

THE EFFECT OF TEACHER COGNITIVE AND BEHAVIORAL AGILITY ON
STUDENT ACHIEVEMENT

By

Mary K. White

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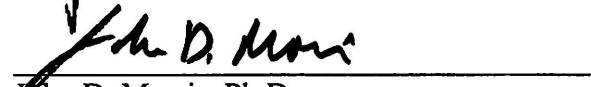
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This dissertation was prepared under the direction of the candidate's dissertation advisor, Dr. John R. Pisapia, Department of Educational Leadership and Research Methodology, and has been approved by the members of her supervisory committee. It was submitted to the faculty of the College of Education and was accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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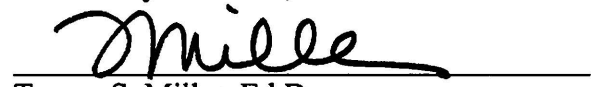
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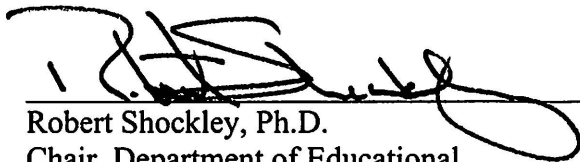
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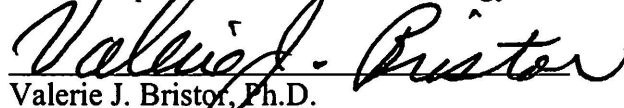
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Knowing is not enough; we must apply. Willing is not enough; we must do.
- Goethe

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ABSTRACT

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The purpose of this study was to determine if teachers who use thinking and leading actions have higher student achievement as measured by the teacher's Value Added Measure (VAM) score. A quantitative non-experimental design investigated the relationships between teacher cognitive and behavioral agility and student achievement. Cognitive agility, measured through the Strategic Thinking Questionnaire for Teachers (STQ^T), refers to the leader's ability to use their repertoire of thinking skills. Behavioral agility, measured with the Strategic Leadership Questionnaire for Teachers (SLQ^T), denotes the leader's ability to use a wide array of leader influencing actions. Teachers were surveyed and the data were analyzed through correlation and multiple regressions to determine the relationship among the variables.

Although the cognitive and behavioral agility was not correlated with a teacher's VAM score, the results indicate that teachers do perceive themselves as leaders in their classrooms. Educational leadership certification, higher degrees, and years experience of

a teacher did moderate the relationship between local VAM and both cognitive and behavioral agility. The sub-scales of systems thinking and transforming of the survey instruments also were significant to the results. Theoretically, this study contributes to the teacher leadership literature, focusing on the classroom teacher and their effect on student achievement. Practically, with educational accountability changing the landscape, school districts should train teachers to engage in leadership skills, reward teachers for earning a Master's degree in leadership, and work to retain high quality teachers who are leaders within their classroom. Greater student achievement could be the result.

DEDICATION

For my mother

“She made broken look beautiful
and strong look invincible.
She walked with the universe
on her shoulders and made it
look like a pair of wings.”

- Ariana Dancu

THE EFFECT OF TEACHER COGNITIVE AND BEHAVIORAL AGILITY ON
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CHAPTER 1: INTRODUCTION

In the current age of accountability, the expectation is that teachers will produce results; namely, increased student test scores and outcomes (Everson, Feinauer, & Sudweeks, 2013). This expectation has led to “increased, intensified, and expanded” teacher work (Valli & Buese, 2007, p. 520) and larger roles for classroom teacher leadership.

While Gardner (1993) indicated that teaching and leading are indistinguishable occupations, school leadership typically is meant to describe the school’s principal or assistant principal (Nichols, 2010). Moller and Katzenmeyer (1996) claimed that within the last 10 years reform has pushed teachers into leadership roles. Structures and roles are flattening within a school and teachers often are looked to as leaders within the school and certainly within the classroom. According to Suleiman and Moore (1997), there is a false assumption that teaching is for teachers and leading is for administrators.

Leadership can be a nuanced word, meaning different things to different people. But most scholars agree with Northouse (2013) and Yukl (2008) when they purported that leadership involves human interaction, influence, and caring for those they lead. As Kouzes and Posner (1987) added, “The most effective leaders we know care deeply about others, and they often refer to those with whom they work as family” (p. xvii).

While these definitions relate to those in recognized organizational leadership positions, they also apply to classroom teachers. Classroom teachers decide on activities to implement curricula goals and use their influence to move students toward this

common set of expectations (Crowther, 1997) and collaborate with students, parents, and community. Hence, teaching involves daily interaction with students and trying to influence them is part of the job. Thus their work can be viewed through the lens of leadership and the classroom teacher leader can use influence actions of leaders with students to help guide their performance. While literature on teacher leadership has garnered attention, the term classroom teacher leader has not received the same treatment.

The distributed leadership lens often has been used in regard to teacher leadership, and the term has been used interchangeably with the terms shared leadership, team leadership, or democratic leadership. These terms often are problematic because of the lack of empirical evidence of the effect of distributed leadership on the increase of student achievement (Spillane, 2005). Conversely, Harris (2002) claimed that research evidence on distributed leadership could be advantageous to schools. According to Spillane (2005), “What matters for instructional improvement and student achievement is *not* that leadership is distributed, but *how* it is distributed” (p. 149). Harris (2013) echoed,

Distributed leadership does not guarantee better performance; it is not a panacea for success, it does not possess any innate good or bad qualities, it is not friend or foe. Much depends on how leadership is distributed and the intentions behind it.

(p. 552)

According to Murphy (2005), the reforms of the 1980s initiated a reshaping of the school structure to change teaching from a single role to a variety of differentiated assignments. From this, career ladders, mentor teaching plans, and performance-based compensation plans were initiated (Yarger & Lee, 1994). These early efforts in teacher leadership, grown from reform movements, were rooted to the hierarchical structure of

schools. Darling-Hammond, Bullmaster, and Cobb (1995) argued that teacher leadership should not be slotted into different functions or hierarchical conceptions. Promoting that same notion, Yarger and Lee (1994) indicated that the emphasis should be on promoting the professionalization of all teachers (p. 227). While this greater purpose is noted in the literature, Berry, Byrd, and Wieder (2013) purported the conception of America's teacher leader remains too narrow, "...often upholding the existing and quite archaic, school structures" (p. 5), and the leadership traditionally takes on hierarchically rooted roles in the form of department heads, team coordinators, or chairing important committees. Teachers are reluctant to take on the role of teacher leader because of the perception by their fellow teachers it is an administrative one (Katzenmeyer & Moller, 1996).

A more current view of teacher leadership is forming. Stein (2014) indicated the roles and responsibilities of America's teachers have evolved significantly since the 19th century. The recent accountability policies and attention to increased student achievement have led to a greater discourse over the role of teachers (Block, Crochet, Jones, & Papa, 2012). Studies (Ballet, Kelchtermans, & Loughran 2006; Bartlett, 2004; Murphy, 2005; Valli & Buese, 2007) have indicated that regulations and decisions by policymakers to improve educational quality have changed the role of teachers. Hargreaves (1994) concurred and indicated that the pressures of postmodernity expand the role of the teacher as new mandates and problems come into play. Combined with innovation and accelerating change, teachers are teaching in a different world than the teachers now retiring from the profession. "Much of the future of teaching will depend on how these distinctive challenges of postmodernity are realized and resolved within our modernistic schools and school systems" (Hargreaves, 1994, p. 10).

Problem Statement

The goal of teacher training has been limited to acquiring pedagogical knowledge and passing the certification test (Bond, 2011, p. 281). The extant literature describes the teacher preparation in colleges as dealing with classroom management (Ertesvåg, 2011) and pedagogy (Bond, 2011; Moller & Katzenmeyer, 1996; Rogers & Scales, 2013). The literature describes teacher practice as encompassing discipline, order, and control (Rogers & Scales, 2013); allocation of time (Moller & Katzenmeyer, 1996); and pedagogy (Bond, 2011; Moller & Katzenmeyer, 1996; Roger & Scales, 2013). While Darling-Hammond (2010) indicated the last two decades have seen dramatic policy changes in teacher preparation to include the conception of building a greater, more knowledgeable teaching staff, research on the classroom teacher leader has been scant. Thus far, the focus has not led to solving education's vexing problems with student gains in achievement.

A newer opportunity is to recognize, as the research does, that teachers are the most important influence on student learning in the school (Hanushek, 2010; Hattie, 2009; Leithwood, Louis, Anderson, & Wahlstrom, 2004; Sanders & Horn, 1994). Hence, it could be argued that teachers are the key to higher student achievement. Katzenmeyer and Moller (1996) introduced the metaphor of a sleeping giant to illustrate the dormant status of teacher leadership as well as the power, if exerted, it could have on school reform. This change to viewing teachers as classroom leaders could lead to an increased level of sophistication in the job of teaching (Valli & Buese, 2007) and increased respect for the role as student achievement increases.

Whitaker (2004) claimed an effective teacher is an effective leader and those teachers who possess great leadership skills are great teachers. This line of thought suggests that perhaps teachers would be able to influence student learning to a greater degree if they were trained as classroom leaders to bring out the best in students and to help manage the innovation and rapidity of change. According to Nichols (2011), teachers need to have a greater sense of purpose and direction and be able to communicate this to their students; in essence, practice leadership in their classroom. This study proposed to determine if a connection exists between teacher classroom leadership, thinking and influence actions, and student outcomes.

Purpose of the Study and Research Questions

The purpose of this study was to determine if a teacher's cognitive and behavioral agility is related to student outcomes as measured by Value Added Measure (VAM) score, and if this relationship is moderated by alterable and unalterable variables.

Complex times require teachers with complex mental and behavioral abilities. Teachers must first think. In this study, thinking refers to the teachers' cognitive agility; the ability to use multiple thinking skills to understand the complexities they face. Then teachers must act. In this study, acting refers to the teachers' behavioral agility; the ability to use multiple forms of leader influence actions to act upon the complexities they face in their classrooms. The teacher as classroom leader is nimble of mind and action. The study was guided by the following research questions:

1. Is there a relationship between a teacher's cognitive agility and student academic performance as measured by a teacher's VAM score?

- a. Do alterable and unalterable variables moderate the relationship between the teacher's cognitive agility and student academic performance?
2. Is there a relationship between the teacher's behavioral agility and student academic performance as measured by a teacher's VAM score?
 - a. Do alterable and unalterable variables moderate the relationship between the teacher's behavioral agility and student academic performance?
3. Can a predictor model of effective teacher classroom leadership be developed?

Significance of the Study

The extant literature indicates that the classroom teacher is the most important factor in relation to student achievement in schools (Hanushek, 2010; Hattie, 2009; Leithwood et al., 2004; Sanders & Horn, 1994). Yet, there are no studies focused on the teacher's ability to lead in the classroom. Thus, identifying teacher classroom leadership skills that lead to student performance could help district leaders obtain and retain highly effective classroom leaders who have a positive impact on student achievement.

This study contributes to the literature in several ways. First, studying the effects of teacher classroom leadership is limited. Secondly, studying teacher classroom leadership through the lenses of cognitive and behavioral agility has not been studied nor researched with thoroughness to contribute to the education accountability literature.

On a practical note, if desired classroom thinking and leadership behaviors are replicable, then schools could improve student achievement by increasing classroom

leadership behaviors. Teachers who display an advanced set of skills in the classroom can help transform school culture and contribute to real improvement for students (Suleiman & Moore, 1997). Finally, examining the teacher’s cognitive and behavioral agility and their contribution to the teacher’s VAM score could lead to changes in pre-service training as well as in recruiting, hiring, and training practices that contribute to greater achievement for school systems.

Theoretical Considerations

This study was framed by the four major concepts: a classroom teacher’s cognitive agility, behavioral agility, teacher performance as measured by VAM, and alterable and unalterable variables, as depicted in Figure 1.

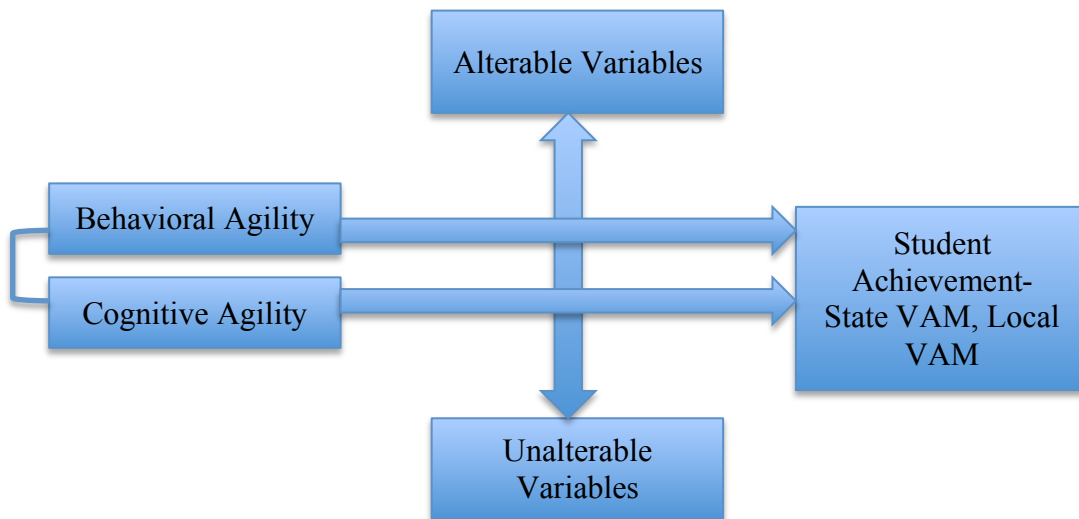


Figure 1. The research map that guided this study.

Cognitive Agility

Denison, Hooijberg, and Quinn (1995) studied the repertoire of leadership behaviors in their interactions with subordinates as well as with their peers and superiors and posited leaders who possess the necessary cognitive and behavioral complexity are

effective. Green (2004) expanded to include differences in individuals' ability to differentiate and integrate parts of information stimuli, and this notion warrants examination. Classrooms are dynamic environments and Glynn (1996) claimed that understanding where individuals may be adaptive might be a good starting point for navigation of dynamic environments.

Cognitive complexity was given credence with the work of Bieri (1955), who explained cognitive complexity as the person's ability to differentiate constructs – a more cognitively complex person has a more differentiated system for perceiving others' behavior. Crockett (1965) found that cognitively complex individuals were able to attribute both good and bad traits about a person. According to Larson and Rowland (1974), definitions of cognitive complexity differ; however, there is agreement that individuals who utilize a number of constructs to perceive and evaluate their environment are more cognitively complex. "Individuals with low complexity, therefore, are characterized as having categorical black-white perceptions as well as relatively few, but rigid rules of integration" (Larson & Rowland, 1974, p. 38). Cognitively complex leaders can absorb information and use it in many ways. In today's globally flat and complex world, leaders must possess and use these complex skills. This current study followed Warkentien's (2016) definition of cognitive complexity: "Cognitive complexity is a psychological characteristic describing the breadth of a person's framing or perceptual skills which may enable them to perceive opportunities and make better decisions" (p. 15).

However, being cognitively complex is not enough. Leaders also must be cognitively agile. They must be able to interpret, understand, and identify alternatives in

this uncertain educational arena. Leaders need cognitive agility, or the ability to use schemata and strategic thinking skills. Cognitively agile leaders are able to differentiate information and see relationships within information to search for meaning. These advanced cognitive skills allow leaders to have advanced communication skills that include writing, reading, and listening skills as well as the ability to evaluate information through critical thinking skills (M. Mumford, Friedrich, Caughron, & Byrne, 2007). According to Pisapia and Pang (2012), cognitively complex people perceive nuances. Cognitive skills, according to T. Mumford, Campion, and Morgeson (2007), are the foundation of leadership skill requirement, including the ability to learn and adapt – the skills enabling leaders to work with new information and grasp its implications (p. 156). According to Streufert and Swezey, this agility can contribute to a greater search for novel information and an increased amount of time spent interpreting it (as cited in Massingham, 2013, p. 235). Swisher (2013) indicated that leaders in the future would need to be better prepared to meet the challenges of the future, including an increased competitive environment, rapid technology change, and a global marketplace. The need to manage these changes begs for increasing the cognitive agility of those in front of students.

Cognitive complexity and agility has its place in classrooms. Robinson (1973) discovered that teachers who are more cognitively complex do not attribute a good or bad trait to a student. This could mean that a less cognitively complex teacher is unable to integrate information and constructs about the child's learning or performance. The more cognitively agile teacher may be able to individualize the cognitive demands that are employed to meet the needs of the students. The present day classroom offers an arena

where cognitive agility must be active. In the data-driven school where student performance becomes a metric, the agile teacher will make decisions to increase student achievement. Additionally, the teacher's ability to differentiate instruction for the myriad-leveled students as well as the ability to interpret the wide variety of social and emotional abilities and needs of students in the inclusion classroom presents a complex arena. Like organizations, classrooms are complex environments and teachers have the task of navigating this environment where internal and external forces contribute to the complexity.

Leinhardt and Greeno (1986) proposed that a skilled teacher has a complex knowledge structure consisting of interrelated sets of organized actions referred to as schemata. The literature identifies many cognitive skills such as analysis and synthesis to positively impact student achievement. In a review of this literature, Pisapia, Reyes-Guerra, and Coukos-Semmel (2005) extracted three promising skills that lead to successful leadership: systems thinking, reframing, and reflection. The three skills of reflection, reframing, and systems thinking as defined in the literature here are three effective thinking habits of leaders. The term reflection, in a leadership context, means the leader is cognizant that one decision might be better than another. Dewey (1933) defined reflection as rationalizing and assessing one's beliefs. Boud, Keogh, and Walker (1985) referred to reflection as "a generic term for those intellectual and affective activities in which individuals engage to explore their experiences in order to lead to new understandings and appreciation" (p. 3). According to Mezirow (1990), the term reflection often is used as a synonym for higher order mental processes. Within reflection, there are discriminations and evaluations that must be made as well as the skill

of remembering, solving problems, and interpreting. Pisapia (2009) defined reflection as “the ability to use perceptions, experiences and information to make judgments as to what has happened in the past and is happening in the present to help guide future actions” (p. 64).

