1.967	2	.983	.075	.927	.001
Error	1514.319	116	13.054			
Total	1866.000	119				
Corrected Total	1516.286	118				

a. R Squared = .001 (Adjusted R Squared = -.016)

Title I Secondary ANOVA & Tukey Post Hoc Test

For Title I secondary schools, mathematics achievement was not statistically significantly different for different portfolio group sizes, $F(2, 54) = 2.796$, $p = .070$; partial $n^2 = .002$. English Language Arts achievement was not statistically significantly different for different portfolio group sizes, $F(2, 54) = .044$, $p = .957$; partial $n^2 = .001$. As a result of the ANOVA not being statistically significant for mathematics achievement and English Language Arts achievement, the Tukey post hoc test will not be reported. Tables 256 to 260 illustrate the results of the statistical analyses.

Table 256: ANOVA for Title I secondary mathematics achievement

ANOVA

Diff 3yr Math Ach

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	229.370	2	114.685	2.796	.070
Within Groups	2214.665	54	41.012		
Total	2444.035	56			

Table 257: Univariate test for principal supervisor groups and mathematics achievement for Title I secondary schools

Tests of Between-Subjects Effects

Dependent Variable: Diff 3yr Math Ach

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	229.370[a]	2	114.685	2.796	.070	.094
Intercept	256.287	1	256.287	6.249	.015	.104
GroupNumber	229.370	2	114.685	2.796	.070	.094
Error	2214.665	54	41.012			
Total	2562.000	57				
Corrected Total	2444.035	56				

a. R Squared = .094 (Adjusted R Squared = .060)

Table 258: ANOVA for Title I secondary English Language Arts achievement

ANOVA

Diff 3yr ELA Ach

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.004	2	.502	.044	.957
Within Groups	620.925	54	11.499		
Total	621.930	56			

Table 259: Univariate test for principal supervisor groups and English Language Arts achievement Title I secondary schools

Tests of Between-Subjects Effects

Dependent Variable: Diff 3yr ELA Ach

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1.004[a]	2	.502	.044	.957	.002
Intercept	176.964	1	176.964	15.390	.000	.222
GroupNumber	1.004	2	.502	.044	.957	.002
Error	620.925	54	11.499			
Total	842.000	57				
Corrected Total	621.930	56				

a. R Squared = .002 (Adjusted R Squared = -.035)

A MANOVA, ANOVA, and Tukey post hoc test were conducted to identify which principal supervisors' leadership portfolio size had the greatest impact on schools' percent of students passing mathematics and English Language Arts assessments. The analysis concluded that elementary principal supervisor portfolios with one to 14 schools had the greatest impact on student achievement increases for both mathematics and English Language Arts for non-Title I schools and Title I schools. The analysis concluded that secondary principal supervisor portfolios with 12 to 15 schools had the greatest impact on student achievement increases for mathematics only for non-Title I schools and Title I schools. The analysis also concluded that secondary principal supervisor portfolios with 16 or more schools had the greatest impact on student achievement increases for English Language Arts for non-Title I schools and Title I schools. 63% of the analyses performed had a statistically significant difference in the outcome variable between portfolio size groups. The null hypothesis proposed that there is no correlation in the varied sizes of principal supervisors' leadership portfolios and percent of student passing mathematics assessments and English Language Arts assessments. As a result of the analysis the null hypothesis is rejected. Tables 260 and 261 summarize the portfolio size groups with the greatest impact and the statistical significance of the analyses performed.

Table 260: Summary of Portfolio Size Group Impact and Statistical Significance for Research Question 5 Elementary Schools

Elementary Schools	Portfolio Size Group w/ Greatest Impact		Statistical Significance between groups and combined Dependent Variables	Statistically Significant difference between achievement and portfolio size groups	
	Math	ELA		Math	ELA
All	1-14	1-14	Yes	Yes	Yes
Title I	1-14	1-14	Yes	Yes	Yes

Table 261: Summary of Portfolio Size Group Impact and Statistical Significance for Research Question 5 Secondary Schools

Secondary Schools	Portfolio Size Group w/ Greatest Impact		Statistical Significance between groups and combined Dependent Variables	Statistically Significant difference between achievement and portfolio size groups	
	Math	ELA		Math	ELA
All	12-15	16 or more	No	Yes	No
Title I	12-15	16 or more	No	No	No

Summary

In this chapter, the researcher used statistical analyses to measure the impact of large school districts reducing principal supervisors' span of control on academic outcomes of schools. Various statistical analyses were performed to measure impact on varied school types and complexities: elementary schools, secondary schools, Title I schools, low-performing schools, or

DA schools. The analyses of data for this study is presented in this chapter. Chapter five contains a summary of research, discussions of findings, influence of policy, and recommendations for further research.

CHAPTER 5: DISCUSSION AND RECOMMENDATIONS

Introduction

The research study was guided by five research questions that focused on a change within a principal supervisor model utilized by several large school districts around the country (Goldring et al., 2018). The reduction of principal supervisors' span of control was measured for its impact on schools' academic outcomes. The research supplements current knowledge about the role of principal supervisors and the impact of principal supervisor models in large school districts. This chapter includes a summary of the study, discussion of the findings, and recommendations.