A frame is a mental model and the term, reframing, according to Bolman and Deal (2011), is the ability to think about situations in more ways than one. The researchers also indicated that leaders often use multiple lenses to get a better sense of what they are dealing with and how best to take next steps. Pisapia’s (2009) defined reframing as “the ability to look at your reality using multiple perspectives, differing frameworks, different mental models, and different paradigms in order to generate new insights and options for actions” (p. 64). This ability to sort through problems and see them differently allows leaders to solve problems differently. Bolman and Deal (2011) suggested that those who master reframing claim a sense of power.

According to Pisapia (2009), “Systems thinking refers to the leader’s ability to see systems holistically by understanding the properties, forces, patterns, and interrelationships that shape the behaviors of the system and decide which options for action” (p. 65). Fullan (2005) suggested that in schools there is a need for leadership that reflects systems thinking in action. Senge (2000) suggested that schools must use all three skills in order to regenerate the antiquated school system and indicated that reframing how schools are envisioned and reflecting upon existing assumptions could contribute to greater school success. Leaders who are cognitively agile collect and interpret information, view this information from multiple perspectives, and apply it to practice.

The empirical evidence being generated from use of these three skills is mounting. Several studies (Pang & Pisapia, 2007; Pisapia & Pang, 2012, 2013; Pisapia, Pang, Hee, Ying, & Morris, 2009; Pisapia, Reyes-Guerra, & Yasin, 2006; Warkentien, 2016; Zsiga, 2008) have used the Strategic Thinking Questionnaire (STQ) to measure the use of the three mental skills of strategic thinking to posit that the success of a leader is differentiated by the cognitive agility of the leader, and when the three skills are used in harmony, the leader is more effective. While many of the studies focused on leader effectiveness (Pang & Pisapia, 2012; Pisapia et al., 2006), one also pointed to the leader role and school type (Pang & Pisapia, 2012). Zsiga (2008) focused on self-directed learning. Pisapia et al. (2009) examined differences in countries, but found the use of the strategic thinking skills was a function of age and gender and not location. Warkentien (2016) used an altered instrument with teacher leaders and found cognitive agility was related to a teacher's VAM if the teacher was over the age of 55. The current study plays a role for aspiring leaders, many of who are teachers and possibly play a quasi-leadership role within the school.

Behavioral Complexity and Agility

Denison et al. (1995) theorized that leadership is performed through action and not cognition; therefore, theories of behavior need to be developed. The researchers wrote that effective leaders are able to use a wide variety of behaviors that promote relationship and hierarchy. Complex situations, similar to that of a classroom, require actions that present paradox and contradiction.

If teachers are asked to lead in today's changing educational environment, teachers will need a wide array of influence actions in order to be effective. Stogdill

(1950) described leadership as a way to influence people to cooperate toward the same goal. Gerth and Mills suggested, “Direct leadership is an interaction process in which an individual, usually through the medium of speech, influences the behavior of others toward a particular end” (as cited in Bass, 2008, p. 18). Leadership influence implies a reciprocal relationship between the leaders and the followers. Bass (2008) cautioned that this relationship does not have to be about control and compliance, but that successful leadership has a determining effect on the activities and behaviors of the group (p. 19).

According to Pisapia (2009), “Life in the postmodern condition is characterized by complexity, ambiguity, and messiness” (p. 5). With this in mind, he continued, “leaders are caught between the need for change and the need for stability” (Pisapia, 2009, p. 5). This balancing act is an example of behavioral complexity, defined as “the capacity of a given leader to engage in a wide repertoire of behaviors” (Lawrence, Lenk, & Quinn, 2009, p. 88). Pisapia (2009) identified leader influence actions (bonding, bartering, bridging, managing, and transforming) that could contribute to success as a leader. Bonding actions help to ensure trust is built within the organization’s values. With bridging, the leader develops alliances with people of power from outside and inside the organization. Bartering actions are exchanges of sorts, used to strengthen relationships and alliance building efforts (Pisapia, 2009). Managing is about control, efficiency, and effectiveness, while transforming actions influence direction and culture so that change and learning is an everyday occurrence within an organization.

The actions of a strategic leader are considered behavioral influence actions. Socrates (or Xenophon) was the first to identify the role of *strategos*, or strategic leader, and saw these skills as transferrable (Adair, 2010). Strategic leadership is “...the ability

(as well as the wisdom) to make consequential decisions about ends, actions and tactics in ambiguous environments. Strategic leadership marries management with leadership, politics with ethics, and strategic intent with tactics and actions” (Pisapia, 2009, p. 9). The idea that leaders have to manage a network of relationships has been repeated in the literature (Kotter, 1982; Yukl, 1989).

Agility stems from behavioral complexity and the term is used to indicate the leader is behaving in a behaviorally complex manner. Those leaders who behave in a behaviorally complex manner are using a wide variety of strategic actions, which enable them to be agile. Teachers consistently have to exhibit and become accustomed to using opposing behaviors to achieve results in their classroom. The conditions inside a classroom are multi-dimensional: differentiating instruction, managing behaviors, using formative and summative assessment to guide instruction, collaborating with teammates, and communicating with parents and community stakeholders, and contribute to the wide repertoire of skills for teachers. The expectations that teachers participate in these activities to improve student outcomes cause additional pressure.

Teachers and classrooms, as a microcosm of society, need to use more than one action to deal effectively with the competing behaviors in the multi-dimensional classroom. Pisapia’s (2009) strategic leadership framework helps to recognize the different actions needed by the leader and, in this case, the teacher.

Pisapia (2009) identified one of the leader actions as managing actions, which allow efficiency in processes such as setting policies and goals and operating smoothly. Teachers are experts at managing actions as the day-to-day classroom requires procedures, plans, and purpose for effective operation. In addition to the nuts and bolts of

teaching, teachers inspire and motivate students to achieve goals. These transformational behaviors also are part of a teacher's work. Creating a classroom culture that is collaborative and positive is an integral part of these behaviors.

Bonding actions, also important in the classroom, help to promote a sense of a common good and purpose. Teachers create a connection with their students through storytelling, listening, and relationship building. It is through these actions that teachers can model for students the moral character necessary for citizenship in their post-secondary life. Bridging and bartering are additional leader actions that serve as networking actions to help teachers attain necessary resources. In the classroom, teachers use these actions as they develop relationships with peers and students, write grants, meet with stakeholders, and reach out for mutual benefit. Classroom teachers use the leader influence actions on a daily basis to help accomplish goals for students.

Teacher effectiveness as measured by VAM. According to McCaffrey, Lockwood, Koretz, Louis, and Hamilton (2004), the use of VAM, a student growth measure, and its attempt to isolate contributions of teachers in order to hold teachers accountable for student outcomes is increasing. Using VAMs for studying teacher effectiveness uses a formula to measure growth over time by inferring that an estimate of student gains can be obtained from the data (Hallinger, Heck, & Murphy, 2014). The use of the student growth performance measure has become popular and is attractive because extensive research has been done in the area of teachers and their differentiating effects (Betts, 1995; Hanushek & Rivkin, 2010; Rockoff, 2004). Bracey (2006) purported that successive cohort models like a student growth measure or VAM may have nothing to do with the quality of instruction, but, in 2011, the state of Florida adopted policy that

requires teachers in Florida to be evaluated using student achievement data after Florida contracted the American Institute For Research (AIR) to assist in the development, evaluation, and implementation of VAM (Florida Department of Education [FLDOE], 2011). Additionally, a 27-member Florida Student Growth Implementation Committee was established to help provide input and feedback.

The state of Florida uses a complex model to calculate a VAM score:

$$(1) Y_{isjt} = \beta_0 + Y_{isjt-1} \beta_1 + Y_{isjt-1} \beta_2 + X_{it} \beta_3 + S_{it} \beta_4 + \Theta_s + \varepsilon_{isjt}$$

In (1), Y_{isjt} is a test score for student i in subject j (math or language arts) in year t , X_{it} is a vector of student characteristics for student i , S_{it} is a vector of school characteristics for the school attended by student i in time t , Θ_s is a vector of school fixed effects, and ε_{isjt} is the error term (Ehlert, Koedel, Parsons, & Podgursky, 2013, p. 6). While VAM is not without its critics, Scherrer (2012) defended the accountability measure by accepting its use for isolating teacher effects. Due to the concerns associated with high stakes testing, it is not recommended for ranking teachers.

For the purpose of the current study, two criterion variables were used to assess student achievement. State VAM is the score that teachers receive from the state of Florida for the proficiency and growth of students taking a state provided end-of-year assessment, Florida Standards Assessment (FSA), or other End-of-Course (EOC) assessment. The second, local VAM, is the score that the county of study assigns to teachers based on the proficiency or growth of a teacher's students. The local VAM scores are derived from school district assessments or a combination of state assessments.

Moderating Factors

Moderating factors may have the ability to influence the relationship of the

predictor and criterion variables. The research of Yukl, Ping Fu, and McDonald (2003); Vaccaro, Jansen, Van Den Bosch, and Volberda (2012); and Miron (2015) helped inform the variables in the current study these variables can influence or moderate relationships. Alterable variables including school size, the grade level of the school, and the socioeconomic status (SES) of the school are factors that might affect the relationships examined in this study. Unalterable variables such as gender, age, years of experience as a teacher, highest degree earned, in-state or out-of-state teacher certification, and if the teacher has certification in the area of leadership also were examined in the study. Contextual variables include where the teacher received his or her undergraduate degree or leadership degree, and the grade or content taught are used for descriptive purposes. These variables could contribute to the student outcomes and results of the two measures used in this study. An interaction may exist between the variables and knowing if there is interaction was important to the researcher.

Methodology

This study used a quantitative non-experimental design employing correlation and multiple regression analysis to identify relationships between the variables. The moderated-effects model hypothesizes that teachers achieve their effect on school outcomes through different avenues and variables (ten Bruggencate, Luton, Scheerens, & Slegers, 2012).

The relationships investigated in the design included those between teacher cognitive and behavioral agility and student achievement as measured by VAM scores with two metrics (state and local). Cognitive and behavioral agility refers to the ability of the teacher to use a wide repertoire of thinking and influence structures in his/her

practice. VAM scores are used to isolate an effect of the teacher on an individual student and his/her academic growth in comparison to the expected growth. Cognitive and behavioral agility were measured through an amended Strategic Thinking Questionnaire (STQ) and a Strategic Leadership Questionnaire (SLQ). The district of study provided teacher VAM.

The sample for this study was acquired from a population of 1,340 teachers in a southeastern Florida school district. The teaching workforce was surveyed and the data analyzed through a multiple regression/correlation analyses to determine the relationship among the variables.

Summary

The current study, concerning the possible relationship of classroom leadership, thinking and influence actions, and teacher effectiveness as measured by a teacher's VAM, has broad reaching implications. "The challenges facing our schools cannot be met with all teachers serving in the same narrow roles designed for a bygone era" (Berry et al., 2013, p. 3). Knowing the cognitive and behavioral agility of classroom teachers and their effect on student achievement could contribute to teacher preparation programs as well as in-service training programs. Because a teacher's VAM score is reflective of performance, higher VAM scores could be an indication of greater student achievement. Predicting the actions of teachers and the effect on student achievement has implications across school districts and communities.

CHAPTER 2: LITERATURE REVIEW

Introduction

The purpose of this study was to investigate the link between the cognitive and behavioral agility of a classroom teacher and student academic performance as measured by a teacher's VAM score. This study measured a classroom teacher's cognitive and behavioral agility using Pisapia's (2009) strategic leadership instruments. The review of the literature begins with a review of the historical development and effects of teacher leadership. The literature on teacher leadership helps to expose the varied and wide use of the term teacher leadership, but does not adequately help to define classroom teacher leadership for this study. The variables identified in the conceptual framework – cognitive and behavioral agility, teacher leadership, and performance – guided this study and helped to provide context for this review of the literature and are explored. Current value-added approaches to measure teacher performance are explored in the final section.

Teacher Leadership

The concept of teacher leadership has been embedded in the language and practice of education for many years. Varied and useful definitions and studies exist but do not adequately define the classroom teacher leader. Classroom teacher leadership is important because for students to improve, quality instruction must be implemented across all classrooms (Sanders, 1998).

Yarger and Lee (1994) noted that in the 1970s a federally funded program, Teacher Corps, helped develop the notion of teachers being team leaders. Education

reform in the late 1980s – career ladders, teaching mentorship, and performance-based compensation – helped to change the landscape of a teaching career (Berry & Ginsberg, 1990; Leithwood, Steinbach, & Ryan, 1997; Yarger & Lee, 1994). Reform saw the idea of teachers improving the profession by identifying exemplary teachers. Regardless of its placement, the concept of teacher leadership denotes the important concept that teachers hold a central position in the core functions of the school (York-Barr & Duke, 2004).

There is increasing recognition in the literature that principals alone cannot do the massive amount of work required to increase student achievement today. Katzenmeyer and Moller (2001) corroborated this notion: “When given opportunities to lead, teachers can influence school reform efforts. Waking this sleeping giant of teacher leadership has unlimited potential in making a real difference in the pace and depth of school change” (p. 102). Murphy (2005) cited research to indicate that teacher leadership has become an accepted and established feature of school improvement. Fullan (2005) reiterated, “leadership, (not ‘leaders’) is the key to the new revolution” (p. xi) in transforming schools. Fessler and Ungaretti (1994) supported the notion that meaningful school reform will not occur until teachers are recognized as full partners in defining and leading school improvement efforts. Danielson (2006) reiterated this notion because teacher leadership “entails mobilizing and energizing others with the goals of improving the school’s performance of its critical responsibilities related to teaching and learning” (p. 12).

Teacher leaders work in collaboration with other teachers so that their teaching practice can become visible and public. Danielson indicated that this could make a significant contribution because the teacher leader de-privatizes practices, which is critical for collective learning (p. 15). York-Barr and Duke (2004) agreed when they suggested that

the vehicle of teacher leadership is within the professional community as teachers assume roles of coach, mentor, and mentee.

Danielson (2006) indicated that teacher leadership could involve the process of change because it means doing things differently. She eschewed the notion of leadership being one of the lone rangers for teacher leadership. The relationship for teacher leaders is more about collaboration than isolation.

The term teacher leadership is not clear and multiple definitions exist (Moller & Pankake, 2006; York-Barr & Duke, 2004). “Teacher leadership is not necessarily vested in a formal hierarchy or role description, it is legitimately grounded within the boundaries of several other leadership theories” (York-Barr & Duke, 2004, p. 263). Multiple definitions are problematic and York-Barr and Duke (2004) indicated the literature is descriptive instead of explanatory. Quantitative studies are necessary in order to move from explanatory to descriptive. Fairman and Mackenzie (2015) went so far as to say that the term teacher leader hinders progress toward a collective responsibility of improved student outcomes and refers to the work as an evolving, interactive, ongoing process.

York-Barr and Duke (2004) defined teacher leadership as, “the process by which teachers, individually or collectively, influence their colleagues, principals, and other members of school communities to improve teaching and learning practices with the aim of increased student learning and achievement” (pp. 287-288). Danielson (2006) referred to a set of skills demonstrated by teachers that extended beyond their classroom walls. Regardless of the definition, Yarger and Lee (1994) highlighted core components of teacher leadership and included:

1) commitment to classroom teaching and role-modeling for students and teachers; 2) expertise in subject matter and pedagogy; 3) specific personality characteristics, especially risk taking; 4) well-developed interpersonal skills for effective communication, collaboration, and support of colleagues; and 5) understanding of the contexts and the policies of the school and school district. (p. 228)

The literature on teacher leaders is varied and extensive. Silva, Gimbert, and Nolan (2000) described three waves of teacher leadership that evolve from formal to less formal roles that have boundaries. The first is a formal leadership role such as department chairperson or other similar role designed to maintain an efficient system. The second wave, which involves teachers employed in teaching positions such as curriculum developer, instructional coach as well as other teachers whose job is based outside of the classroom, is more aligned with teaching and learning. The third wave is one that recognizes teachers within the day-to-day work of teaching. These teachers have no special titles and are working collaboratively to improve student learning.

Pounder (2006) claimed a fourth wave, which includes the use of transformational leadership to influence students toward a common goal. The style, popularized first by Burns (1978), includes transformational leaders who are able to inspire followers to change expectations and work toward a common goal. The transformational leader articulates through an energizing vision and challenging goals. Harris and Muijs (2004) offered dimensions of teacher leadership, which include brokering, where teachers implement effective practices; participative leadership, where teachers develop new

strategies; and mediating, where teachers use their own knowledge to interpret improvement efforts.

Often teacher leaders do not want to be seen as leaders, but first as teachers (Danielson, 2006; Fairman & Mackenzie, 2015; Katzenmeyer & Moller, 2009). According to a recent Metropolitan Life Insurance Company Survey (2013), 51% of the teachers reported that they are interested in taking on additional roles, but only 16% are interested in becoming a principal. Many teachers do not view leadership as a step up the ladder, and there are many teachers who want to remain close to the students. Many teachers assume leadership roles that will affect their daily practice in their classroom (Fairman & Mackenzie, 2015; Katzenmeyer & Moller, 2009). Yarger and Lee (1994) concurred by indicating that teachers are able to participate in decisions about curriculum and instruction, rather than the managerial tasks of a school principal.

Seminal research on teacher leadership conducted by York-Barr and Duke (2004) offered a conceptual framework to guide their inquiry into how teacher leadership develops and presented four conceptions of leadership: participative leadership, leadership as an organizational quality, distributed leadership, and parallel leadership (p. 261). The authors' review of teacher leadership pointed to three distinct waves. In Wave 1, teachers serve as grade-level chairs, department heads, or union representatives and take on managerial roles. In Wave 2, teachers take on instructional roles and help to implement curriculum and mentoring new teachers. In Wave 3, teachers begin to lead professional learning communities (PLC). This work on teacher leadership suggests leadership is not bestowed on one person in a hierarchy, but is viewed within the organizational context and has a social influencing effect (Yukl, 1994).

Ogawa and Bossert (1995) maintained leadership is a quality of the organization: “The medium of leadership and the currency of leadership lie in the personal resources of people” (p. 225). The researchers indicate that the current development of teacher leadership is helping to define new understandings of organizational leadership.

Leithwood and Duke (1999) described teacher leadership as instructional and participative. Participative leadership stresses group decision-making in order to make the organization better. A complementary style of leadership is distributive leadership (Spillane, Halverson, & Diamond, 2001). Distributive leadership also aligned with Ogawa and Bossert’s (1995) findings where they indicated the practice of leadership is distributed and stretched over contexts. The last term that York-Barr and Duke (2004) described is parallel leadership introduced by Crowther, Kaagen, Ferguson, and Hann (2002). In parallel leadership, the principal assumes the role for strategic leadership and teachers assume the role for pedagogical leadership.

An additional topic that warrants research is the concept of teacher leadership within teacher preparation programs. There are fierce debates on the best way to prepare teachers for their teaching experience. Traditionally, teacher preservice training focuses on identifying management and instructional strategies that will enable teachers to instruct and help students of low SES and varied ability (Ross & Kyle, 1987). According to Boyd, Grossman, Lankford, Loeb, and Wyckoff (2009), there are schools of thought that include easing requirements into teacher preparation programs as well as another school of thought that seeks to tighten requirements because teaching preparation is a promise approach to teaching quality. Henry et al. (2014) indicated teacher preparation matters. The researchers tied teacher preparation avenues with student achievement

during their first year of teaching. Teachers who were prepared in formal programs were more effective than those trained in other paths. While Boyd et al. (2009) indicated teacher preparation can have an effect on student achievement, they also wrote that there is a wide variety of information presented to preservice teachers and there is no conclusion as to the effects of this information. The researchers found programs that focus on what new teachers actually will be doing in the classroom have a greater effect on student achievement. Darling-Hammond and Baratz-Snowden (2007) concurred and indicated that critical concepts must be taught and students then exposed to multiple applications of the concepts. Ironically, Peik (1946) had similar findings – pre-service teachers need more time in the classroom and more training in the professional aspects of teaching. The research on teacher preparation programs and their landscape has not changed significantly.

Preparing teachers for leadership in preservice programs has not been studied and has become an important topic in preservice teacher education. Dewey (1946) purported that because teachers worked directly with students they had a responsibility to guide policy that had an impact on the school. O’Hair and Odell (1995) indicated that teachers need an expanded role in leadership and teacher preparation should include a focus on leadership to fill the expanded role in school reforms. These reforms include performance-based programs as well as outcomes model of teacher preparation programs (Cochran-Smith, 2001); creating and sustaining leaders is a common goal of many colleges of education (Rogers & Scales, 2013). The goals of state standards in teacher preparation include teachers taking responsibility for student learning, collaborating with peers and families, and ensuring learning growth (Rogers & Scales, 2013, p. 18).

In the Rogers and Scales's (2013) study of leadership essays by preservice teachers, the teachers indicated that their leadership was influenced by the context of the school and classroom. This suggests that if a preservice teacher is not within a context where the leadership experiences are set up for the preservice teacher, the opportunities may not exist. Many agree that the concept of teacher leadership should be introduced in the teacher preparation program (Bond, 2011; Rogers & Scales, 2013); the school context will enhance or impede the teacher leader's development. Ross and Kyle (1987) agreed that the literature suggests competent teachers need skills that highlight intelligence and flexibility (p. 42), suggesting a need for leadership skills.

While teacher leadership has been examined in preservice programs, teacher leadership in-service programs should be studied. Jacob and McGovern's (2015) research project titled *The Mirage* showed teacher development is a highly individualized process. While the authors and researchers of the study had no conclusions in terms of how better to develop teachers, they did agree, "it will require a new conversation about teacher development—one that asks fundamentally different questions about what better teaching means and how to achieve it" (Jacob & McGovern, 2015, p. 3).

According to Jacob and McGovern (2015), school districts spend an average of \$18,000 per teacher per year on development. This represents a strong commitment of time, money, and resources on supporting teachers' professional growth as the primary strategy for improving student learning. Their research indicated that the evaluation records of these teachers remained constant or declined over the last two to three years (Jacob & McGovern, 2015, p. 2). The research showed that they were unable to link a teacher's growth to any particular development strategy. The research also suggested that

teachers need clear information about their strengths and weaknesses, but many are not getting this information. Teachers who have received low ratings seem to dismiss them, perhaps suggesting a culture of low expectations for teacher development and performance. To address these findings, the researchers have recommendations: (1) redefine, that is to define development as measurable progress toward an ambitious standard; (2) reevaluate, that is to take inventory and examine the effectiveness of programs; (3) reallocate funding based on their impact; (4) reinvent, that is to balance the funding for development with the funding for recruitment, compensation, and retention, as well as redesign schools to extend the influence of great teachers; and (5) reimagine how teachers are trained and certified (Jacob & McGovern, 2015, p. 3).

Seeking leadership opportunities for preservice and in-service teachers can help teachers reimagine the job they hold and how they interact with the changing educational conditions. Additionally, school systems are not helping teachers understand how to improve or even indicating if they have room to improve at all. Because many teachers dismiss improvement efforts, thinking they do not need to improve, many of the efforts to improve teacher quality do not work.

Teacher Leadership and School Improvement

There are few studies that help to quantify and elucidate the effects of teacher leadership on student achievement (York-Barr & Duke, 2004). Crowther (1997) indicated that the study of teacher leadership and student achievement is underdeveloped. Also underdeveloped is the notion of classroom teacher leadership and its effects on student achievement.

Additional research is needed to assess the impact of classroom teacher leadership on school improvement. The research is clear – teacher leadership activities contribute to overall school improvement (Leithwood, Patten, & Jantzi, 2010; Lieberman & Miller, 2004; Murphy, 2005; Spillane, 2006). Policy discussions have suggested increased teacher influence has the potential for positive effects on school improvement (Huber, 2004; Leithwood & Beatty, 2007; Leithwood & Mascall, 2008)

There has been minimal research conducted or quantified to determine whether classroom teacher leaders increase student outcomes or achievement in their own classrooms. Louis, Dretzke, and Wahlstrom (2010) argued the need for additional research to examine the specific leadership behaviors used in the classroom that are effective in supporting student achievement.

In her dissertation, Sugg (2013) examined the student achievement of English language arts (ELA) scores on the Kentucky Criterion Reference Test of two large urban middle schools that received Title I School Improvement Grants (SIG). A sample size of 42 teachers was connected to their students' ELA scores to determine the relationship between teacher leadership and student achievement. Poverty, disability, and ethnicity were taken into account in the study. Teacher leadership was quantifiably measured using a teacher leadership perception survey. The survey questions, developed from the questions in the SIG grant application, determined the extent of teacher leadership in the school building as well as teacher self-perception as a teacher leader. The survey was considered reliable with a Cronbach alpha = .793. Bivariate correlation revealed that individual levels of teacher leadership do not predict increased levels of student achievement for students under their care. In fact, the relationship between student

achievement and teacher leadership was statistically significant and a slight negative one. Additionally, simple linear regression yielded a similar result: teacher leadership is not related to student achievement. Student characteristics including disability, race, and income predicted achievement in ELA.

Studying effective teachers and their impact on students' academic achievements, Qureshi and Niazi (2012) explored the effects of effective teacher traits and student achievement in Islamabad, Pakistan. In addition to exploring the principles, traits, and skills of effective teachers, obstacles to effective teaching also were studied. The sample comprised 500 respondents from students, teachers, and heads of institutions. Two questionnaires were developed and administered to teachers, and the arithmetic mean, percentage, and correlation were calculated. According to the literature within the study, "the effective teacher is a leader who can inspire and influence students through expert and referent power" (Qureshi & Niazi, 2012, p. 31). Other characteristics of an effective teacher include optimism, motivation, and self-regulation. The results found students who were with teachers who demonstrated kindness, shared responsibility, and allowed freedom in the classroom had greater achievement. Teachers who accept diversity and foster individual instruction and creativity have the potential to be a more effective teacher.

Another international study considered the relationship between distributed leadership, teacher academic optimism, and student achievement in Taiwanese elementary schools (Chang, 2011). The random sampling consisted of 1,500 teachers. Structural equation modeling was used to explore further the relationships of distributed leadership, academic optimism, and student achievement. The research pointed and cited

in a Silins and Mulford (2002) study concluded that higher levels of distributed leadership might affect student learning results. Surveys were distributed to measure the variables and results show elementary school teachers' perceptions of distributed leadership and teachers' academic optimism were high. Difficulties in the analysis of student achievement limited the results of this study.

Another study examined the distributed leadership (DL) intervention implemented in four schools in the Philadelphia school district and student academic achievement (Cole, 2008). Within the district, four schools received the Annenberg-funded intervention in the form of professional development for teachers in DL, including training in professional learning communities (PLCs) and in distributing leadership around the school. Schools were examined for their SES, attendance, and ethnicity. The two separate data sources included a staff survey and student data from the Pennsylvania System School Assessment exam. The overarching question assessing the effect of DL on student outcomes showed no significant differences in student achievement.

Osman, Acar, Bull, and Sevinc (2007) studied whether the leadership style of the teacher or the learning style of the student affects academic achievement more. The large sample of 746 eighth grade students in Istanbul, Turkey participated in the study. Two scales were used: the Perceptual Learning Style Preference Questionnaire assessed the students' learning style, and to evaluate the teachers' leadership style a second scale was developed. To measure student achievement, grades of the students were collected. The study showed that the most important factor affecting student academic success was student perception of the teacher. Students who perceived their teacher to have people-

oriented leadership style were more successful. Learning styles of students did not have an effect on student achievement outcomes.

Nowocien (2005) studied if changes in teachers' approaches in their professional practice affected achievement of students after a teacher leadership capacity-building intervention framework was implemented. The researcher studied teachers' perceptions of changes in their classroom environments, instructional practices, planning, assessment, and confidence in teaching students of diversity as well as the observer ratings of the teachers, teachers' readiness for self-directed learning, and student achievement in reading. Student achievement was measured from results of the Reading Running Record within the district's Benchmark Literacy Assessment for students in grades K through 2 and the reading portion of the Florida Comprehensive Assessment Test (FCAT) for students in grades 3 through 5. The researcher developed the Teacher Leadership Capacity-Building Intervention Framework that provided infrastructure for a school to build its own teacher leadership capacity by focusing on identified teachers' strengths to support and transform each other. The Intervention Framework was implemented in two elementary schools. Teachers were administered a Self-Directed Learning Readiness Scale. When student data were examined following the implementation, gains were noted on the FCAT, but it was determined no significant difference in student achievement was noted.

According to Berry et al. (2013), in 1987 the National Board for Professional Teaching Standards began developing an advanced certification system built around rigorous standards of teaching practice including the use of systematic thinking and learning from experience (reflection). Although there were mixed reviews on the effect of

student learning, the research evidence was heralded and included the gold seal of approval from the National Research Council (Berry et al., 2013).

Warkentien (2016) also studied cognitive and behavioral agility in his non-experimental study of 75 teachers and related the measures to VAM and the Marzano (2007) instructional practice framework. He found that both cognitive and behavioral agility were significantly related to VAM and instructional practice for teachers over the age of 50.

With the exception of the NBPTS, the studies examined offer an extension of the research, but were limited as they relate to a classroom teacher using influence actions of a leader and guiding and helping students in their academic performance.

Classroom Leadership

Pounder (2006, 2014) views all teachers as leaders in their classrooms and concurred with Cheng (1994), who studied primary schools in Hong Kong, that the classroom is a small social quasi-organization. These notions have been asserted and advocated by researchers (Bolkan & Goodboy, 2009, 2011; Cheng, 1994; Harrison, 2011; Luechauer & Shulman, 2002; Pounder, 2006, 2014) who advocate the use of transformational leadership as the model for classroom leadership. Using research from Bass (1985), Pounder (2014) indicated the model for classroom leadership embodies transformational leadership traits as measured by the Multifactor Leadership Questionnaire, which includes measures for charisma, motivation, individual consideration, and intellectual stimulation (p. 274). It should be noted that Pounder's (2006, 2014) work occurred within university settings and not within the context of K-12 public schools. Early work from Eberly (1970) denoted famed leadership researcher

Mary Parker Follett gave one speech about education, mainly addressing social science teachers, and she suggested that teachers, like leaders, relate academics to real-life and permit students to express themselves within socially acceptable boundaries. Lewin, Lippitt and White (1939) studied the leadership style of teachers and its effect on student behavior. Norr and Crittenden (1975) showed that characteristics of effective leaders also were characteristics of effective educators, and have contributed to literature surrounding teacher effectiveness. Fairman and Mackenzie (2015) expanded the conventional ideal of teacher leadership and saw leadership occurring within individual teacher classrooms, and that it is through these informal roles and relationships teachers have their greatest influence. In their study of seven schools, participating teachers had a strong desire to improve student learning. The teachers also shared strategies of coaching, collaborating, and advocating through their professional relationships. The notion of classroom leadership neither has been extensively studied nor addressed in the literature. Teacher and classroom leadership needs additional study to understand its impact on student achievement.

Pisapia's (2009) work extends transformational leadership to cognitive leadership. According to Pisapia et al. (2009),

The ability to interpret and make meaning of discreet and seemingly unrelated events is a hallmark of today's successful leader. This ability should help leaders think strategically by understanding, identifying, predicting, responding, and adapting to opportunities and challenges confronting them. (p. 46)

This rings true for classroom teachers. The two themes (artistry-behavioral agility and agility-cognitive agility) presented in *The Strategic Leader* (Pisapia, 2009) are suitable

for the classroom setting and can help to create a new path for leadership for classroom teachers, both preservice and in-service, and contribute to overall student success.

Cognitive and Behavioral Agility

Cognitive agility is the ability to use a wide array of thinking skills. Complexity theories have been used in many fields and arenas. Researchers have defined cognitive complexity in terms of psychological differentiation (Bieri, 1955; Crockett, 1965). Bieri (1955) defined cognitive complexity as a system a person could use to differentiate among persons and to predict behavior. Crockett (1965) referred to cognitive complexity as a construct that refers to the variety of interpersonal concepts a subject has to describe others (p. 165). Others have defined cognitive complexity in terms of integration, perceived dimensions, and information ordering (Crano & Schroder, 1967; Harvey, Hunt, & Schroder, 1961; Schroder, Driver, & Streufert, 1965; Suedfeld & Streufert, 1966). Individuals with complex structures are able to adapt to ambiguity and information resulting in analysis of choice. Later, Dollinger (1984) indicated that highly cognitively complex people process more information and can use the information. His work studying the boundary spanning of entrepreneurs was used to measure organizational performance and information processing of small business owners. Boundary spanning is a strategic action and is significantly related to the performance of the business. The underlying assumption is that cognitively complex individuals process information differently because they are able to use more dimensions to discriminate.

Cognitive complexity was expanded into the leadership arena. Merron, Fisher, and Torbert (1987) posited that cognitive complexity is the way managers make meaning of their world and help to redefine problems. Decision-making with later-stage managers

is more collaborative in nature. According to Pisapia and Pang (2012), cognitive complexity describes a person's framing and persons who are cognitively agile process information differently and perform tasks better (p. 6). Highly cognitively agile (HCA) people perceive nuances and subtleties more than those who are not HCA. In Pisapia's (2009) notion of strategic leadership, cognitive complexity plays a strong role. The three main components of cognitive agility are reframing, reflection, and systems thinking. Research and theory on these topics was presented earlier. Denison et al. (1995) indicated that this agility is necessary for effective leadership.

Exploration that is important and noteworthy is to define how leaders think, especially in the increasingly complex world. As a microcosm of that world, the school and the classroom also deserve research and treatment.

Pisapia (2009) related his two concepts of cognitive and behavioral agility. While the concepts have different components and constructs, Denison et al. (1995) indicated that behavioral complexity must be present because "Leadership must be inevitably performed through action, not cognition" (p. 524). Boal and Whitehead (1992) denoted leaders need both cognitive and behavioral complexity as well as flexibility. Behavioral agility is the ability to perform multiple and often conflicting roles. According to Hooijberg and Quinn (1992), behavioral complexity is necessary for an individual to exhibit a broad array of contrasting behaviors. Bullis (1992) found that behavioral repertoire impacts leader and organizational effectiveness. Additionally, Hooijberg (1996) wrote that managerial jobs have changed from supervising and giving orders to forming teams and shaping strategies. His study of 282 middle managers from manufacturing companies and 252 managers from a public utility demonstrated that

managers who have a broad repertoire of roles are seen as more effective. Managers and leaders have to manage networks that include superiors as well as subordinates. In essence, effective leaders must possess a “wide repertoire” of behavior (Lawrence et al., 2009, p. 88).

Pisapia (2009) interconnected both cognitive and behavioral agility in his work, *The Strategic Leader*, which represented the framework of this study. He contrasted management versus leadership and described old science and hierarchy to explain a set of leadership skills that is no longer viable in today’s chaotic environment. The old must be replaced with flexibility, adaptive thinking, and a focus on relationships. Perhaps this is true of the modern classroom: management is no longer necessary, but a model of flexible thinking, leading, and adaptability.

The current study employed Pisapia’s (2009) strategic leadership theory as a framework for thinking and leading. Although typically tied to leadership and business circles, strategic thinking and leading influence actions can translate into a teacher’s classroom and can impact student achievement. Table 1 illustrates this by synthesizing and comparing the well-researched teaching frameworks of Danielson (1996), Marzano (2007), and Hattie (2015). Although Hattie’s (2015) is not considered a framework, it is considered a collection of evidence-based research on the high effect and high yield strategies that are used in the classroom to increase student achievement. Both Danielson (1996) and Marzano (2007) list four domains. These researchers have identified aspects of a teacher’s complex responsibility that have been documented, through research and studies, to improve student learning and have been part of the teaching practice for many years. The components of their frameworks of professional teaching practice are broad

and attempt to make the complexity of teaching understandable. Pisapia's (2009) strategic actions as they relate to teachers and student achievement have been studied in Warkentien's (2016) study.