Summary of the Study

The purpose of this study was to measure the impact of reducing principal supervisors' span of control on school academic outcomes via state's annual mathematic assessments and English Language Arts assessments. Academic outcomes were measured by the percent of students passing Florida's annual mathematic assessments and English Language Arts assessments with a level 3 or above. The span of control referenced in the research focused on the number of schools within the purview of principal supervisors. The number of schools within their purview is also referred to as a leadership portfolio. The study focused on three years prior to the change in principal supervisors' span of control and three years post change. Few school districts across the country have implemented this change in their principal supervisor model. The Wallace Foundation facilitated a change in principal supervisor models for five large school districts across the country (Goldring et al., 2018). To date, they are the only institutions to facilitate a change in this model and also initiate research for its support. The study was conducted in two large school districts in Florida, one was a part of the Wallace Foundations' research and the other was not. The two large school districts initiated their change in principal supervisor models during the same school year and combined had a total of 29 principal supervisors that supervised 360 schools. The study focused solely on comprehensive schools that included Title I schools, low-performing or schools participating in the states' Differentiated Accountability (DA) program, non-Title I schools, and non-DA schools.

A quantitative analysis was conducted to respond to the five research questions guiding the study. Research Questions 1, 2, 3, and 4 utilized a simple linear regression to measure the impact of reducing principal supervisors' portfolio size on the outcome variables. Research Question 5 applied a multivariate analysis of variance (MANOVA), analysis of variance (ANOVA), and Tukey post hoc test to identity the principal supervisor portfolio size range with the greatest impact on school academic outcomes. Research Question 1, 2, and 3 focused on specific types of schools for both elementary schools and secondary schools separately; overall non-Title I schools and non-DA schools, DA schools, Title I schools, respectively. Research Question 3 measured the impact of reducing principal supervisor leadership portfolios over a span of three consecutive years for each type of school within the study.

Discussion of the Findings

Research Question 1

What impact does a reduced principal supervisors' span of control have on schools' percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment?

h_{01}: There is no correlation in the reduction of principal supervisors' span of control and schools' percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment.

For this research question, the study suggests that there is not a relationship between reducing the number of schools within a principal supervisor's leadership portfolio and increases in schools' academic outcomes. The study was conducted with a sample of 241elementary schools, 119 secondary schools, and 29 principal supervisors. A simple linear regression was used to analyze the impact of reducing principal supervisor leadership portfolios. The results of the analyses for post change in reducing leadership portfolio sizes indicated that the majority (67%) of the analyses performed were not statistically significant, $p > 0.05$. All of the analyses performed for secondary schools were not statistically significant while a majority (67%) of the analyses performed for elementary schools were statistically significant. The findings imply that a relationship exists between reducing principal leadership portfolio sizes and increases in elementary school academic outcomes. The results are noteworthy because of the contrasting statistical significance between elementary schools' academic outcomes and secondary schools' academic outcomes.

Researchers (Corcoran et al., 2013; Hallinger, 2005; Hallinger & Murphy, 1985; Heck et al., 1990; Lemoine et al., 2014) detailed multiple instructional leadership practices and strategies that lead to increased academic outcomes if leveraged by principal supervisors. These practices and strategies influence an exemplary model of principal supervisors that utilize collaborative structures focused on instructional leadership, coaching and supporting principals, progress monitoring effects of teacher instruction, and participating in ongoing professional development (Corcoran et al. 2013; Vitcov & Bloom, 2010). The contrasting impact on academic outcomes by elementary school principal supervisors and secondary school principal supervisors supports inquiry of the practices and strategies used by both to accomplish task and goals. It can be easily inferred that both groups are implementing dissimilar practices. Goldring et al. (2018) detailed several components that guided the work of the Wallace Foundation's Principal Supervisor Initiative (PSI): Revising the principal supervisor role, reducing their span of control, training focused on building capacity to support principals, creating systems for succession planning, changing organizational structures to support principal supervisors. This initiates several questions about the contrasting results of the analysis that focus on effective professional development and organizational structures that support principal supervisors. Differing professional development opportunities may be needed since common training practices may not support the needs of both groups. This could be the same for changes in organizational structures resulting from the reduction in principal supervisor portfolios. One approach for both elementary and secondary principal supervisors may contribute to creating gaps in instructional leadership capacity to support increased academic outcomes. The environment and complexities of elementary schools and secondary schools differ and may require differentiated strategies of support for principal supervisors.

Research Question 2

What impact does a reduced principal supervisors' span of control have on Florida Department of Education Differentiated Accountability schools' percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment?

h_{02}: There is no correlation in the reduction of principal supervisors' span of control and percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment for the Florida Department of Education Differentiated Accountability schools.

For this research question, the study suggests that there is not a relationship between reducing the number of schools within a principal supervisor's leadership portfolio and increases in DA schools' academic outcomes. The study was conducted with a sample of 47 elementary schools, 9 secondary schools, and 21 principal supervisors. A simple linear regression was used to analyze the impact of reducing principal supervisor leadership portfolios. Due to the small sample of secondary DA schools, the analysis was not reported for this group. Elementary schools experienced a severe decline in the number of DA schools for school years 2017-2018 and 2018-2019. The decline in DA schools affected the sample sizes resulting in both school years being excluded from reporting. The results of the remaining analyses for post change in reducing leadership portfolio sizes indicated that 50% of the analyses performed was statistically significant, $p < 0.05$. 83% of the analyses performed for pre-change in principal supervisor leadership portfolios were not statistically significant, $p > .050$. The results are noteworthy due to the severe decline in elementary schools' sample size of DA schools post change in principal leadership portfolio sizes.