Table 1

Teaching Framework Comparison to Pisapia's Strategic Actions in the Classroom

Danielson (1996) Instructional Framework	Marzano (2016) Instructional Framework	Hattie (2015)
Domain 1: Planning and Preparation	Domain 1: Classroom Strategies and Behavior	
Component 1a: Demonstrating knowledge of content and pedagogy (managing, reflection)	Design question 1: Communicating learning goals and feedback (reflection, managing)	Teacher estimates of achievement (reflection)
Component 1b: Demonstrating knowledge of students (bonding, reflection)	Design question 2: Helping students interact with new knowledge (managing, bonding, transforming)	Collective teacher efficacy (reflection, systems thinking)
Component 1c: selecting instructional goals (managing, reflection)	Design question 3: Helping students practice and deepen new knowledge (transforming, managing)	Self-reported grades (reflecting, bridging)
Component 1d: Demonstrating knowledge of resources (managing)	Design question 4: Helping students test and generate hypothesis (transforming, managing)	Piagetian programs (managing, systems thinking)
Component 1e: Designing coherent instruction (managing)	Design question 5: Engaging students (bonding, managing, transforming)	Conceptual change programs (systems thinking)
Component 1f: Assessing student learning (managing, systems thinking)	Design question 6: Establishing rules and procedures (managing)	Response to intervention (reflecting, reframing, transforming, bridging, managing)

Table 1 (cont.)

Danielson (1996) Instructional Framework	Marzano (2016) Instructional Framework	Hattie (2015)
	Design question 7: recognizing adherence to rules and procedures (managing)	Teacher credibility (bridging, bartering)
	Design question 8: Establishing and maintaining effective relationships with students (bonding, transforming)	Micro teaching (managing, reframing, bonding)
	Design question 9: Communicating high expectations for all (transforming, reflection, reframing)	Cognitive task analysis (systems thinking, managing)
Domain 2: The Classroom Environment	Domain 2: Planning and Preparing	Classroom discussion (managing)
Component 2a: Creating and environment of respect and rapport (bonding, bridging, transforming)	Planning and preparing for lessons and units (managing)	Interventions for learning disabled (transforming, reframing)
Component 2b: Establishing a culture for learning (managing, transforming)	Planning and preparing for use of resources and technology (managing)	Teacher clarity (systems thinking, managing)
Component 2c: Managing classroom procedures (managing)	Planning and preparing for special needs of students (managing, reflection, transforming)	Reciprocal teaching (reflection, transforming, systems thinking)
Component 2d: Managing student behavior (managing)		Feedback (reflection, bonding, transforming, bridging)
Component 2e: Organizing physical space (managing)		Providing formative evaluation (reflection)
Domain 3: Instruction	Domain 3: Reflecting on Teaching	Acceleration (transforming, systems thinking, and reframing)

Table 1 (cont.)

Danielson (1996) Instructional Framework	Marzano (2016) Instructional Framework	Hattie (2015)
Component 3a: Communicating clearly and accurately (bridging, managing, bartering)	Evaluating personal performance (reflection)	Creativity programs (bonding, transforming, bridging)
Component 3c: Engaging students in learning (bonding, transforming)		Concept mapping (systems thinking, managing)
Component 3d: Providing feedback to students (reflecting, reframing)		Problem solving teaching (reframing, reflecting)
Component 3e: demonstrating flexibility and responsiveness (reflection, bartering, bridging)		Classroom behavioral (managing)
Domain 4: Professional Responsibilities	Domain 4: Collegiality and Professionalism	Prior achievement
Component 4a: Reflecting on teaching (reflection)	Promoting a positive environment (bonding, bridging, transforming)	Vocabulary programs (managing)
Component 4b: Maintaining accurate records (managing)	Promoting exchange of ideas and strategies (bartering, reframing)	Time on task (managing)
Component 4c: Communication with families (bridging, bonding)	Promoting district and school development (bridging, reframing)	Not labeling students (bonding, bridging)
Component 4d: Contributing to the school and district (bartering, bridging, reframing)		Spaced vs. mass practice (managing)
Component 4e: Growing and developing professionally (reflection)		Direct instruction (managing)
Component 4f: Showing professionalism (reflection)		Repeated reading instruction (managing)
		Study skills (managing)

In the table, Pisapia’s (2009) actions are in parentheses and serve as possible definitions in comparison to the teaching framework.

Table 2 quantifies the strategic thinking and leading influence actions of Pisapia (2009) and compares these actions with these three researchers and their work on using teaching to increase student achievement.

Table 2

Frequency of Strategic Thinking and Leading Actions with Three Teaching Framework Researchers

Strategic Action	Frequency
Reflecting	18
Reframing	10
Systems Thinking	8
Bonding	9
Bridging	14
Bartering	5
Managing	25
Transforming	18

It has been presented in the literature that teachers are trained for management and this is apparent within the table. Teachers are trained for traditional roles of managing and transforming students, but are not trained to use systems thinking, bartering, or reframing, which are seen as traditional leadership actions.

Educational Measurement

The use of VAM for teacher evaluation is a relatively new and highly contested practice. With the pressure to receive federal dollars in the form of Race to the Top (U.S. Department of Education [USDOE], 2016) grant initiatives, states moved quickly to

revamp old, managerial-oriented teacher evaluation systems in favor of an evaluation system based on student outcome data (Bill & Melinda Gates Foundation, 2013).

According to Podgursky and Springer (2007), incentive pay for teachers is gaining in popularity throughout the United States. Value-added models intend to estimate the unique contribution or value-added change on student learning. As early as the Coleman et al. (1966) report, teacher characteristics tended to explain variance in student achievement. Meyer (1997) was one of the first researchers to identify and use the value-added models and indicated a fundamental understanding or assumption that the gains in test scores are due to teacher effects, be it instruction, characteristics, or behavior.

Research in economics led to studies and research on teacher effects on student achievement and the difference between being taught by a high performing or poorly performing teacher can translate into a year's worth of grade level achievement (Hanushek, 1986, 1992, 2011; Winters & Greene, 2012). Hanushek (1992, 2011) also indicated that education, experience, or salaries were not consistently related to student academic achievement, so teacher effects could and should be isolated.

According to Hanushek (2011), teachers are the most important factor affecting student achievement and different teachers cause different effects in student achievement. In his research, he posited that no other influence is greater on student achievement than a teacher (Hanushek, 2011, p. 467). In this same research, Hanushek indicated that whether the teacher has a master's degree bears no meaning on student achievement nor does the number of year's of experience a teacher has (with the exception of the first few years of teaching). Credentials, degrees, or experience are not necessarily correlated with high teaching skill as it relates to student achievement. Isolating the effects of individual

teachers became the new model for distinguishing highly successful teachers from less successful ones.

There have been some observational studies of pay for performance models (Clotfelter, Glennie, Ladd, & Vigdor, 2008; Fulbeck, 2014; Steele, Murnane, & Willett, 2007). The studies conducted resulted in a mixed and inconclusive set of findings as to the effect of pay for performance models.

Current policy would indicate that there should be highly effective teachers in the classroom – teachers who produce high student achievement results. Many districts and states have initiated performance pay policies to identify and reward teachers that lead students to significant gains in achievement (Goldhaber, 2009; Johnson & Papay, 2009; Podgursky & Springer, 2006, 2007).

Since the 1960s, a great deal of educational research has been conducted to identify school characteristics or factors contributing positively to student achievement. Now, VAM is widely used as a tool to identify which teachers are effective according to student achievement gains or performance. The ultimate goal, it appears, is to punish or reward teachers (Konstantopoulos, 2014) based on student academic performance.

According to Everson et al. (2013), often 30-50% of a teacher's evaluation score is linked to student outcomes. In 2011, the state of Florida enacted legislation requiring teachers in Florida to be evaluated using student achievement data (Florida Department of Education [FLDOE], 2011). Revised legislation, enacted in Florida in 2014, indicates that 33% of a teacher's final evaluation score can be attributed to the effects of student achievement testing (The Florida Legislature, 2017).

In Florida, SES is not accounted for and does not represent a covariate in the Florida model. Research by Ballou (2005) and Sanders and Rivers (1996) indicated that when using SES, the effect might be over adjusted. While Florida does not account for a student's SES, it has been well documented since Coleman et al. (1966) that a covariance in student achievement could be explained by student background factors such as SES. According to the recommendations of the Florida Student Growth Implementation Committee (FLDOE, 2011), the covariates of VAM are intended to "level the playing field" (p. 2) so that schools and teachers do not have disadvantages or advantages as a result of the students assigned to a school or class. The legislature explicitly prohibits using the variables of gender, race/ethnicity, and socioeconomic status, favoring Students with Disabilities status, English language learner status, and attendance.

VAM is not without its critics. Studies abroad (Glewwe, Ilias, & Kremer, 2010; Lavy, 2002, 2009) have shown positive effects of performance pay on student outcomes. Critics argue that these effects may not be long lasting and according to Darling-Hammond and Youngs (2002), these effects may not be transferable to the context of the U.S. educational system. The research in the United States, for example, Springer et al. (2010) in Nashville; Goldhaber and Walch (2012) in Round Rock, Texas and in Denver; and Glazerman and Seifullah (2010) in Chicago, report negligible effects of performance pay on student achievement. The research in New York City, completed by Goodman and Turner (2011), Marsh, Springer, McCaffrey, Yuan, and Epstein (2011), and Fryer (2011), reported a negative or null finding.

There are objections to VAM because the results vary across years (Amrein-Beardsley & Collins, 2012; Goldhaber & Hansen, 2008; Kyriakides & Creemers, 2008;

Leckie, 2009; McCaffrey, Sass, Lockwood, & Mihaly, 2009) as well as across testing instruments (Lockwood, McCaffrey, Mariano, & Setodji, 2007). Additionally, the long-term effects are of questionable value (Jacob, Lefgren, & Sims, 2008; Kane & Staiger, 2008; Lockwood, McCaffrey, Hamilton et al., 2007) and cause critics to question VAM's reliability.

Limitations exist within the use of VAM. The statistical models generally are conducted with high precision (Konstantopolous, 2014), yet there is research that the model cannot capture the intricacies of teaching and separate the differences between schools and teachers. Glass's (2013) commentary on the 2011 MET study again highlights and refutes the limitations of the evidence base on using VAMs in practice. The use of VAMs in evaluating the performance of individual teachers has come under criticism. Darling-Hammond, Amrein-Beardsley, Haertel, and Rothstein (2012) summarized three key limitations of using value-added measures for the purposes of teacher evaluation: (1) Value-added models of teacher effectiveness yield inconsistent patterns of results for individual teachers over time, thereby calling into question their validity for the purposes of performance appraisal; (2) Teachers' value-added performance is affected by the students assigned to them in a given year, thereby calling into question the transparency and fairness of using value-added measures of student learning in evaluations; and (3) Value-added ratings are unable to disentangle the many other influences that contribute to student progress, thereby providing an incomplete and distorted measure of an individual teacher's effectiveness (Darling-Hammond et al., 2012, pp. 9-11).

Linking teacher evaluation to value-added models, according to Everson et al. (2013) seems reasonable to many policy makers. While Florida and other states are using the VAM to derive teacher evaluation scores, the researchers argued that the method should be completed in the most valid way possible and that the current method has “stymied the teacher evaluation conversation in both the research and policy arenas” (Everson et al., 2013, p. 350). One of the ways in which the method used is flawed is that the estimates used are in comparison to other teachers at the school, district, or state level. The researchers concluded that these efforts are flawed because they hold the teacher responsible for how they are estimated to teach students whom they do not encounter. This system is setting up large scale controversies in states and educational communities about important decisions being made about a teacher’s salary, promotion, or termination of employment (Balch & Springer, 2015). The policy logic driving teacher evaluation remains considerably stronger than empirical evidence of positive results and, therefore, continued studies and research using the Florida VAM should be conducted. While research is indicating mixed results, policy makers in Florida and in the nation are using the model to evaluate teachers. Additional research should be conducted for the purpose of crediting or discrediting its value.

Florida began implementing the use of the VAM after obtaining Race to the Top (USDOE, 2016) funds. The state, following the recommendation of the Commissioner of Education, implemented a covariate adjustment model (FLDOE, 2011). The model creates expected growth for each student by estimating historical data and applying adjustments for covariates. This represents the typical growth observed among students who earned similar test scores the past two years and who share certain characteristics.

The teacher's value-added score reflects the average amount of learning growth of the teacher's students above or below the expected learning growth of similar students in the state, using the variables accounted for in the model. The teacher's value-added score is expressed as a sum of two components: one that reflects how much the school's students gained, on average, above or below like students in the state, and a second that reflects how much the teacher's students gained, on average, above or below similar students within the school.

According to the recommendations of the Florida Student Growth Implementation Committee's White Paper on VAM, there are 10 covariates (variables) used to establish the expected growth for students:

- The number of subject-relevant courses in which the student is enrolled,
- Two prior years of achievement scores,
- Students with disabilities (SWD) status,
- English language learner (ELL) status,
- Gifted status,
- Attendance,
- Mobility (number of transitions),
- Difference from modal age in grade (as an indicator of retention),
- Class size, and
- Homogeneity of entering test scores in the class. (FLDOE, 2011)

When considering variables, the implementation committee used a framework to decide if the data were available and accurate, if it were in the teacher's control, and whether it

already was measured by another variable. The inclusion of these control covariates established expected student scores based on typical growth.

The model's equation is:

$$y_i = \mu + \sum_{g=1}^M \delta_g x_g + \sum_{j=1}^K \beta_j x_j + \theta_{(k)i} + \omega_{(mk)i} + \varepsilon_i$$

where y_i denotes the test score for student i , δ_g is the coefficient associated with g^{th} prior test score, β_j is the coefficient associated with covariate j , θ is the common school component of school k assumed $\theta \sim N(0, \sigma_\theta^2)$, ω is the effect of teacher m in school k assumed $\omega \sim N(0, \sigma_\omega^2)$, and ε is the random error term assumed $\varepsilon \sim N(0, \sigma_\varepsilon^2)$. “The school and teacher effects were treated as random effects, and the teacher- and school-specific values are empirical Bayes estimates” (FLDOE, 2011).

After four years of VAM data, the state recently presented information that indicated a 95% confidence interval within the highly effective and unsatisfactory scores (FLDOE, 2014).

The teachers in the current study all have received a 2014-2015 VAM score. The FDOE calculates a VAM score for teachers of English language arts (ELA) and mathematics as well as teachers with a state-developed End-of-Course (EOC) assessment. According to Florida legislation teachers must have a score based on their students (The Florida Legislature, 2017). In light of this legislative requirement, the school district in the current study and their accountability department report teachers receive a VAM score based on their students' English language arts (ELA) or mathematics scores. In the population being studied, non-ELA, mathematics, or EOC teachers receive a score based on their students' growth or proficiency, called a local

VAM. For example, kindergarten through second grade teachers receive a score derived from growth and proficiency on the i-Ready ELA and math assessments. i-Ready is a purchased assessment program. Table 3 contains information and determination of the teachers receiving a state or local VAM in the district of study.

Table 3

State and Local VAM of the School District of Study

Teaching Assignment	Performance Measure(s) for Evaluation Purposes	State or Local VAM
Pre-Kindergarten (PK)	School-wide VAM (FSA ELA and Math; EOCs; i-Ready, average)	Local
Kindergarten (K)	i-Ready Reading and Math	Local
First Grade (1)	i-Ready Reading and Math	Local
Second Grade (2)	i-Ready Reading and Math	Local
Third Grade (3)	FSA English Language Arts and Math	State
Fourth Grade (4)	FSA English Language Arts and Math	State
Fifth Grade (5)	FSA ELA and Math	State
Other (K-5), including non-classroom instructional personnel (teach all students at their site in PE, Music, and Art)	50% i-Ready 50% Florida Standards Assessment in English Language Arts and Math	Local
Math Courses (6-8)	Florida Standards Assessment Math	State
Science Courses (8)	FCAT 2.0 Science	State
English/Language Arts/Reading Courses (6-8)	Florida Standards Assessment English Language Arts	State
Other (6-8), including non-classroom instructional personnel (teach related arts, science, and social studies)	Florida Standards Assessment English Language Arts	State
Civics	Civics End of Course Assessment	State
English 1	Florida Standards Assessment English Language Arts	State

Table 3 (cont.)

Teaching Assignment	Performance Measure(s) for Evaluation Purposes	State or Local VAM
English 2	Florida Standards Assessment English Language Arts	State
English 3	SAT, ACT or PERT (highest score)	Local
English 4	SAT, ACT or PERT (highest score)	Local
Advanced Placement English Comp	English Advanced Placement Exam	Local
Algebra 1; Algebra 1 Honors; Algebra 1B	Algebra I Florida Standards Assessment End of Course	State
IB Middle Years Program – Algebra 1 Honors	Algebra I Florida Standards Assessment End of Course	State
Geometry; Geometry Honors	Geometry End of Course	State
IB Middle Years Geometry Honors	Geometry End of Course	State
Biology 1; Biology 1 Honors; Biology Technology; Biology 1 Pre-IB; Integrated Science 3; Integrated Science 3 Honors	Biology I End of Course	State
IB Middle Years Program Biology Honors	Biology I End of Course	State
United States History	United States History End of Course	State
ROTC	SAT, ACT or PERT (highest score)	Local
Other (9-12), including non-classroom instructional personnel (teach electives, career technical, social studies)	FSA ELA; EOCs (if available); SAT, ACT or PERT (highest score)	Local
District Non-Classroom Instructional Personnel	School-wide VAM (FSA ELA and Math; EOCs; i-Ready, average)	Local

Note. Student Performance Measure: All instructional personnel will include student performance data for at least three years, including the current year and the two years immediately preceding the current year, when available. If less than the three most recent years of data are available, those years for which data are available must be used. Adapted from the 2015-2016 Instructional Evaluation System Template of the school district of study.

Effect of VAM on Student Achievement

Less is known as to the effect of VAM on student achievement. Borman and Kimball (2005), who used teacher evaluation scores in their study, found that teacher quality was not distributed among classrooms of poverty and better teaching appeared to be related to better learning outcomes. Additionally, the researchers found teachers who rated higher on the teacher evaluation system did not appear to close achievement gaps between low and high achieving students from low income or minority backgrounds. Chetty, Friedman, and Rockoff (2012) indicated that the use of the value-added model might not be as useful for identifying the long-term effects of teachers if teachers cheat or teach to the test. Their study did not compare the effect of other teacher evaluation models such as teacher observation, which, according to the researchers, might be a better indicator of student long-term success. Pressley (2015), in his dissertation, found teachers had negative feelings about their VAM score and the teachers he studied did not feel that VAM changed their instruction. He articulated that additional research needed to be conducted on VAM and its effects. The 2016 validation study of Warkentien was conducted on self-selected teacher leaders and used VAM as the criterion; it found teacher VAM scores increased when the teacher's use of reframing increased. The research reveals, as Hallinger et al. (2014) concluded, the policy logic remains stronger than the empirical evidence and additional studies are needed.

Contextual Factors

This study sought to explore the effect teacher leadership thinking and skills have on student achievement as measured by a teacher's VAM score. Moderating these

concepts is school size, level, and socioeconomic status. Unalterable moderating variables included age, years of experience, ethnicity, and gender.

Arguments about school size have been going on since the models of efficiency schools in the 1920s (Strang, 1987). James Conant, president of Harvard University has specified that schools be consolidated to about 400 K-12 students (as cited in Howley & Howley, 2004). During the 1930s to the 1960s, one-room schoolhouses were closed in favor of larger, more comprehensive schools. The 1970s ushered in a need to save money and larger schools gained popularity for specialized instruction and development of teachers and students. Lee and Smith (1997) argued that the ideal student population was between 600-900 students. The Matthew Project (Howley & Bickel, 1999) found that students from higher socioeconomic backgrounds benefitted from larger schools. Still other studies were in favor, and proved through research, that smaller schools were better at increasing student achievement. The seminal Tennessee class size experiment (Krueger & Whitmore, 2001) provided evidence that small class sizes consisting of approximately 15 students had strong effects on African American children. Current research favors smaller schools (Howley & Howley, 2004). However, the research is inconclusive on the effect of school size as a determining factor in student achievement. Leithwood and Jantzi (2009) also favor smaller class size. The researchers found that students who struggle at school or come from disadvantaged backgrounds benefit from smaller schools and recommended elementary school size be from 300-500 students, depending on the student's background, and secondary schools range from 600 or fewer to 1,000 students, depending on the background of the students.

Socioeconomic status often is used as a variable in educational research. After the landmark study, *Equality of Educational Opportunity* (Coleman et al., 1966), which confirmed that widespread school segregation created inequality of opportunity for students, education research turned its attention to the achievement outcomes of various socioeconomic backgrounds. Perry and McConney (2003) studied The Programme for International Student Assessment (PISA) mathematics, science, and reading assessment results and SES and found there was a relationship between SES and achievement. Willms (2010) corroborated with science PISA results and found similar results, but determined the relationship varies among countries. Jencks and Mayer (1990) acknowledged different effects on the social composition of students and found that a school's mean SES may have more effect on Black students than White students and more effect on high SES students than low SES students. Rumberger and Palardy (2005) indicated prior research on SES effects is not conclusive, but provides some evidence that the social composition of high schools has an impact on some students.

The issue of race/ethnicity and academic achievement also has been an oft-studied topic in the literature (Gibson & Ogbu, 1991; Sleeter & Grant, 1993). Baker, Keller-Wolff, and Wolf-Wendel (2000) suggested there is a difference in the research literature and policy literature and suggest more research to inform policy.

Winters, Haight, Swaim, and Pickering (2013) have researched the educational outcomes of Florida students with same-gender teachers and suggested that teachers of the same gender could “theoretically improve a student’s achievement by serving as high-quality role models or because they are more inclined to think positively about the student’s potential” (p. 74). The results of their study also found that both male and

female students benefit from instruction from a female teacher. The researchers found that most of these effects occur between sixth and tenth grade, supporting earlier research suggesting that gender stereotypes is recognized by students between 10 and 12 years of age. Antecol, Eren, and Ozbeklik (2015) found that math test scores of female primary students, particularly in disadvantaged neighborhoods, are lower with a female teacher as well as when these students are placed in a class where the female teacher has low math ability. The researchers found having a female teacher had no effect on male students' reading or math test scores. Trinidad and Normore (2005) found women prefer transformational leadership and adopt participative leadership styles in the corporate world and in education. The characteristics of transformational leadership relate to female values developed through socialization processes that include building relationships, communication, consensus building, power as influence, and working together for a common purpose – many of the same traits as agile leaders. Although there are minimal previous studies to indicate there is a relationship, there is present interest. It is helpful to know if there is a relationship (Tuckerman & Harper, 2012).

Minimal research exists on age and years of experience of a teacher and their effect on student achievement or outcomes and/or school improvement. In their study of Finnish student temperament and teacher characteristics, Mulolla et al. (2011) found teacher gender had no effect on school grades, but teacher age had an effect only on mother language grades. The results could identify ideas about grading practices for teachers rather than information on gender.

Darling-Hammond (1996, 2000) has concluded that teacher quality matters and that a well-prepared teacher can have a powerful effect on student achievement, even

overcoming student background, poverty, minority status, and language. Hanushek (1992) agrees and estimated that having a good teacher can exceed one year's worth of growth for students. Darling-Hammond and Youngs (2002) found evidence to suggest that teacher preparation contributes to outcomes as well as teacher effectiveness and teacher retention (p. 23). The study concluded that alternative certification pathways that "skirt the core features of teacher preparation produce recruits who consider themselves as unprepared, are viewed as less competent by principals, are less effective with students, and have high rates of teacher attrition" (Darling-Hammond & Youngs, 2002, p. 23).

Studies examining the teacher degree level and certification have been inconclusive when studying secondary students (Ehrenberg & Brewer, 1994; Harnisch, 1987). There are very few studies regarding younger students. Croninger, King Rice, Rathbun, and Nishio (2007) completed a study with first grade students and their achievement in reading and math. The study concluded that teacher preparation, including specific reading coursework and having a degree in elementary education, was an indicator of student achievement. The study also concluded that certification and advanced degrees were not positively related to student achievement in reading and having an advanced degree had a negative effect on math achievement.

Summary

This literature review has acknowledged the most relevant and significant essential foundations to examine the impact of a classroom teacher's leadership ability on their student's achievement yet falls short of establishing the effect of a classroom teacher's leadership influence and its effect on student achievement. Through analysis of

historical, theoretical, and research foundations for teacher leadership, cognitive agility, behavioral agility, and value-added modeling important themes have developed. The move to a classroom leadership focus for teachers requires more than pedagogical and management skills. The required action and thinking skills are different than the skills in which teachers are trained. Thus these results could provide strong evidence on how enhancing teacher thinking skills and influence actions support an overall effort to change the effects of schooling in the one place everyone agrees that it can be changed – the classroom. Senge (1990) indicated that the cognitive aspect of leadership is necessary to foster systematic patterns of thinking. Teachers need to challenge the mental models of students.

The classroom teacher has not been a studied subject for the implications of leadership skills and student achievement. This study has implications for preservice and in-service training programs as well as district recruitment and professional development. Preservice teachers spend time in teacher preparation programs on classroom management professional development instead of on developing the thinking skills and influence actions required of teachers in today's classroom.

The study also makes a strong contribution to practice. The changing educational environment, coupled with changing technology, demands that new approaches to training and development be examined so teachers are able to lead in the accountability climate and increase student achievement.

Hoerr (2005) suggested:

Strong leaders are artists. They inspire, applaud, chastise, steer, and stand on the side. They create, monitor, reinforce, encourage, and stand in the back. Yes,

sometimes they stand in the front too. They recognize that it is their responsibility to help create a setting in which each individual can flourish and grow. Strong leaders understand that leadership is about relationships. (Introduction)

These qualities are also true of classroom teachers. To examine the leadership and thinking behaviors of classroom teachers and their contribution to greater student achievement has value for teachers, students, and communities.

Additional research needs to be conducted linking classroom teacher leadership to specific individual student outcomes, which would help define and clarify the role classroom leadership plays on student performance. This study directly ties individual teacher leadership with student achievement outcomes.

With the incorporation of VAM into a teacher's evaluation, it is imperative to conduct research of this variety; one that makes possible use of leadership skills to help lead students and communities through the maelstrom of education today. Perhaps these skills studied can help to contribute to the literature of teacher evaluation and effectiveness as it relates to student achievement. Should there be a positive relationship between the leadership abilities of teachers and the academic achievement of their students, a new frame could be created, both for teacher preservice training, for professional development, and for measuring and analyzing teacher performance.

CHAPTER 3. METHODOLOGY

This chapter describes the methods that were utilized to examine the purpose of the study and research questions. It explains the research design, sampling and population plan, instrumentation, data collection, and the statistical analysis used to test the hypotheses.

Purpose

The purpose of this study was to determine if a teacher's cognitive and behavioral agility is related to student achievement as measured by Value Added Measure (VAM) and if this relationship is moderated by alterable, unalterable, and contextual variables (school size, school level, grade(s) taught, subject/content taught, socioeconomic status of the school, age, gender, years of teaching experience, highest degree earned, location of undergraduate degree, course of study of undergraduate education, Florida teacher certification, whether the teacher has an educational leadership certificate, the location of the educational leadership certificate, and if the teacher had taken the Florida Educational Leadership Exam [FELE]). This study was guided by three research questions.

- RQ1. Is there a relationship between cognitive agility and student academic performance as measured by a teacher's VAM score?
- a. Do alterable and unalterable variables moderate the relationship between the teacher's cognitive agility and student academic performance?

RQ2. Is there a relationship between the teacher's behavioral agility and student academic performance as measured by a teacher's VAM score?

a. Do alterable and unalterable variables moderate the relationship between the teacher's behavioral agility and student academic performance?

RQ3. Can a predictor model of effective classroom leadership be developed?

The following hypotheses were tested to provide insights into the answers to these questions:

H₀: The teacher's cognitive agility predicts student academic achievement as measured by VAM (unidimensional effect).

H₁: The teacher's use of reflection, reframing, and systems thinking predicts student academic achievement as measured by VAM (multidimensional effect).

H₂: Alterable and unalterable variables moderate the relationship between cognitive agility and student achievement.

H₃: The teacher's behavioral agility predicts student academic achievement as measured by VAM (multidimensional effect).

H₄: The teacher's use of bonding, bridging, bartering, managing, and transforming predicts student academic achievement as measured by VAM (unidimensional effect)

H₅: Alterable and unalterable variables moderate the relationship between behavioral agility and student achievement.

H₆: The influence of the teacher's cognitive agility on student achievement is moderated by their behavioral agility.

H₇: The teacher's combined cognitive and behavioral agility predicts student academic achievement as measured by VAM.

Research Design

This study used a quantitative, non-experimental research design with linear regression statistical analysis and correlational procedures to determine possible relationships among the variables. Cognitive and behavioral agility are the predictor variables and student achievement as measured by teachers' State or Local VAM serve as the criterion variable. Table 4 identifies and describes the variables that operationalize the study's framework.

Research Setting

The research setting was a medium-sized district located in southeastern Florida. The school district encompasses 753 square miles and contains 22 schools. According to 2014-15 demographic data, the student population was comprised of 11,372 (60.9%) White; 1,378 (7.4%) Black; 5,055 (27.1%) Hispanic; 311 (1.7%) Asian; 505 (2.7%) Multiracial; and 41 (0.2%) Native-American students. Within the student population, 2,838 (14.68%) were students with disabilities; 787 (4.07%) were gifted students; 2,520 (13.04%) were identified as English Language Learners; and 8,576 (45.36%) participated in the free and/or reduced price lunch program.

Table 4

Variables Used to Operationalize the Study's Framework

Variable Type	Explanation
Predictor Variables	
Cognitive Agility	Cognitive agility is an aggregate, unidimensional score of reflection, reframing, and systems thinking that identifies one's capacity to think strategically. Higher scores suggest a positive prediction for being able to think strategically and a lower score predicts a lower capacity to think strategically.
Reflection	The multidimensional score represents the "ability to use perceptions, experience and information to make judgments as to what has happened in the past and is happening in the present to help guide your future decisions" (Pisapia, 2009, p. 64).
Reframing	The multidimensional score represents "The ability to look at your reality using multiple perspectives, differing frameworks, different mental models, and different paradigms in order to generate new insights and options for action" (Pisapia, 2009, p. 64).
Systems Thinking	The multidimensional score represents "The ability to see systems holistically by understanding the properties, forces, patterns and interrelationships that shape how a system works and provide you with options for action" (Pisapia, 2009, p. 64).
Behavioral Agility	Behavioral agility is an aggregate unidimensional score of managing, transforming, bridging, bartering, and bonding which identifies one's capacity to lead strategically. Higher scores suggest a positive prediction for being an effective strategic leader and a lower score predicts a lower capacity to function as a strategic leader.
Managing	The multidimensional score represents actions and decisions made to maintain smooth operations.
Transforming	The multidimensional score represents actions that use vision to motivate change. These include communicating vision, challenging mental models, and establishing an agreed upon set of values and priorities.
Bridging	The multidimensional score represents actions used to create alliances that further the organization's goals.
Bartering	The multidimensional score represents the exchange of goods and services to strengthen relationships which promote the organization's agenda.
Bonding	The multidimensional score represents actions that display the values of the organization and promote the common good.

Table 4 (cont.)

Predictor Variable	Explanation
Moderator Variables	
Alterable Variables	
School Size	Teachers will select the school at which they teach from a drop down menu. School size will be retrieved based on the school selected
School Level	Elementary (Grades Pre-K -5), Secondary (grades 6-12)
School Socioeconomic Level	Free and reduced priced meal percentages determined by the identification of the school site
Unalterable Variables	
Age	Write in age
Gender	Male, Female
Ethnicity	
Years of Experience	Record the number of years of teaching experience
Highest Degree Earned	Associate's Degree Bachelor's Degree Master's Degree Ed.D. Ed.S. Ph.D.
Teaching Certification	In State Out of State Local Certification (CTE)
Educational Leadership Certificate	Yes No
Florida Educational Leadership Exam (FELE)	Yes No
Contextual Variables	
Grade Level Teaching Assignment	K, 1, 2, 3, 4, 5, 6, 7 8, 9, 10, 11, 12, other

Table 4 (cont.)

Predictor Variable	Explanation
Primary Teaching Assignment	Select all that apply: Mathematics Social Studies Visual Arts Foreign Language Science Career Technical Education Physical Education English Language Learner English Language Arts Other: Performing Arts Computer Science / Technology Exceptional Student Education
University/college where earned Bachelor's degree	
Undergraduate degree	Education ELA Criminal Justice Psychology/Social Sciences Math Social Studies Business Computer Science Science Performing Arts Liberal Arts Local Certification (Career Technical Education) Other – write in
If have educational leadership certificate, from which university?	Write in university/college.
Criterion Variables	
State VAM	Obtained from the state-given VAM score
Local VAM	Obtained from the locally-given VAM score

Study Sample

The study sample included 22 schools in a southeastern United States school district with a breakdown of 12 elementary schools, 5 middle schools, and 3 high schools. Additionally, two alternative school sites were included. All 22 schools had respondents to the survey instruments. A total of 156 teachers responded to the survey, for a participation rate of 12%. Respondents included 94 teachers from elementary school, 26 from middle school, and 27 from high school. The 2014-15 state or local VAM scores for teachers were used in the data collection. The participants with a state VAM totaled 33, while 95 participants received a local VAM.

A total of 20 participants were removed from the data set because the respondents had no VAM score, were from a non-classroom pre-kindergarten setting, were members of the district Exceptional Student Education (ESE) staff serving in the role of program specialist, were teachers at the district-run environmental school, or were guidance counselors at the school. One pre-kindergarten teacher was included in the data set. The certified teacher holds a teaching certificate and teaches at one of the 22 school sites, while other voluntary pre-kindergarten (VPK) teachers within this school district are not certified teachers.

For inconsistency analysis, eight respondents had a response that was more discrepant than 1 on the Likert-type inconsistency items (e.g., I am honest with students). They were removed from the data set.

Thus, the sample that was used for analysis consisted of 128 participants, 85 from elementary school, including the Pre-K teacher; 23 from middle school; and 20 from high school.

Participant Selection

All teachers were given an opportunity to participate in this study; 1,340 teachers were drawn from the teaching pool in the school district. Teachers were asked to consent to participate through the school district email system (Appendix A). All teachers were asked to complete the Strategic Thinking Questionnaire (STQ) and Strategic Leadership Questionnaire (SLQ), which were altered for teachers.

Instruments

The SLQ and STQ survey instruments were modified to make the language consistent to teacher work by a team of researchers conducting research on teacher classroom leadership and survey instrument creator, Dr. John Pisapia. From this collaboration, the Strategic Thinking Questionnaire (STQ)^T and the Strategic Leadership Questionnaire (SLQ)^T were created. The *T* indicates that the assessments are meant for use within the teacher's environment, the classroom. Changes to the instrument included semantic adjustments so that questions would be relevant to the classroom teacher. For example, the survey question, "I work to create a shared vision" was changed to "I work to create a shared vision for students." The surveys therefore are called the Strategic Thinking Questionnaire (STQ)^T and the Strategic Leadership Questionnaire (SLQ)^T, respectively. The new instruments were combined into one survey instrument (Appendix B) and then pared down for a total of 53 questions in length, with 22 of the survey questions from the STQ^T and the remaining questions for the SLQ^T.

Strategic Thinking Questionnaire

The STQ measures the ability of participants to discriminate among a wide variety of stimuli using different schemata. The STQ is a 25 question self-report

instrument that measures the teacher's use of the three cognitive abilities of reframing, reflection, and systems thinking. Participants who score well are said to have a greater capacity to think strategically. An iterative process was used to ascertain latent factors, means, and standard deviations. Past research indicates that within the instrument, the alpha reliabilities for the three subscores were reflection ($\alpha = .917$), systems thinking ($\alpha = .773$), and reframing ($\alpha = .735$). Additionally, a validation study by Pisapia, Morris, Cavanaugh, and Ellington (2011) concluded, after confirmatory factor analysis, the data were a good fit to this three-factor model.