The statistical significance from Research Question 1 may provide further evidence to support the reason for low performing elementary schools exiting the state's DA program due to increased academic achievement. Elementary principal supervisors are implementing effective practices that are leading to multi-year increases in academic outcomes, which includes their lowest performing schools. Bambrick-Santoyo (2012, 2018) discussed two levers that support effective instructional leadership: instructional levers and cultural levers. The levers include many of the elements of previous researchers with instructional levers focusing on professional development, instructional planning, coaching and feedback, and supporting data driven instruction (Bambrick-Santoyo, 2012, 2018). School districts' strategies of supporting elementary principal supervisors seem to include these instructional levers while building a sustainable culture to replicate successes for DA schools. Elementary principal supervisors have supported a severe decline in DA schools during the 3 years post change in the principal supervisor model. During the 2016/2017 school year, there were 34 for schools in the state's DA program, declining to 11 schools within the program during the 2018/2019 school year. Elementary principal supervisors have operationalized the concept of instructional leadership that ultimately guides and regulates leadership actions that amplifies success for this group of schools (Carbaugh, Marzano, & Toth, 2015). The strategies are sustainable and embedded in culture.

Research Question 3

What impact does a reduced principal supervisors' span of control have on Title I schools' percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment?

h_{03}: There is no correlation in the reduction of principal supervisors' span of control and percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment for Title I schools.

For this research question, the study suggests that there is not a relationship between reducing the number of schools within a principal supervisor's leadership portfolio and increases in Title I schools' academic outcomes. The study was conducted with a sample of 173 elementary schools, 57 secondary schools, and 27 principal supervisors. A simple linear regression was used to analyze the impact of reducing principal supervisor leadership portfolios. The results of the analyses for post change in reducing leadership portfolio sizes indicated that all of the analyses performed for both elementary schools and secondary schools were not statistically significant, $p > 0.05$. The results for elementary school statistical significance is stark contrast from Research Question 1 and Research Question 2. The increase in complexities of Title I schools may contribute to the difficulty of increasing student achievement. The findings imply that no relationship exists between reducing principal supervisors' leadership portfolios and Title I schools attributing variable of poverty and low-income households.

Instructional leadership practices lauded by researchers as a catalyst for increased academic achievement seems to have a null effect on Title I schools when implementation does not address the contextual concerns of this group of schools. The central context for this group of schools is poverty: student poverty resulting for low-income households. Golding et al. (2008) discussed that instructional leadership practices are relative to the contextual demographics of the school. Hallinger and Murphy (1985) endorsed the same component for instructional leadership concepts and practices while promoting differing practices conducive to the schools' context. The analysis from Research Question 1 and Research Questions 2 supports the effectiveness of strategies used by elementary principal supervisors, but they prove to be ineffective in supporting Title I schools. Lack of addressing the specific contextual differences of these schools by not varying strategies to meet their needs may have resulted in the lack of overall achievement. Title I schools are highly complex due to multiple variables that contribute to poverty. All Title I schools may not share the same variables that contribute poverty, leading to a need to clearly understand the variables that contribute to a school's context and coupling the right support to increase academic outcomes.

Research Question 4

What impact does a reduced principal supervisors' span of control have on schools' percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment for a period of three consecutive years?

h_{04}: There is no correlation in the reduction of principal supervisors' span of control and percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment for a period of three consecutive years?

For this research question, the study suggests that there is not a relationship between reducing the number of schools within a principal supervisor's leadership portfolio and increases in schools' academic outcomes over a span of three years. The study was conducted with a sample of 241 elementary schools, 119 secondary schools, and 29 principal supervisors. The study included all school types to include Title I (n =230) and DA (n = 54) schools. Secondary DA schools were excluded from reporting due to a small sample size. A simple linear regression was used to analyze the impact of reducing principal supervisor leadership portfolios over a period of three years. The results of the analyses for post change in reducing leadership portfolio sizes indicated that the majority (60%) of the analyses performed was not statistically significant, $p > 0.05$. A majority (75%) of the analysis performed for secondary schools was not statistically significant while a half (50%) of the analyses performed for elementary schools was statistically significant. The findings indicate that overall a relationship does not exist between reducing principal leadership portfolio sizes and increases in school academic outcomes over a period of three years. The results for elementary schools have been consistent with Research Question 1 and Research Question 2, with its statistical significance overshadowing those of secondary schools.

Elementary school principal supervisors are implementing strategies and practices that are addressing the needs of many schools. Bambrick-Santoyo (2012, 2018) detailed several components of the cultural levers within his concept of instructional leadership that may have contributed to multi-year successes of reducing elementary principal supervisors' portfolio sizes. A strong culture focused on learners, building and supporting the right team, and training leaders for increased impact are the components of the cultural levers (Bambrick-Santoyo, 2012, 2018). Elementary school principal supervisors seem to espouse these components of the cultural levers due to their ongoing impact on increased academic outcomes. Secondary principal supervisors' gaps and lack of consistent impact on academic outcomes may be caused by the lack of one or more cultural levers. Ensuring that appropriate candidates are in the role and providing professional development to build instructional leadership capacity are also elements of effective principal supervisors researched by Goldring et al. (2018) during their implementation of the PSI. Other variables can contribute to secondary principal supervisors lack of impact on academic outcomes. A three-year trend in improving academic outcomes in elementary schools implies the implementation of culturally embedded practices that are effective and can be scaled out to amplify future impact.