The STQ is a self-report instrument and has features to guard against validity issues. The STQ^T has embedded mechanisms such as the inconsistency index to alleviate these concerns. Paired items within the questionnaire measure the same factor and divergent points are eliminated. Seven reverse scored items also provide another mechanism to assist with inconsistency. The original STQ has strong validity and has been used in six different countries and in many contexts and levels of leadership (Pisapia & Pang, 2012).

Strategic Leadership Questionnaire

The Strategic Leadership Questionnaire (SLQ) is a 35-item validated research instrument that has been tested in a variety of contexts with over 2200 users worldwide (Pisapia & Pang, 2012). The SLQ measures the participants' capacity to act using a wide repertoire of leader influence actions. The SLQ asks participants how frequently they use the five leader actions: managing, transforming, bonding, bridging, and bartering in performing their duties on a 5-point Likert-type scale from 1 (almost never) to 5 (almost

always). Higher scores suggest a positive prediction for being an effective strategic leader and a lower score predicts a lower capacity to function as a strategic leader.

The SLQ was psychometrically validated through principal axis factor analysis in the United States (Pisapia, 2009; Reyes-Guerra, 2009) and principal component analysis in China (Pisapia & Pang, 2013). The reliability scores on four of the leadership actions on the SLQ were: managing ($\alpha = .84$), transforming ($\alpha = .97$), bonding ($\alpha = .95$), and bridging ($\alpha = .88$). The subscore of the fifth action, bartering, was considered to have low reliability in the Chinese version, but through item adjustment, the factor was improved ($\alpha = .81$) (Pang & Pisapia, 2012).

Yasin (2006) validated the SLQ to be valid as a panel of leadership experts developed the items. Later, a psychometric approach developed by Nunnally and Bernstein (1994) for construct validity was used by Yasin and Tahir (2013) and determined the instrument valid.

As part of the SLQ, information regarding alterable, unalterable, and contextual variables was gathered through questions at the beginning of the survey instrument. Alterable variables included school size, the grade level of the school, and the content taught. The SES of the school was ascertained from the school name. Unalterable variables such as gender, age, years of experience as a teacher, highest degree earned, Florida teacher certification, and certification in the area of leadership were questions available prior to the combined instrument questions. Contextual variables in this study were used to gather descriptive data of the study subjects. These variables included where the subjects went to university, location of leadership program if applicable, and specific information about teaching assignments.

Finally, the VAM with two metrics (state and local) was used as the criterion variable measuring student achievement. According to current state legislation (FLDOE, 2011), all teachers must receive a VAM that includes student achievement information on his or her students. The school district in Florida studied uses state VAM to delineate those teachers who are given a VAM based on state-provided assessments, and local VAM to delineate those teachers whose VAM is derived from locally based assessments. Teacher evaluation scores include a VAM measure, which, in the Florida, can account for up to 33% of the total teacher evaluation score. In the mid-sized school district in which this study was conducted, a teacher's evaluation is based on three factors: instructional practice, as measured by classroom observations conducted by the school administration; deliberate practice growth as self-selected by the teacher; and a teacher's VAM score. VAM scores account for 33% of the teacher evaluation and the remaining 67% of the evaluation score is based on the instructional and deliberate practice of the teacher. VAM (state and local) scores were used for this study. They were inserted into the data, according to the name of the respondent, by a third party from the school district.

Data Collection Plan

Institutional Review Board (IRB) approval (Appendix C) was received from the university and permission granted from the school district's school board (Appendix D) to conduct the study. The new and combined survey instrument was used exclusively to collect data for the study. Each teacher received an email (Appendix E), using the school district's email system, which explained all aspects of the study. Within the email, confidentiality of the study as well as the use of a third party to make data anonymous for the researcher were outlined. The email to each of the classroom teachers contained a link

to the electronic survey created by the researcher using Google docs. Completion of the electronic survey served as consent. The surveys were not anonymous as teacher names were required to pair the state or local VAM score to the participant. A third party, a specialist with the assessment and accountability department in the school district under study, was used to collect the survey data and then assign the archived state and local VAM score to each of the teachers completing the survey. The third party then assigned a number to each of the participants to anonymize the data. The anonymous data contained within an Excel spreadsheet was sent to the researcher via the school district email and included the responses to the STQ^T and the SLQ^T, the questions related to the variables of the study, and the state or local VAM.

Data Analysis

The unit of analysis was the classroom teacher. The anonymous data on the Excel spreadsheet was entered into the Statistical Package for the Social Sciences (SPSS) v 24 to examine the descriptive statistics and test the hypotheses. The level of significance for all statistical tests was set at α of .05. Correlational analysis was used to explore the relationships of a classroom teacher's cognitive and behavioral agility and student achievement. Moderator analyses were conducted using regression to determine the effects of the alterable and unalterable variables.

Role of the Researcher

The role of the researcher was one of graduate student in the doctoral program in an educational leadership and research methodology program. Additionally, the research was completed in a school district where the researcher is employed. The researcher, having been employed in the district for 29 years, might know some of the participants.

While the researcher did not evaluate or supervise any of the participants, participants needed to respond to the survey questions without answering to the desired effect so the third party collection was employed as a safeguard.

Limitations

The number of study participants was a limitation. The school district providing the sample of teachers included 1,340 teachers. The instruments were combined to create one survey, and although the appearance may have been shorter, filling out the 53-question survey could have been a difficult and a time-burdened task for teachers in an already busy schedule. Some of the survey questions were long and teachers may not have had time to comprehend them fully before answering. Teachers were answering the survey based on their own self-perception of their leadership abilities and this type of self-report survey response could have been a limitation. Additionally, the researcher knows and will be known by many of the participants. The researcher is in a position to assist in the planning and development of professional learning in the district. This proximity, while limiting, presents an opportunity for increased district wide use of the results.

Delimitations

The sampling method was one of convenience for the researcher and this delimits the study. Using only one district also was a delimiting factor in this study.

Summary

This chapter outlined the aspects of the research design, sampling plan, data collection, and analysis plan. The purpose of this non-experimental study was to investigate the relationship between a classroom teacher's cognitive and behavioral

agility and their student outcomes as measured by state or local VAM. The survey instrument used to measure the classroom teacher's strategic thinking and leader actions and the instrument designed to measure a teacher's cognitive agility were a revised version of the STQ and SLQ based upon the research of Pisapia (2009) and Warkentien (2016). The variables of the study were described in detail and concerns of validity and reliability were addressed with theoretical and empirical fundamentals. Results of the data analysis are presented in Chapter 4.

CHAPTER 4. DATA ANALYSIS AND RESULTS

The purpose of this study was to determine whether a teacher's cognitive and behavioral agility had a relationship with his or her VAM score and to explore whether that link was moderated by other variables. This chapter outlines the results of the study as determined through the statistical analysis of the data collected.

The data analysis proceeded as follows. First, reliability tests were completed to determine Cronbach's alpha for the subscores of the STQ^T and the SLQ^T and to determine if the factors were similar to the findings in the validation study conducted by Warkentien (2016). Within Warkentien's validation study, a factor analysis was completed and items were removed from the survey in order to increase the Cronbach's alpha of the subscores. All questions of the instruments were employed for data analysis in this study. A Cronbach alpha of .70 or above was considered acceptable and for this study, the subscores of the instrument are reliable and acceptable.

Table 5 shows the reliability for each of the subscales of the combined instruments and the alphas of Warkentien's (2016) study.

Descriptive Statistics

A description of the sample was conducted to get a sense of the data. The preponderance of survey participants were teachers at the elementary level 66.4% (85), while 17.9% (23) of the participants were from middle school and 15.6% (20) high school. The 128 participants reflected a range of teaching assignments and levels, from pre-kindergarten to career technical education (CTE). The respondents included: 1 pre-

kindergarten teacher, 6 kindergarten teachers, 18 first grade teachers, 11 second grade teachers, 8 third grade teachers, 9 fourth grade teachers, 15 fifth grade teachers, 7 sixth grade teachers, 9 seventh grade teachers, 4 eighth grade teachers, 3 ninth grade teachers, 4 tenth grade teachers, 5 eleventh grade teachers, and 3 twelfth grade teachers; 23 teachers listed their primary grade level as other. The primary teaching assignment of the respondents included: 4 performing arts teachers, 5 visual arts teachers, 2 physical education teachers, 1 computer teacher, 4 CTE teachers, 18 ESE teachers, 4 science teachers; 9 mathematics teachers, 3 social studies teachers, and 1 media specialist; the other participants reported other as their primary teaching assignment.

Table 5

Comparing Reliabilities with the Warkentien Validation Study within the Subscales STQ^T and SLQ^T Instruments

	<u>White</u>		<u>Warkentien</u>	
	No. of items	Cronbach's Alpha	No. of items	Cronbach's Alpha
Strategic Thinking Questionnaire ^T Subscales				
Reframing	9	.65	5	.75
Reflection	6	.65	5	.75
Systems Thinking	7	.83	6	.83
Strategic Leadership Questionnaire ^T Subscales				
Bartering	8	.80	2	.79
Bonding	7	.70	4	.75
Bridging	4	.74	4	.81
Managing	6	.69	4	.77
Transforming	6	.78	4	.69

Of the participant sample, 48.4% (63) held a bachelor's degree, while 45.3% (58) were master's degree recipients. A small percentage of 3.9% (5) reported having specialist degrees; less than 1% (1) had a doctorate degree. Three participants held an Associate's degree and teach Career Technical Education (CTE). The county in which the survey was given has an alternate certification pathway for teachers within specialized fields and experience within the field serves as a local teaching certification.

A majority (96.8%) of the participants are certified teachers within the state and hold Florida certification, while 3% (4) had out-of-state certification. Three participants have local certification, and in the district of study is used for CTE teachers where experience within a career or technical field serves as a local teaching certification and as a substitute for Florida teaching certification. Within the data set, 16% (21) of the participants had educational leadership certificates. These participants held a master's degree or certification in educational leadership. Of these participants, nine of them participated in an online degree program. Two of the participants earned educational leadership degrees at private universities, one from an out-of-state public university and nine from Florida public universities.

Many of the study participants were White, non-Hispanic (99% or 127), with one participant Black, non-Hispanic. Additionally, 91% (116) were females, while 9% (12) were male. The majority (74% or 95) were teachers who received a local VAM score; 26% (33) received a score based on state-provided assessments.

Table 6 provides means, standard deviations, and correlations among all study variables.

Table 6.
Descriptive Statistics and Correlations of the Study Variables

Variable	Descriptives		Pearson Correlation Coefficient																						
	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21		
1 Local VAM	2.8	0.62	1																						
2 State VAM	3.0	0.72	.a	1																					
3 SES	48.4	23.47	-.094	-.025	1																				
4 Level	1.3	0.47	.500**	.378*	.0665	1																			
5 Sch Size	866.3	440.45	.189	.235	-.275**	.522**	1																		
6 Age	43.3	10.45	.311**	.218	-.034	.055	-.004	1																	
7 Yrs. Exp.	13.1	8.07	.337**	.152	-.016	0.1	.125	.622**	1																
8 Gender	1.9	0.29	.033	.096	.012	-.168	-.143	.045	-.041	1															
9 HDE	2.6	0.63	.209*	.083	-.085	-.014	-.09	.114	.210*	-.019	1														
10 Ed Lead Crt	0.2	0.38	-.096	-.144	-.05	.027	-.023	-.11	.054	-.067	.364**	1													
11 FELE	1.2	0.38	-.096	-.144	-.05	.027	-.023	-.11	.054	-.067	.364**	1.0**	1												
12 Cog Agility	4.2	0.45	.032	-.003	-.177*	-.074	-.053	-.026	-.088	.094	.1	.139	.139	1											
13 Reframing	4.4	0.41	-.267**	-.168	-.137	-.177*	-.155	-.174*	-.224*	.087	-.048	.016	.016	.705**	1										
14 Reflection	4.3	0.53	.112	.040	-.116	-.017	-.023	.063	.037	.049	.073	.127	.127	.817**	.344**	1									
15 SysThinking	3.9	0.58	.212*	.095	-.163	.008	.039	.046	-.024	.086	.194*	.178*	.178*	.862**	.358**	.643**	1								
16 Beh Agility	4.5	0.40	.085	-.143	-.018	-.062	-.074	-.132	-.115	.127	.084	.043	.043	.489**	.407**	.270**	.467**	1							
17 Barter	4.0	0.83	.102	-.002	.011	.023	-.07	-.002	-.087	.214*	.139	-.027	-.027	.354**	.285**	.394**	.394**	.806**	1						
18 Bonding	4.8	0.31	.099	.090	.024	-.029	-.119	-.072	-.091	.078	.022	-.036	-.036	.354**	.246**	.216*	.363**	.731**	.586**	1					
19 Bridging	4.6	0.45	-.044	-.341	.01	0	.017	-.200*	-.119	-.032	-.004	-.002	-.002	.315**	.358**	.176*	.218*	.758**	.432**	.350**	1				
20 Managing	4.0	0.37	.074	-.008	-.023	-.230**	-.102	-.094	.039	.052	.094	.101	.101	.331**	.226*	.219*	.330**	.608**	.350**	.488**	.265**	1			
21 Transforming	4.4	0.38	.182	-.036	-.114	-.111	-.081	-.058	-.1	.214*	.164	.185**	.185**	.489**	.321**	.301**	.516**	.722**	.554**	.467**	.311**	.511**	1		

Note **p is .01 level (2-tailed)

a. Local VAMN = 85

b. State VAMN = 33

The mean years of experience for the sample teaching population were 13.1. Within the cognitive agility measure, the highest mean for the subscore was the reflection sub score with a mean of 4.4; the lowest on the cognitive scale was reframing with 3.9. On the behavioral agility measure, the highest subscore was managing, lending credence to the notion that teachers have been traditionally trained as managers rather than leaders.

As seen in the means table, the teacher cognitive agility profile was systems thinking (3.9), reflection (4.3), and reframing (4.4). The teacher behavioral agility profile was managing (4.0), transforming (4.4), bonding (4.8), bridging (4.6), and bartering (4.0).

Correlation analysis was completed to determine the significance of the relationships between the variables. Within the correlations, there were 33 subjects with state VAM score and 95 with a local VAM score; therefore any correlation involving these respective VAM variables was based on the 33 for local VAM or 95 subjects for state VAM. To be specific, any of the correlations of the variables for state VAM involved only 33 subjects and those variables examined with local VAM involved 95 subjects. For the remainder of the correlations, the total sample size of 128 was used. This procedure was completed both unidimensionally and multidimensionally for STQ^T and SLQ^T.

As seen in the table, there were significant correlations between the two scales. For example, the subscores of the SLQ^T – bonding, bridging, bartering, managing, and transforming – had significant correlations with the subscores of the STQ^T – reframing, reflection, and systems thinking.

The *r* can be used to quantify the strength of an effect and Cohen (1992) explained that the correlation coefficient could be used to determine the strength.

According to Cohen, an r of .10 is a small effect and explains 1% of the variance; an r of .30 is a medium effect and explains 9% of the variance; and $r = .50$ is a large effect and explains 25% of the variance. The correlation between the subscores, reflection, and bartering was not significant ($r = .135$) and the correlation between reflection and bridging ($r = -.176$) was of small effect. According to the effect size estimates of Cohen, the correlation of the subscore between systems thinking and bridging also had a small positive effect size ($r = .218$).

Upon examination of state and local VAM, the correlation data as seen in the table indicates that there are few significant relationships between the subscore constructs and VAM data. The correlation of systems thinking and local VAM are significant at the .05 level ($r = .212$). There is a significant, albeit negative, relationship with local VAM and reframing ($r = -.267$), which could suggest that those teachers with a higher local VAM use less reframing. School level is correlated to local VAM ($r = .500$), as is age ($r = .311$), years of experience ($r = .337$), and highest degree earned ($r = .209$). Only school level is correlated to state VAM ($r = .378$).

Table 7 specifies additional information for the significant relationships between the variables and local VAM. Within Table 7, r^2 is used to indicate proportion of variance in the dependent variable that is predictable from the independent variables. It is to provide an effect size and a notion of importance to the relationship.

Table 7

Analysis of Significant Correlations Prediction on Local VAM

Independent Variable	r	r ²
School Level	.500**	0.25
Age	.311**	0.097
Years Experience	.337**	0.113
Reframing	-.267**	0.71
System Thinking	.212*	0.04

Note. **p<.01 * <.05

Local VAM was correlated with school level ($r = .500$) and significant ($p < .05$) and explained 25% of the variance within local VAM. Local VAM also was correlated with age ($r = .311$), explaining 10% of the variance within local VAM. Reframing was significant with local VAM ($r = .267$) with large effect (0.71) and explained 7% in local VAM. Systems thinking had a significant correlation with local VAM ($r = .212$) and explained 4.49% of the variance in local VAM scores.

There was one significant relationship between state VAM and the predictor variables: school level ($r = .378$). There were 33 respondents who earned a state VAM, while 95 of the respondents obtained a local VAM. Low power may be a partial explanation for the lack of correlation with state VAM. With only 33 subjects, post-hoc power estimates were all below .40.

Other noteworthy correlations include the relationship between SES and cognitive agility ($r = -.177$). As schools have less students who fall within poverty levels, the

unidimensional cognitive agility score goes up, which indicates that in the schools with higher poverty rates as measured by SES status, cognitive agility decreases.

Additionally, gender was significantly correlated ($r = -.168$) to school level. This finding is proportionate with the number of female teachers at the elementary level. School level also accounted for a negative small significant relationship with the subscale of managing ($r = -.230$). There is a significant negative correlation between age and reframing as well as bridging ($r = -.174$ and $-.200$, respectively). There is a significant correlation with gender and bartering ($r = .214$) and gender and transforming ($r = .214$).

The variable of teacher certification (in-state, out-of-state, or local certification) yielded trivial variance, with 97% of the survey respondents having in-state certification, which therefore was not included in the correlations. There was a redundant relationship between obtaining educational leadership certification and whether the subject had taken the FELE, as the exam is required for certification. In terms of whether the respondent had obtained an educational leadership certificate, there were correlations that were significant, albeit small, with systems thinking and transforming ($r = .178$ and $.185$, respectively); this also is true of the same respondents who indicated they have taken the FELE ($r = .178$ and $.185$, respectively). These findings and correlations indicate that respondents who possess an educational leadership degree score higher on the variables of systems thinking and transforming.

Finally, the highest degree earned was significantly correlated with systems thinking with a small effect ($r = .194$). As the subjects gain higher degrees, they score higher on the variable of systems thinking.

Inferential Statistics

To test whether a teacher's cognitive agility predicts student academic achievement (H_0), bivariate correlation was completed. The findings indicate that there was no significant relationship between the unidimensional score of the cognitive agility (STQ^T) and state or local VAM ($r = -.003$ and $.032$, respectively). With these results, the researcher failed to reject the hypothesis.

It was hypothesized (H_1) the multidimensional subscores of cognitive agility, reframing, reflection, and systems thinking would predict academic achievement as measured by a teacher's VAM score. Reframing had a significant relationship with local VAM ($r = -.267$) and explained 7% of the variance, indicating that as teachers used reframing more, the VAM decreased. Also a significant relationship exists between systems thinking and local VAM ($r = .212$), explaining 4% of the variance in local VAM. For state VAM, no significant correlation with cognitive agility subscores was found. The researcher rejected the hypothesis.

It was hypothesized (H_2) that alterable and unalterable variables moderated the relationship between cognitive agility and student achievement. Alterable variables included school size, school level (elementary or secondary), and SES. The unalterable variables included age, years of experience, gender, highest degree earned (HDE), teacher certification in Florida, and teachers with educational leadership certification who had taken the FELE.

Multiple regression moderator analysis was completed. First, the continuous variables were centered to reduce collinearity. To center variables, the mean was subtracted for the variables of SES, school size, age, years of experience, and highest

degree earned. The dichotomous variables required no centering. The variables of in-state or out-of-state teacher certificate and whether or not the teacher took the FELE were dichotomized.

Then, both the state and local VAM were examined. The findings for the moderation of cognitive agility and state and local VAM are displayed in Table 8.

Table 8

Moderator Analysis of the Relation Between Cognitive Agility with Product Terms on State (n=33) and Local VAM (n=95)

Product Term		SES	Sch Size	Level	Age	Yrs Exp.	Gndr.	HDE	Ed Lead	FELE
State VAM	β	-.577	.344	.417	-.223	-.122	-2.71	.490	-2.15	-215
	p	.263	.081	.437	.287	.532	.127	.013*	.131	.131
	Max VIF	7.74	1.23	4.43	1.34	1.11	95.1	1.12	61.86	61.86
Local VAM	β	.101	.207	.518	-.014	.199	.523	.035	-.541	-.541
	p	.869	.047*	.008*	.892	.048*	.554	.738	.264	.257
	Max VIF	10.12	1.044	4.768	1.028	1.034	71.12	1.0	21.57	20.93

Note. ** $p < .01$; * $p < .05$

The results indicate that the variable of HDE had significant moderation ($p = .019$) with state VAM. The max variance inflation factor (VIF) was a 1.0, therefore reducing collinearity concerns. This implies that as teachers gain higher degrees, the relationship between cognitive agility and VAM increases. To examine the nature of the moderating relationship of highest degree earned and state VAM, a split case analysis was conducted and the results are shown in Table 9.

Table 9

Split-case Correlation Analysis of Cognitive Agility on State VAM Moderated by Highest Degree Earned

Degree	<i>n</i>	<i>r</i>	<i>p</i>
Associates	0	*	*
Bachelor's	15	-.430	.110
Master's	17	.372	.142
Specialist	1	*	*
Doctorate	0	*	*

Note. *=*n* too small to calculate a correlation

The results of the split-case analysis of the unidimensional score of cognitive agility as moderated by highest degree earned indicate there are not enough data to fully understand the moderating relationship of the highest degree earned to cognitive agility and state VAM. Upon examination of variance, the Bachelor's degree accounted for 18% of the variability, while the Master's degree accounted for 14% of the variance and gives measure to the importance of the effect.

Many of the variables yielded a moderating relationship to cognitive agility and local VAM. Cognitive agility was moderated by school size. To examine the nature of the moderation, school level was split into different sizes. Only a limited amount of subjects were in schools below a school size of 500 students and schools above 1,000 students would exclude elementary and middle schools. The results are shown in Table 10.

Table 10

Split-case Correlation Analysis of Cognitive Agility on Local VAM Moderated by School Size

School size	<i>n</i>	<i>r</i>	<i>p</i>
≤ 800	66	.009	.783
≥ 801	29	.164	.031*

Note. **p* < .01

Schools with student populations greater than 800 students had subjects whose cognitive agility score was moderated by the larger student population. Cognitive agility is not correlated with local VAM for less populated schools, but more strongly correlated for those subjects at larger schools.

Cognitive agility was moderated by school level and to examine the moderating relationship, a split case analysis was conducted. Subjects placed themselves into two categories – elementary if they taught pre-kindergarten through fifth grade and secondary is the subject taught sixth grade through seniors in high school. The results of the analysis are shown in Table 11.

Table 11

Split-case Correlation Analysis of Cognitive Agility on Local VAM Moderated by School Level

School Level	<i>n</i>	<i>r</i>	<i>p</i>
Elementary	67	-.029	.165
Secondary	28	.419*	.162

Note. **p* < .01

As seen in Table 11, there was a significant correlation on a teacher’s cognitive agility when it comes to school level. For those subjects at the elementary level, cognitive agility is not correlated to local VAM, while those teaching at the secondary level have stronger correlation to local VAM.

The years of experience of a teacher had significant moderation and were inspected using a split-case analysis to examine the influence of years of experience to local VAM. The results are shown in Table 12.

Table 12

Split-case Correlation Analysis of Cognitive Agility on Local VAM Moderated by Years Experience

Years Experience	<i>n</i>	<i>r</i>	<i>p</i>
≤ 15	63	.186	.408
≥ 15	32	.533	.017*

Note. * $p < .01$

As seen in table 12, there was significant moderation on a teacher’s cognitive agility when it comes to years of teaching experience. Cognitive agility is not correlated with local VAM for the less experienced, but more robustly positively related to local VAM for more experienced teachers. Therefore, the researcher rejected the second hypothesis.

When examining the hypothesis (H₃), it was suggested that behavioral agility has a direct and significant relationship with both state and local VAM. The unidimensional effect of behavioral agility as in H₀ was computed by averaging the subscores of bartering, bonding, bridging, managing, and transforming and using bivariate correlation.

The correlation analyses demonstrated that behavioral agility did not predict VAM ($r = -.143$ for state VAM and $.085$ for local VAM). Based on these findings, the researcher failed to reject the hypothesis.

In terms of the multidimensional effect of the subscores of behavioral agility, it was hypothesized (H_4) that managing, transforming, bonding, bridging, and bartering would have a significant relationship with state or local VAM. As was done with a previous hypothesis, correlation analysis was completed. The analysis showed that transforming was the only subscore significantly related to local VAM ($r = .182$) and using Cohen's (1992) measure was of small effect. The use of bridging skills ($r = .341$) was the only leader influence action approaching a significant relationship to state VAM. The analysis showed no collinearity concerns and the researcher rejected the hypothesis.

Hypothesis 5 posited that the alterable and unalterable variables had a moderating effect on behavioral agility and student achievement. To test this hypothesis, a multiple regression was completed. The results are displayed in Table 13.

The information presented in Table 13 indicates there is no significant moderation of behavioral agility and state VAM. The data also indicate that school level, years of experience, and whether teachers have an educational leadership degree or have taken the FELE were significant moderators between behavioral agility and local VAM. The variable indicating whether the subject had taken the FELE is redundant with the educational leadership variable so was not included in the split-case analysis.

Table 13

Moderator Analysis of the Relation Between Behavioral Agility with Product Terms on State and Local VAM

Product Term		SES	Sch Size	Level	Age	Yrs Exp.	Gndr	HDE	Ed Lead	FELE
State VAM	β	-.121	.235	.130	-.181	-.076	-1.06	.213	-.303	-.303
	p	.599	.195	.742	.360	.696	.264	.279	.670	.670
	Max VIF	1.553	1.03	5.24	1.19	1.13	26.8	1.15	15.2	15.2
Local VAM	β	-.067	.172	.439	.189	.333	-.232	.126	-1.52	-1.52
	p	.541	.095	.032*	.055	.001**	.683	.233	.039*	.041*
	Max VIF	1.09	1.023	5.25	1.000	1.022	29.36	1.06	51.8	52.19

Note. ** $p < .01$; * $p < .05$

To assess the relationship of these moderating factors, split case analysis was completed for school level, years of experience, and whether the subject had an educational leadership degree. The results are examined in Tables 14, 15, and 16.

Table 14

Split-case Correlation Analysis of Behavioral Agility on Local VAM Moderated by School Level

School Level	<i>n</i>	<i>r</i>	<i>p</i>
Elementary	67	.010	.934
Secondary	28	.475*	.011*

Note. * $p < .05$

Table 14 identifies the results of the split case analysis of behavioral agility on local VAM as moderated by school level, and indicates that, for secondary teachers, there is a relationship between behavioral agility and local VAM. Behavioral agility is not

correlated with local VAM for those subjects at the elementary level, but significantly correlated with those teachers at the secondary level. Therefore, the researcher rejected the hypothesis.

The variable years of experience was also one that required closer examination on the moderating effect on behavioral agility. The results listed in Table 15 indicate that the behavioral agility of teachers with over 15 years of experience significantly influences the behavioral agility-local VAM relationship.

Table 15

Split-case Correlation Analysis of Behavioral Agility on Local VAM Moderated by Years Experience

Years Experience	<i>n</i>	<i>r</i>	<i>p</i>
≤ 15	22	-.159	.221
≥ 15	30	.527	.003*

Note. * $p < .05$

The relationship between behavioral agility and local VAM is slightly negative for the less experienced, but manifested a large positive correlation for those who were more experienced. There is a positive correlation and significant relationship of behavioral agility and local VAM, which is moderated by years of experience ($p = .003$) with a medium effect.

Table 16

Split-case Correlation Analysis of Behavioral Agility on Local VAM Moderated by Educational Leadership Certification

Certification	<i>n</i>	<i>r</i>	<i>p</i>
Yes	13	.550	.007*
No	82	.038	.737

Note. * $p < .05$

Table 16 identifies the results of the split-case analysis of behavioral agility as moderated by educational leadership certification. The relationship between behavioral agility and local VAM is less for those subjects with no educational leadership certification, but manifested a large positive correlation for those who were certified in educational leadership. There is positive correlation and a significant relationship of behavioral agility and local VAM, which is moderated by educational leadership certification ($p = .007$). With these findings, the researcher rejected the hypothesis.

It was hypothesized (H_6) the influence of the teacher's cognitive agility on student achievement is moderated by their behavioral agility. To begin, a new product variable was created from the centered variables for the unidimensional cognitive and behavioral agility scores. From this product variable, multiple regression was conducted. The analysis indicated that the relationship to local VAM was not significant ($p = .951$). The analysis indicated no concerns for multicollinearity and a negative beta ($\beta = -.007$). The relationship to state VAM also was not significant ($p = .690$) and there was a positive beta ($\beta = .08$) with no multicollinearity issues. The researcher failed to reject the hypothesis.

When the cognitive and behavioral agility scores were combined, it was predicted (H₇) that there would be a positive relationship with local and state VAM. A bivariate correlation was conducted and the results indicated that the correlation was not significant for state VAM ($r = .551$) or local VAM ($r = .074$); therefore, the researcher failed to reject the hypothesis.

Summary

The purpose of this study was to determine whether a classroom teacher's use of cognitive and behavioral agility influences state or local VAM. The study also examined the relationship of contextual variables to establish their moderating effects. A conceptual framework and eight hypotheses were generated for this study. Using the statistical software package, SPSS, the eight hypotheses were tested through multiple statistical analyses including bivariate correlations and linear regression of variables, moderator analysis of product terms through multiple regression, and, due to the results of the moderator analyses, split-case bivariate analysis was completed.

H₀ theorized that cognitive agility predicts student achievement as measured by state or local VAM. Using bivariate correlational analysis, it was determined that cognitive agility did not predict local or state VAM. The subscores of the instruments, STQ^T and SLQ^T, were significantly related to one another. Based on the statistical analysis, the researcher failed to reject the hypotheses.

H₁ proposed that a teacher's use of the subscores of cognitive agility, including systems thinking, reframing, and reflection, predicted scores on state or local VAM. To assess this unidimensional effect, the average of the three subscores was determined and bivariate correlation was completed. Within the bivariate correlation, systems thinking

was a subscore that was correlated to VAM scores. Reframing had a significant relationship to VAM scores. The researcher rejected the hypothesis.

H₂ posited that alterable and unalterable variables would moderate the relationship of cognitive agility and student achievement based on a teacher's VAM score. The variables for the study included school size, school level, age, years of experience, gender, highest degree earned, Florida teacher certification, and if the respondents have an educational leadership degree and had taken the FELE. Depending on the dichotomous nature, variables were centered, new product variables were created, and then multiple regression moderator analyses were completed. Few contextual variables had a moderating effect on state or local VAM. Within state VAM, only the highest degree earned variable had a moderating effect. For local VAM, school size, level, and years of experience had a moderating effect. The years of experience of a teacher significantly moderated behavioral agility and local VAM scores. As a teacher's years of experience increases so does the cognitive agility. The researcher rejected the hypothesis.

H₃ proposed that a classroom teacher's behavioral agility predicts student achievement as measured by state or local VAM. Averaging the subscores and conducting bivariate correlation and using regression showed that behavioral agility did not predict state or local VAM. The researcher failed to reject the hypothesis.

H₄ posited that the classroom teacher's use of bonding, bridging, bartering, managing, and transforming predicts student achievement as measured by a teacher's state or local VAM. Correlational analysis was conducted and the analysis showed that

the subscore of bridging was approaching significance ($r = .341, p = .052$). With no collinearity concerns, the researcher rejected the hypothesis.

H₅ posited that the alterable and unalterable variables of this study moderate behavioral agility and student achievement. A multiple regression analysis of the variables including school size, school level, SES, age, years of experience, gender, highest degree earned, a teacher's Florida certification, having educational leadership certification, and if the teacher took the FELE were examined. Selected variables were centered and new multiplier variables created. For state VAM, highest degree earned (HDE) was a significant moderator. For local VAM, there were significant moderation findings for the variables of school level (elementary or secondary), years of experience, school level, whether the teacher has an educational leadership degree, and if the teacher had taken the FELE. The variable of age was approaching significance ($p = .055$). Split-case analyses were completed with results indicating those subjects at the secondary level with greater years of experience and educational leadership certification moderate behavioral agility and local VAM. The researcher rejected the hypothesis.

H₆ posited that a teacher's cognitive agility influence on student achievement is moderated by their behavioral agility. From this multiple regression analysis, there were no moderation effects. The researcher failed to reject the hypothesis.

H₇ posited that a teacher's combined cognitive and behavioral agility predicts student achievement as measured by state or local VAM. A variable was created from the averages of the two means scores of the two instruments for a combined leadership score. The combined leadership score yielded a mean of 4.17 out of 5 and represented a very high self-reported leadership score. The combined leadership score did not predict

student achievement as measured by state or local VAM. The researcher failed to reject the hypothesis.

Table 17 lists the hypotheses tested in this study.

Table 17

Hypotheses Tested

Hypothesis	Description	Null Hypothesis Result
H ₀	The teacher's cognitive agility predicts student academic achievement as by VAM (unidimensional effect)	Failed to Reject
H ₁	The teacher's use of Systems Thinking, Reframing, and Reflection predicts student academic achievement as measured by VAM (multidimensional effect)	Rejected
H ₂	Alterable and unalterable variables moderate the relationship of cognitive agility and student achievement.	Rejected
H ₃	The teacher's behavioral agility predicts student academic achievement as measured by VAM (unidimensional effect).	Failed to Reject
H ₄	The teacher's use of Transforming, Managing, Bonding, Bridging, and Bartering predicts student academic achievement as measured by VAM (multidimensional effect).	Rejected
H ₅	Alterable and unalterable variables moderate the relationship of behavioral agility and student achievement.	Rejected
H ₆	The teacher's cognitive agility influence on student achievement is moderated by their behavioral agility.	Failed to Reject
H ₇	The teacher's combined cognitive and behavioral agility predicts student academic achievement as measured by VAM.	Failed to Reject

CHAPTER 5. DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

This closing chapter recapitulates and reviews the problem, purpose, and methodology for this study. A summary of the analysis and findings are presented as well as conclusions based on the research findings and literature reviewed.

Restatement of the Problem

Bolman and Deal (2010) purported that teachers, even those with years of experience, “often bounce from one unpleasant shocker to another” (p. 1). According to Berry et al. (2013), the complexity of teaching new, more rigorous standards and handling the personalized learning systems required to prepare the diverse mix of 55 million students for college and or careers in a global economy is a teacher’s daily pressure. An additional pressure is that 1 in 5 students may not speak English and 1 in 10 live in poverty (Berry et al., 2013, p. 3). According to Fullan (2016),

...the added pressure of accountability, ask a lot of teachers in terms of daily maintenance and expectations for student success for all, and give back little in the time needed for planning, constructive discussion, thinking, and just plain composure, to say nothing of rewards. (p. 99)

The dilemmas of teaching have been well-documented – raising student achievement, inadequate preparation, and lack of time and resources are all named – yet systematic attempts seem incapable of cracking the code and accountability pressures mount.

Beyond these classroom challenges, the schools in which teachers work are faced with compelling barriers they must overcome to achieve student success. Snyder, Acker-

Hocevar, and Snyder (2008) identified diversified population, diminishing resources, bureaucratic hurdles, increased testing, and poor communication as preventing schools from succeeding and indicated schools are “living on the edge of chaos,” the title of their book. Additionally, they argued that other systemic political pressures – including market schools (charter and virtual schools) – are causing decreased enrollments and competition.