Research Question 5

Which principal supervisors' leadership portfolio size has the greatest impact on schools' percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment?

h_{05}: There is no correlation in the varied sizes of principal supervisors' leadership portfolios and percent of students passing mathematics assessments and English Language Arts assessments with a level 3 or above on the Florida Standards Assessment

For this research question, the study suggests that there is a relationship between varied sizes of principal supervisors' leadership portfolios and increases in schools' academic outcomes. The study was conducted with a sample of 241 elementary schools, 119 secondary schools, and 29 principal supervisors. The study included all school types to include Title I (n =230) and DA (n = 54) schools. Elementary and Secondary DA schools were excluded from reporting due to a small sample size that led to violations of assumptions for statistical analyses used. A MANOVA, ANOVA, and Tukey post hoc test were used to analyze which portfolio sizes had the greatest impact on school academic outcomes. Portfolio size groups used for both analyses were 1-14, 15, 16 or more for elementary school principal supervisor portfolios and 1-11, 12-15, 16 or more for secondary school principal supervisor portfolios. The results of the analyses indicated that elementary portfolio size group 1-14 had the greatest impact on both mathematics achievement and English Language Arts achievement. There was also a statically significant difference in the outcome variable between portfolio size groups, $p < 0.50$. The results of the analyses were also consistent for all types of elementary schools; non-Title I, non-DA, and Title I. The results of the analyses indicated that secondary portfolio size group 12-15 had the greatest impact on mathematics achievement and portfolio size group 16 or more had the greatest impact on English Language Arts achievement for elementary. A majority (75%) of the analysis performed for secondary schools was not statistically significant, indicating that no statically significant difference exists in the outcome variables between portfolio size groups, $p > 0.50$. Overall, 63% of the analyses performed had a statistically significant difference in the outcome variables between portfolio size groups. The findings imply that a relationship exist between varied principal supervisors' leadership portfolio sizes and increases in school academic outcomes. As stated previously, the results for elementary schools has been consistent with previous research questions, with its statistical significance overshadowing secondary schools.

Principal supervisors are the main support for schools and their principals (Goldring et al., 2018; Saltzman, 2016a). The Wallace Foundation's PSI touted reducing principal supervisors' span of control as one main lever to support principal effectiveness and therefore increasing school academic outcomes (Goldring et al., 2018). The average span of control for principal supervisors in the six large school districts involved in the PSI was 13 schools in the initial implementation and eventually was further reduced to an average of 12 schools (Goldring et al. 2018). A majority of the portfolio size groups with the greatest impacts determined by this study are comparable to the averages of the Wallace Foundation's PSI. Furthermore, Bambrick-Santoyo (2018) endorsed a 12 to one principal to principal supervisor ratio. The rationale for the ratio supported bi-weekly visits to schools to effectively support principals and desired outcomes (Bambrick-Santoyo, 2018).

Elementary principal supervisor portfolio size ranges with the greatest impact for both mathematics and English Language arts was 1-14 schools. This is comparable to average portfolio sizes of the PSI and supports bi-weekly visits and accompanying support touted by Bambrick-Santoyo (2018). Secondary schools had differing impact results with portfolio size range 12-15 having the greatest impact for mathematics and 16 or more having the greatest impact on English Language arts. The portfolio size range of 12-15 is comparable to portfolio sizes of the PSI and allows for strategies discussed by Bambrick-Santoyo (2018). The portfolio size range of 16 or more exceeds recommended portfolio sizes and does not align with portfolio sizes of the PSI. The results of analyses for secondary principal supervisor portfolios supports inquiry into understanding gaps in strategies and practices implemented that may contrast those of elementary principal supervisors. Inconsistencies in professional development, capacity of personnel chosen for these roles, organizational structures, and instructional leadership capacity as discussed by Bambrick-Santoyo (2012, 2018), Hallinger and Murphy (1985), Goldring et al. (2018), and Weber (1989) may be contributing to the inconsistencies identified in secondary principal supervisors' academic outcomes.

Recommendations for Policy

This research provides essential knowledge to policy makers. The findings of this study suggest that a reduction in principal supervisors' span of control or leadership portfolios has a greater impact on elementary school achievement than secondary school achievement. Policymakers should examine the practices of elementary school principal supervisors to isolate practices that are contributing to a greater impact on elementary school academic outcomes. Conversely, policy makers should examine secondary principal supervisors to identify practices that are not contributing to increased academic outcomes and also identify gaps in practices. Furthermore, a simple comparison and contrast of practices implemented by elementary principal supervisors and secondary principal supervisors should be performed to identify similarities and differences.

Policymakers should also understand the complexities of each school level and type to support a coherent understanding of practices that may be beneficial or detrimental to school academic outcomes. Goldring et al. (2008), Hallinger and Murphy (1985), and Weber (1989) discussed school context as an important component of instructional leadership practices. A clear understanding of school context supports an understanding of its complexities, helping leaders to implement appropriate instructional leadership practices. The research identified the portfolio size ranges with the greatest impact was 1-14 schools for both mathematics and English

Language Arts for elementary principal supervisor portfolios and 12-15 schools for mathematics and 16 or more schools for English Language Arts for secondary principal supervisor portfolios. As a result, policymakers should be strategic in implementing portfolio sizes that have the greatest impact for Title I schools, DA schools and schools without these complexities. Research by Bambrick-Santoyo (2018) supports a 12 to one principal to principal supervisor ratio, stating that it supports frequent school visits and effective support of principals. It is befitting for policymakers to examine individual practices implemented by principal supervisors at schools of high complexity to create a repository of effective practices for replication in similar scenarios. Policymakers must understand that any reduction in principal supervisors' portfolio sizes requires additional funding and changes in organizational structures (Goldring et al., 2018). This reduction in spans of control usually means an increase in personnel; principal supervisors and those that support their daily task. Policy makers can gauge the implications of funding by examining school districts principal supervisor portfolio sizes prior to a change in service model and post change.

Recommendations for Practice

A significant finding of this study is that reducing principal supervisors' portfolio size had a greater impact on elementary schools than secondary schools. Practitioners should leverage these findings to isolate strategies that increase their effectiveness and the effectiveness of the principals they supervise. Several steps can be implemented by practitioners to gain new knowledge and implement effective practices.

First, practitioners must gain a full understanding of the significant impacts of reducing principal supervisor portfolios. The research indicated a greater impact for elementary schools, but specific portfolio sizes also impacted academic outcomes for specific subject areas and types of schools. This knowledge will help to make planning more efficient and effective for changes or revisions in existing principal supervisor models. A review of previous research will also help practitioners understand the important elements that increase the effectiveness of principal supervisors. Professional development, identifying the right personnel, and focusing on instructional leadership practices are a few elements touted by Hallinger and Murphy (1985), Goldring et al. (2018), and Weber (1989). Practitioners must also understand the implications of this research may benefit large school districts, with a 100,000 or more students, more than small school districts. Leaders in small school districts have multiple roles that include principal supervision and duties that support the operations of the overall school district (Canales et al., 2008). Small school districts budgets may not support the addition of personnel and changes in organizational structures that promotes principal supervision as singular role.

Subsequently, practitioners can identify school districts that are implementing the researched principal supervisor model to gain practical knowledge through observation of its implementation. Practitioners must be prepared with a plan devised from initial steps to guide strategies and practices to observe and clarifying questions to ask. Questions should not be solely focused on accomplishments but also on failures to gain knowledge about mistakes to avoid. Questions should also address the support and supervisory structures that support principal supervisors. Practitioners must know how they are supported through resource allocations, professional development, and accountability measures to ensure it aligns with adopted practices for supporting schools and principals. The Wallace Foundation's PSI provides valuable insight into implementing changes in the principal supervisor roles. The five components of the PSI provide knowledge about initiating and sustaining practices to increase effectiveness of principal supervisors: reduce spans of control, build capacity to support principals, identify and train principal supervisor candidates, create organizational structures to support principal supervisors, and revise the role to focus on instructional leadership (Goldring et al., 2018)

Afterwards, practitioners can utilize the research and observation to develop a comprehensive plan that leads to an effective reduction in principal supervisor portfolio sizes for specific school environments. The plan should include accompanying practices and strategies detailed by Goldring et al. (2018) and Hallinger and Murphy (1985) that mirror the needs of the principal supervisors, focusing on professional development and organizational structures that provide ongoing support for instructional leadership practices. The plan must include frequent progress monitoring of implementation to accommodate revisions as needed to increase effectiveness. Monitoring of formative assessments provides practitioners key leading indicators that can forecast potential issues in implementation strategies.

Recommendations for Future Research

This research solely focused on the reduction of principal supervisors' span of control and its impact on school academic outcomes. Further research should include an examination of practices and strategies utilized by principal supervisors in school districts that have reduced their span of control. This should be conducted as a longitudinal study to identify practices prior to changes in principal supervisor models and post change. The Council or the Great City Schools and the Wallace Foundation discussed supports for continuous improvement of principal supervisors in the form of evaluations (Corcoran et al., 2013). This can initiate research to understand district systems of support for principal supervisors by reviewing data from evaluations. The Wallace Foundation's PSI also emphasized the importance of supporting principal supervisors via professional development and changes in organizational structures (Goldring et al., 2018). Carbaugh, Marzano, and Toth (2015) operationalized instructional leadership concepts resulting in the development of a leader evaluation model widely used by many school districts for principal supervisors and principals.

Future research should also include an examination of principals' reactions to the type of support they received prior to a change in principal supervisor models and post change. Research conducted by Lee (2015) and Nelson et al. (2008) concluded that principal effectiveness required support structures that involved frequent direct coaching and support. As a result, researching principals' responses to received support can contribute to knowledge about effective and ineffective practices leveraged by principal supervisors. Moreover, the support structures for principal supervisors should be examined. An emphasis should be made on the support via direct support from supervisors and professional development that correlates to embedded practices and strategies utilized with schools and principals.

The changes in organizational structures discussed by Goldring et al. (2018) can be examined initially by reviewing organizational charts, prior to changes in the principal supervisor model and post change. A detailed review can lead to understanding funding structures and capacity building initiatives of the school district. The Council of the Great City Schools and the Wallace Foundation emphasized five topics for the changing role of the principal supervisor: defining the role of principal supervisors, selecting and deploying principal supervisors, preparing and supporting principal supervisors, assuring accountability for principal supervisors, encouraging principal supervisor support of principals (Corcoran et al., 2013). These five topics provide fodder for developing research questions that delves into a linear structure of district support of principal supervisors to principal supervisor support of principals. These topics can be examined for principal supervisor models prior to reducing spans of control and post change to measure their effectiveness and impact on principal supervisors, principals, and school academic outcomes. Reducing principal supervisors' spans of control is a fairly new concept only being implement by a few large school districts across the country. Due to a few years of implementation and infancy of associated strategies and practices, it is clear that further research needs to be conducted.

REFERENCES

Alig-Mielcarek, J., & Hoy, W. K. (2005). *Instructional leadership*. In C. Miskel (Ed.), Educational leadership and reform (pp. 29-54). Greenwich, CT: Information Age.

Archer, J. (2005). In Iowa, some superintendents serve two masters. *Education Week, 25*(10), 8.

Bambrick-Santoyo, P. (2012). *Leverage leadership: A practical guide to building exceptional schools.* San Francisco, CA: Jossey-Bass.

Bambrick-Santoyo, P. (2018). *Leverage leadership 2.0: How to build exceptional schools across your district.* San Francisco, CA: Jossey-Bass.

Bambrick-Santoyo, P. (2012). Leading leaders. *Kappan, 94*(3), 70-71.

Bass, B. (1985). *Leadership and performance beyond expectations.* New York, NY: Free Press.

Blasé, J. & Blasé, J. (2000). Effective instructional leadership: Teachers' perspectives on how principals promote teaching and learning in schools. *Journal of Educational Administration, 38*(2), 130-141.

Blasé, J. & Blasé J. (1999). Principals' instructional leadership and teacher development: Teachers' perspectives. *Educational Administration Quarterly, 35*(3).

Blasé, J. & Blasé, J. (1998). *Handbook of instructional leadership: How really good principals promote teaching and learning.* Thousand Oaks, CA: Corwin Press.

Bossert, S., Dwyer, D., Rowan, B., & Lee, G. (1982). The instructional management role of the Principal. *Educational Administration Quarterly, 18*(3), 34-64.

Bray, J. H. & Maxwell, S. E. (1985). *Multivariate analysis of variance*. Newbury Park, CA: Sage Publications.

Burgess, J. S., & Dermott, R. A. (1983). Elementary school principals and leadership development. *Journal of Research in Rural Education*, *2*, 15-20.

Burns, J. (1978). *Leadership.* New York, NY: Harper and Row.

Canales, M. T., Tejeda-Delgado, C., & Slate, J. R. (2008). Leadership behaviors of superintendent/principals in small, rural school districts in Texas. *Rural Educator*, *29*(3), 1-7.

Carbaugh, B. G., Marzano, R. J., & Toth, M. D. (2015). *School leadership for results.* West Palm Beach, FL: Learning Sciences International.

Chance, E. W., & Lingren, C. (1988). The South Dakota rural principal: Characteristics and leadership style. *Journal of Research in Rural Education*, *5*, 23-25.

Clarke, S., & Wildy, H. (2004). Context counts: Viewing small school leadership from the inside out. *Journal of Educational Administration*, *42*, 555-572.

Corcoran, A., Casserly, M., Price-Baugh, R., Walston, D., & Simon, C. (2013). Rethinking Leadership: The changing role of principal supervisors. Retrieved from The Wallace Foundation website: https://www.wallacefoundation.org/knowledge-center/pages/rethinking-leadership-the-changing-role-of-principal-supervisors.aspx

Davis, S., & Darling-Hammond, L. (2012). Innovative principal preparation programs: What works and how we know. *Planning and Changing, 43*(1/2), 25-45.

Edmonds, R. (1979). Some schools work and more can. *Social Policy, 9*(5), 28-32.

Fink, S., & Markholt, A. (2013). The leader's role in developing teacher expertise. In L. R. Melina, G. J. Burgess, L. L. Falkman, & A. Marfurano (Eds.), *The embodiment of leadership* (pp. 317–333). San Francisco, CA: Jossey-Bass.

Florida Department of Education. (2018). *Florida standards assessment 2017-2018 volume 4 evidence of reliability and validity.* Retrieved from http://www.fldoe.org/core/fileparse.

php/5663/urlt/V4-FSA-1718-TechRpt.pdf

Florida Department of Education. (2019). *2019-20 Florida standards assessments end-of-Course assessments fact sheet.* Retrieved from http://www.fldoe.org/core/fileparse.php/5663/urlt/FSAEOCFS1920.pdf

Florida Department of Education. (2019). *2019-20 Florida standards assessments English Language Arts and mathematics fact sheet.* Retrieved from http://www.fldoe.org/core/fileparse.php/5663/urlt/FSAELA-MathFS1920.pdf

Florida Department of Education. (2019). *Differentiated accountability rule update.* Retrieved from http://www.fldoe.org/core/fileparse.php/18655/urlt/DA-Rule-Update-Presentation.pdf

Florida Department of Education. (2019). *Florida's differentiated accountability program.* Retrieved from http://www.fldoe.org/core/fileparse.php/16286/urlt/program.pdf

Florida Department of Education. (2019). *Statewide assessment program information guide 2019-2020.* Retrieved from http://www.fldoe.org/core/fileparse.php/5663/urlt/swapig.pdf

Florida Department of Education. (2019). *The Florida principal leadership standards.* Retrieved from http://www.fldoe.org/teaching/professional-dev/the-fl-principal-leadership-stards/

Florida Department of Education. (2019). *Title I, Part A: Improving the academic achievement of the disadvantaged.* Retrieved from http://www.fldoe.org/policy/federal-edu-programs/title-i-part-a-improving-the-academic-/

Glass, G. V. & Hopkins, K. D. (1996). *Statistical methods in education and psychology 3rd edition.* Needham Heights, MA: Allyn & Bacon.

Goldring, E. B., Grissom, J. A., Rubin, M., Rogers, L. K., Neel, M. & Clark, M. (2018). A new Role emerges for principal supervisors: Evidence from six districts in the principal supervisor initiative. Retrieved from Wallace Foundation website: https://www.wallacefoundation.org/knowledge-center/pages/a-new-role-emerges-for-principal-supervisors.aspx

Goldring, E., Huff, J., May, H., & Camburn, E. (2008). School context and individual characteristics: What influences principal practice? *Journal of Educational Administration, 46*, 332–352.

Goldring, E., Porter, A., Murphy, J., Elliott, S., & Cravens, X. (2009). Assessing Learning-Centered Leadership: Connections to Research, Professional Standards, and Current Practices. *Leadership & Policy in Schools*, *8*(1), 1-36.

Hallam, P. R., & Boren, D. M. (2019). Examining a university-multiple district sponsored academy from the perspective of principal supervisors. *AASA Journal of Scholarship & Practice*, *16*(1), 4-19.

Hallinger, P. (2003). Leading educational change: Reflections on the practice of instructional and transformational leadership. *Cambridge Journal of Education, 33*(3), 329-351.

Hallinger, P. (2005). Instructional leadership and the school principal: A Passing fancy that refuses to fade away. *Leadership & Policy in Schools*, *4*(3), 221-239.

Hallinger, P. (1992). The evolving role of American principals: From managerial to instructional to transformational leaders. *Journal of Educational Administration, 30*(3), 35-50.

Hallinger, P. & Heck, R. (1996). Reassessing the principal's role in school effectiveness: A review of the empirical research, 1980-1995. *Educational Administration Quarterly, 32*(1), 5-44.

Hallinger, P. & Murphy, J. (1985). Assessing the instructional management behavior of principals. *Elementary School Journal*, *86*(2), 217-247.

Hallinger, P., & Murphy, J. (1986). Instructional leadership in effective schools. Retrieved from https://files.eric.ed.gov/fulltext/ED309535.pdf

Hallinger, P., & Murphy, J. F. (1987). Assessing and developing principal instructional leadership. *Educational Leadership*, *45,* 54–61.

Hallinger, P., & Murphy, J. (1987). Instructional leadership in the school context. In W. Greenfield (Ed.), *Instructional Leadership: Concepts, Issues, and controversies.* Boston, MA: Allyn & Bacon.

Harper, B. (2015). Considering principal evaluation as means of renewal, reflection and growth. *Advancing Women in Leadership, 35*, 76-81.

Hassenpflug, A. (2013). How to improve instructional leadership: High school principal selection process versus evaluation process. *Clearing House*, *86(3),* 90-92.

Hauserman, C. P., & Stick, S. L. (2013). The leadership teachers want from principals: Transformational. *Canadian Journal of Education*, *36*(3), 184–203.

Heck, H., Larsen, T., & Marcoulides, G. (1990). Instructional leadership and school achievement: Validation of a causal model. *Educational Administration Quarterly, 26*(2), 94-125.

Hitt, D. H. & Meyers, C. V. (2018). Beyond turnaround: a synthesis of relevant frameworks for leaders of sustained improvement in previously low-performing schools. *School Leadership & Management, 38*(1), 4-31.

Hitt, D. H., Woodruff, D., Meyers, C. V., & Zhu, G. (2018). Principal competencies that make a difference: Identifying a model for leaders of school turnaround. *Journal of School Leadership*, *28*(2), 56-81.

Hollander, E. P. (1978). *Leadership dynamics: A practical guide to effective relationships.* New

York, NY: Free Press

Huang, T., Beachum, F. D., White, G. P., Kaimal, G., Fitzgerald, A. M., & Reed, P. (2012). Preparing urban school leaders: What works? *Planning & Changing*, *43*(1/2), 72-95.

Hvidston, D., Range, B., & McKim, C. (2015). Principals' perceptions regarding their supervision and evaluation. *AASA Journal of Scholarship & Practice, 12(*2*),* 20-33.

Ismail, S. N., Yahya D., Husin, F., & Khalid, R. (2018). Instructional leadership and teachers' functional competency across the 21st century learning. *International Journal of Instruction*, *11*(3).

Jenkins, J., Lock, L. F., & Lock, M. A. (2018). Leadership: A critical bridge to accountability. *Delta Kappa Gamma Bulletin*, *84*(3), 10–15.

King, D. (2002). The changing shape of leadership. *Educational Leadership*, *59*(8), 61–63.

Kowalski, T. J., & Björk, L. G. (2005). Role expectations of district superintendents: Implications for deregulating preparation and licensing. *Journal of Thought*, *40*(2), 73-96.

Lee, L. C. (2015). School performance trajectories and the challenges for principal succession. *Journal of Educational Administration*, *53*, 262-286.

Leithwood, K. A. (1992). The move toward transformational leadership. *Educational Leadership*, *49*, 8-12.

Leithwood, K., Jantzi, D., & Steinbach, R. (1999). *Changing leadership for changing times.* Florence, KY: Taylor & Francis Group.

Lemoine, P. A., Greer, D., McCormack, T. J., & Richardson, M. D. (2014). From managerial to instructional leadership: Barriers principals must overcome. *New Waves - Educational Research & Development*, *17*(1), 17-30.

Manasse, A. (1985). Improving conditions for principal effectiveness: Policy implications of research. *The Elementary School Journal*, *85*, 439-463.

Marks, H. M., & Printy, S. M. (2003). Principal leadership and school performance: An integration of transformational and instructional leadership. *Educational Administration Quarterly*, *39*(3), 370-397.

McKibben, S. (2013). Do local-level principal preparation programs prevent principal turnover? *The Public Purpose*, *11*, 69-85.

Meyer, M. J., & Macmillan, R. B. (2001). The principal's role in transition: Instructional leadership ain't what it used to be. *International Electronic Journal for Leadership in Learning*, *5*(13), 1–14.

Miller, W. (2014). Overlooked Until Now: Principal Supervision. *School Administrator*, *71*(10), 14-15.

Mitchell, C., & Castle, J. B. (2005). The instructional role of elementary school principals. *Canadian Journal of Education*, *28*(3), 409-433.

Montgomery, D. C., Peck, E. A., & Vining, G. (2012). *Introduction to linear regression analysis.* Hoboken, NJ: John Wiley & Sons, Inc.

Ohlson, M. (2009). Examining instructional leadership: A study of school culture and teacher quality characteristics influencing student outcomes. *Florida Journal of Educational Administration & Policy*, *2*(2), 102-113.

Nelson, S. W., de la Colina, M. G., & Boone, M. D. (2008). Lifeworld or systemsworld: What guides novice principals? *Journal of Educational Administration*, *46*, 690-701.

Phillips, G. W. (2016). National benchmarks for state achievement standards. Washington, DC: American Institutes for Research.

Pitner, N., & Hocevar, D. (1987). An empirical comparison of two-factor versus multifactor Theories of principal leadership: Implications for the evaluation of school principals. *Journal of Personnel Evaluation in Education, 1*(1), 93-109.

Purkey, S. & Smith, M. (1983). Effective schools: A review. *The Elementary School Journal, 83*(4), 427-452.

Quin, J., Deris, A., Bischoff, G., & Johnson, J. T. (2015). Comparison of transformational leadership Practices: Implications for school districts and principal preparation programs. *Journal of Leadership Education*, *14*(3), 71-85.

Reitzug, U. C. (1997). Images of principal instructional leadership: From super-vision to collaborative inquiry. *Journal of Curriculum & Supervision*, *12*(4), 324–343.

Robinson, V. M. J. (2010). From instructional leadership to leadership capabilities: Empirical findings and methodological challenges. *Leadership & Policy in Schools*, *9*(1), 1-26.

Saltzman, A. (2016a). Revising the role of principal supervisor. *Phi Delta Kappan*, *98*(2), 52-57.

Saltzman, A. (2016b). The power of principal supervisors: How two districts are remaking an old Role. Retrieved from The Wallace Foundation website: https://www/wallacefoundation.org/knowledge-center/pages/the-power-of-principal-supervisors.aspx

Sinnema, C., & Robinson, V. J. (2012). Goal setting in principal evaluation: Goal quality and predictors of achievement. *Leadership & Policy in Schools, 11(2),* 135-167.

Tice, T. N. (1988). Instructional leadership. *Education Digest, 54*(1), 65.

U.S. Department of Education. (2020). *Title I – improving the academic achievement of the disadvantaged.* Retrieved from https://oese.ed.gov/offices/office-of-formula-grants/school-support-and-accountability/essa-legislation-table-contents/title-i-part-a/

Vitcov, B. J. & Bloom, G. S. (2010). A new vision for supervision of principals. *School*

Administrator, *67*(11), 19-21.

Vogel, L. R. . (2018). Learning outside the classroom: How principals define and prepare to be instructional leaders. *Education Research International*, 1–14.

Webb, N. (2002). *Depth-of-knowledge levels for four content areas*. Retrieved from http://ossucurr.pbworks.com/w/file/fetch/49691156/Norm%20web%20dok%20by%20subject%20area.pdf

Weber, J. R. (1989). *Leading the instructional program*. School leadership: Handbook for excellence. (pp. 191-224). Eugene, OR: ERIC Clearinghouse of Educational Management.

Whitt, K., Scheurich, J. J., & Skrla, L. (2015). Understanding superintendents' self-efficacy influences on instructional leadership and student achievement. *Journal of School Leadership*, *25*(1), 102-132.

Wright Jr., H., & Harris, S. (2010). The role of the superintendent in closing the achievement gap in diverse small school districts. *Planning & Changing*, *41*(3/4), 220-233.

Yukl, G. A. & Nemeroff, W. (1979). Identification and measurement of specific categories of leadership behavior: A progress report. In J.G. Hun and L.L. Larson (Eds.), *Crosscurrents in Leadership.* Carbondale, IL: Southern Illinois University Press.