The classroom, much like a microcosm of the school and society, is an environment in which to use leadership skills. With schools and classrooms, teachers could use these skills to handle some of the teaching tasks not present in teaching days of yore. Accountability and reform have changed the role of teaching and, according to Holland, Eckert, and Allen (2014), many have called upon teachers to help with the transformation and improvement of schools (p. 433). Teachers could use leadership skills when presented with the task of disaggregating, analyzing, and synthesizing countless assessment data as well as when dealing with parents and school administration in a political school environment.

Classrooms today are socially complex and diverse environments that require teachers to use different skills. Sherrill (1999) recognized

The complexity of the issues surrounding new roles for teachers cannot be ignored, but the development of common expectations of teacher leadership roles at the teacher preparation, induction, and ongoing professional development phases could prove helpful in setting high expectations, filling leadership positions with qualified individuals, and contributing to the continuous improvement efforts underway in many of today’s school. (p. 56)

The extant literature has concurred that the concept of classroom teacher leader is not clearly defined nor studied. The notion of a leader, namely the teacher within the classroom, and their effect on student achievement has not been thoroughly studied (Moller & Pankake, 2006; York-Barr & Duke, 2004). Fiore and Whitaker (2005), Berry et al. (2013), Fairman and Mackenzie (2015), and Stein (2014) have discussed the notion of the teacher as an emerging leader working within the context of their classroom. Pounder (2006, 2014) described transformational teacher leaders within the classroom. Warkentien (2016) studied teacher leaders and found that the cognitive and behavioral agility and VAM were correlated for teachers over the age of 50.

Traditionally, the concept of school leadership has focused on school administration and, while this is not a new idea, research of an exploratory nature is necessary. Indeed, Schlechty (1997) defined teaching as a leadership act within the job responsibilities of a teacher. With myriad definitions and lack of empirical research, questions arise as to the research necessary to elucidate the effects of classroom leadership on student achievement. Examining the notion of teachers as leaders within their own classrooms could be an attempt to assist with these pressures in the heightened age of educational accountability while searching for answers to the question of how best to positively impact student achievement. In light of this, the current study endeavored to explore classroom leadership and its effect on student achievement.

Review of Purpose

The purpose of this non-experimental, exploratory study was to establish whether classroom teacher cognitive and behavioral agility related to their state and local Value

Added Model (VAM) scores and to determine if any relationship was moderated by contextual factors. Three research questions guided the study:

RQ₁. Is there a relationship between cognitive agility and student academic performance as measured by a teacher's VAM score?

a. Do alterable and unalterable variables moderate the relationship between the teacher's cognitive agility and student academic performance?

RQ₂. Is there a relationship between the teacher's behavioral agility and student academic performance as measured by a teacher's VAM score?

a. Do alterable and unalterable variables moderate the relationship between the teacher's behavioral agility and student academic performance?

RQ₃. Can a predictor model of effective classroom leadership be developed?

Review of Methodology

Two survey instruments, The Strategic Leadership Questionnaire for Teachers (SLQ^T), which measures behavioral agility, and the Strategic Thinking Questionnaire for Teachers (STQ^T), which measures cognitive agility, were combined into one instrument (SLQ^T and STQ^T) and administered to collect the data to answer the three research questions and test the eight hypotheses regarding the relationship of teacher cognitive and behavioral agility to state and local VAM scores. The two instruments are instruments that were altered from their original construction to measure organizational leadership to accommodate the unit of analysis – the classroom teacher. The data gathered concerning the participants taking the surveys included age, gender, years of experience, school

level, teaching certificate information, educational leadership degree, and whether the respondent had taken the Florida Education Leadership Exam (FELE). A third-party data collector, one within the school district of study, obtained the state and local VAM scores and assigned them to each teacher’s data set and then made the data anonymous to reduce researcher bias.

The teacher survey data were explored using correlational analysis to determine the relationship between variables. Multiple linear regressions were conducted and results analyzed to understand any moderating effects of the product terms on the relationship between the independent and dependent variables

Summary of the Major Findings

Table 18 displays the major findings of the research. Each of the major findings is expounded upon in greater detail.

Table 18

Major Research Findings

Finding	Summary Description
1.	Teacher cognitive agility was positively significantly related to and predicted teacher behavioral agility
2.	The relationship between cognitive and behavioral agility manifested a large positive correlation for those who were more experienced.
3.	The relationship between behavioral agility manifested a large positive correlation for those who were certified in educational leadership.
4.	The relationship of the systems thinking and transforming subscores were more correlated to those participants who possessed an educational leadership degree.
5.	Cognitive agility was moderated by higher degrees for both state and local VAM.
6.	School level moderated the relationship between behavioral agility and local VAM.

Finding 1

Classroom teacher cognitive agility was significantly related to and predicted teacher behavioral agility. The subscales of each of the instruments were related to each other. As Warkentien (2016) found, the relationship between cognitive agility and behavioral agility was established as it was in the extant literature. Hart and Quinn (1993) have suggested “that effective managers not only need to think multidimensionally, but also be able to act out a cognitively complex strategy by playing multiple, even competing roles in a highly integrated and complementary way” (p. 543), which was echoed by Hooijberg and Quinn (1992) and Jacques (1986). Pisapia (2009) suggested that successful leaders must be able to make important decisions and maneuver (p. 41). Put simply, cognitive complexity is not enough to bring about change; behavioral complexity is necessary for the actions to take place.

Table 19 recaps significant descriptive data from the study. Cognitive agility, consisting of the subscales of reflecting, systems thinking, and reframing, had an overall mean score of 4.2, suggesting that the classroom teachers replying to the study believed they had a high capability to think strategically. Pisapia (2009) indicated that scores between a 3.1 and a 3.9 imply average ability, yet a score of 4.1 proposes high ability.

Table 19

Teacher Use of Strategic Thinking Skills and Leader Influence Actions

Strategic Thinking and Leading Actions	<i>M</i>	<i>SD</i>
Cognitive Agility	4.2	.45
Systems Thinking	3.9	.58
Reframing	4.4	.41
Reflecting	4.3	.53
Behavioral Agility	4.5	.40
Managing	4.0	.37
Transforming	4.4	.38
Bonding	4.8	.31
Bridging	4.6	.45
Bartering	4.0	.83

Note. $n=128$

The teachers in the study also indicated they self-reported leadership actions in the classroom. Teachers, by nature, are bonders (Beishuizen, Hof, van Putten, Bouwmeester, & Asscher, 2001; Osterman, 2000), and the mean score of 4.8 suggests this as their strongest action. The overall mean of behavioral agility of 4.5 indicates high use of the leadership actions. Pisapia and Reyes-Guerra (2008) purported stronger skills for leadership action with a score of 4.0 or greater. Upon examination of the standard deviations, bartering had a standard deviation of .83. This large standard deviation suggests there was a large variance in the responses of the teachers. Bartering was one of the lowest subscale scores and many of the questions focused on negotiating with students; this study tested the leadership skills used with students within the classroom and not whether the teacher was leading school leaders, parents, and the community.

Contrary to the research of Pisapia and Pang (2012), both cognitive and behavioral agility from a multidimensional effect did not predict increased scores on VAM in this study. The instrument used was developed for the Warkentien's (2016) validation study and then used for this study. Translating the thinking and leader actions to the classroom context of the teacher instrument could have affected the results. Both cognitive and behavioral agility subscales were shown to be significant and were correlated to VAM.

Finding 2

Years experience moderated the relationship of cognitive and behavioral agility on local VAM, indicating teachers with more experience are more cognitively and behaviorally agile and have a higher use of these leadership skills. These findings corroborate with the findings of Penney (2010) and Pisapia et al. (2009). In the Pisapia et al. (2009) study of strategic thinking and aspiring school leaders in Hong Kong, Malaysia, Shanghai, and the United States, the researchers found that age could be a representation for years of experience and or education, likely moderators of thinking skills, and indicated that practical and life experience contributes to this moderation (p. 53). Penney (2010) studied the use of strategic thinking skills and technology skills by fire chiefs and found that years experience moderated the relationship.

Reyes-Guerra (2009) and Miron (2015) determined the use of leadership actions, or behavioral agility, was influenced by tenure in position, which could be suggestive of years experience. In this study, those participants with over 15 years of experience showed moderation with both cognitive and behavioral agility and local VAM. There was a relationship between age and years experience and local VAM ($r = .311$ and $r = .337$,

respectively). It could be suggested that as the more experienced a person is in their profession, the more cognitively and behaviorally agile they become.

Finding 3

The relationship between behavioral agility and local VAM was less for those subjects with no educational leadership certification; there was positive correlation as well as a significant relationship of behavioral agility and local VAM, which was moderated by educational leadership certification ($p = .007$). There were 13 participants who earned a local VAM and possessed educational leadership certification. While this is a significant relationship, the small sample size limits being able to draw any real conclusion.

Finding 4

The cognitive agility subscale of systems thinking and the behavioral agility subscale of transforming were correlated with educational leadership certification, indicating that those with educational leadership background may use systems thinking and transforming behaviors in the classroom. There were a total of 21 participants who possessed an educational leadership certificate. These participants have a master's degree in educational leadership and likely have been through leadership training as part of their course of study in addition to being placed in leadership roles at their school sites. Systems thinking is associated with leadership (Fullan, 2013; Senge, 2006; Senge, Cambron-McCabe, Lucas, Smith, & Dutton, 2012), but is not necessarily associated with teaching or instruction. Rodriguez (2013) argued that master teachers have been more successful because they utilize a systems thinking approach (p. 77) and that many

educational reform efforts are unsuccessful because they are not operating using a systems thinking approach.

Transformational often has been a word used to describe leaders and was popularized by Burns (1978). Bass (2008) defined the transformational leader as a leader who gets the followers to transcend their own self-interests to the greater good of the team (p. 619). Kouzes and Posner (2003) purported that leaders who engage in transformational leadership will be more effective than those who do not. Sergiovanni (1992) suggested that leaders' vision and individualized consideration were part of improved teaching practices. Much of the research in education and transformational leadership has been conducted on school principals (Leithwood, 1995; Leithwood & Steinbach, 1991; Leithwood, Tomlinson, & Genge, 1995) and not on classroom teachers. Crowther (1997) went so far as to say that teacher leaders may not be aware of their transformational qualities. Pounder (2006) indicated that teacher leaders influence colleagues without the "formal trappings of leadership but by the qualities, characteristics, and approaches that are reminiscent of the transformational leadership construct" (p. 538). Pounder (2006, 2008) purported that a possible explanation of the connection between classroom teachers who are transformational leaders is that they display this skill in the classroom and their classroom leadership equates to excellent performance in the classroom. Teachers in this study with educational leadership certificates are systems thinkers and transformational, which substantiates Pounder's (2006, 2008) notion.

Finding 5

The cognitive agility of teachers and their relationship to local and state VAM

scores increased as they earned higher degrees. As teachers earned degrees, their VAM increased. Teachers with higher degrees achieved a higher local and state VAM. This finding is in agreement with Warkentien's (2016) exploratory study where he indicated that the finding was logical as participants with advanced degrees would be able to differentiate their practice (p. 157). Penney (2010) and Pisapia et al. (2009) also found the cognitive agility skills improve with more education. This finding is contrary to Hanushek (2010), who, when studying the economics of teacher quality, found no evidence that having a Master's degree increases teaching skills.

Finding 6

School level moderated the relationship to behavioral agility to local VAM. According to Dhuey (2013), relatively few studies have been completed relating grade level configuration to student achievement (p. 471), and Rockoff and Lockwood (2010) indicated that grade-level configuration "has received little attention by economists relative to issues such as class size or teacher quality" (p. 1051). Many of the studies focused on the effects of student achievement in certain grade levels; for example, determination of which grade-level structure is best for students, and not whether teacher effectiveness rises as students move up grade levels or if secondary teachers outperform elementary school teachers. Chopin (2003) studied schools in Louisiana and found that the organizational structures of education do impact student achievement, but in complex ways (p. 194).

There is sparse research on school-level configuration and its impact on student achievement. This finding needs additional study to determine if this new knowledge could have an impact on school structure and settings.

Discussion and Conclusions

This study investigated a possible relationship between the leadership actions of classroom teachers and their VAM score. This research was commenced as an interest to the researcher and based on literature studied in the educational leadership doctoral program. The hypothesis of the study was that if teachers use greater leadership actions, both cognitive and behavioral, in the classroom, it would produce greater student achievement, namely greater VAM scores. Within the study, moderating variables including SES, school size, school level, age, gender, degree in educational leadership certification, and if the participant took the FELE were part of the framework of the study and taken into account for research purposes. Finally, it was hypothesized that a predictor model of effective classroom leadership could be recognized. The conclusions of this exploratory study, while not entirely decisive, serve as an establishment for future and further research. Many concepts within the research deserve additional qualitative and quantitative examination. The use of the SLQ^T and STQ^T, with their focus on the classroom teacher, have been used twice and the questions could be examined to ensure the question assesses the thinking or leading action. Additionally, because these instruments were newly developed for use in the classroom context, qualitative interviews of teachers could lead to a better understanding of how these leadership skills translate in the classroom and to student achievement to help formulate the survey questions for future research.

The relationship and predictability of cognitive agility and behavioral agility in this study have been substantiated in the literature. This study demonstrated that teachers are leaders in the classroom, not just facilitators or instructors. The mean cognitive agility

score of the teachers in this study was 4.2, suggesting that teachers are using thinking skills in their classrooms. The subscores of reframing and reflection were above 4.0, indicating that the teachers in this study report that they are using these skills in the classroom. Systems thinking was slightly below 4.0 at 3.9, and implies an average ability to use this skill in the classroom.

Teachers are cognitively agile as they use the skills of reflecting, reframing, and systems thinking. Teachers reflect on their impact of their lesson plans and instruction as well as their interactions with administrators, students, and parents. Teachers reframe with students when discussing perspective and viewpoints as well as when talking to parents about a student's progress. Finally, a classroom is a community where the whole must be considered as well as the part when planning lessons and meeting the needs of students.

The teachers in this study had a behavioral agility mean score of 4.5, which is above the recommended score of 4.0 for indicating high use of behavioral agility skills. All of the subscores were above 4.0. Teachers are behaviorally agile and use these skills within the classroom. Teachers consider themselves to be bonding and transformative and seek relationships with students so that their classroom will be responsive to the needs of students. Daily, teachers manage student behavior, but also the many tasks to be accomplished in a classroom. Teachers use their bartering and bridging skills to gain resources, goods, and services for their students and their classroom. The teachers in this study considered themselves thinkers and leaders in their classroom.

Another conclusion in this study is that reframing, a leadership skill, actually seems to have a negative effect on local VAM ($M = 4.2$, $r = -.267$). This finding would

suggest that as reframing increases, VAM decreases. Warkentien's (2016) study suggested that teachers who reframe, that is, have the ability to view problems and situations from many angles and perspectives, are more likely to increase student achievement as measured by state VAM. As noted, local VAM has performance indicators that are based on locally derived measures and state VAM is calculated based on state assessment scores. This finding warrants further investigation. Perhaps this finding was the case because accountability makes for linear, non-agile thinking in order to train students to take standardized tests as opposed to being inventive and creative (Kaufman & Sternberg, 2007). If the teacher's use of reframing does not increase student performance, does this indicate that the measure of student success is a standardized test and teaching is becoming more standardized? Is it possible that teachers are using one frame because that will produce better results, namely their VAM score? Investigation into this notion that testing is creating teachers with diminished thinking skills is warranted.

As has been proven in the literature, years experience was a moderator of teacher success. Study participants who have been teaching 15 or more years were shown to possess higher cognitive and behavioral agility skills than less experienced teachers. There is evidence to suggest that cognitive agility predicts behavioral agility after years of experience in teaching. More experienced teachers were able to translate their skills into greater student achievement. This substantiates the work of Clotfelter, Ladd, and Vigdor (2006) when they reported that the two teacher qualifications that could predict student achievement scores are teaching experience and teacher licensure (p. 807).

Recommendations for Practitioners

The purpose of this study was to examine the relationship between the leadership agility of classroom teachers and their student achievement, namely VAM scores. The literature has indicated that the term classroom leader has not been defined nor has the effect of leadership within the classroom been studied thoroughly. This study, with its focus on classroom teachers, has presented recommendations for practitioners.

Current literature recommends an increased emphasis on the professional development of teachers (Jacob & McGovern, 2015). This study demonstrated that school districts should provide teachers with professional development on the use of cognitive and behavioral agility. Teachers are given the tools to manage classrooms in preparation and in-service programs; now teachers should be given the opportunity to increase their leadership skills within the classroom. Professionally developing the leadership skills of teachers has broad implications besides increasing student achievement scores, but also with coping with some of the changes taking place in the educational landscape.

The use of systems thinking in the classroom could become an important tool for professional development as the subscore of the cognitive agility survey showed promise toward a positive VAM. Additionally, systems thinking was correlated to educational leadership certification. Forrester (2012) brought system dynamic theory to the classroom as early as the 1980s. Forrester reported that in successful schools systems dynamics is combined with a project-oriented, learner-centered approach “where teachers are no longer necessarily seen as the lecturers in command of the flow of wisdom or even as the authority figures” (p. 270). According to Stuntz and Kruschwitz (2012), systems thinking

allows teachers to see the big picture as well as the parts so that patterns become explicit over time (p. 276). Systems thinking is a way for teachers, and ultimately students, to think systematically and to ask questions that lead to greater understanding.

Because teachers with over 15 years of experience had greater VAM scores, the goal of school districts should be to retain teachers so that increased student achievement could be the result. Johnson (2004) pointed out that those entering the profession today will have more career options than those of the retiring generation. Districts may need to accept and embrace those options. Traditionally, schools have been known to hire new teachers, hoping for the latest innovative instructional techniques. The recommendation for hiring practice could be to interview more experienced teachers. Incentives, pay structures, and career ladders also should be examined for use in school districts so teacher retention is increased and experienced teachers are rewarded. According to Fullan (2016), the highest levels of teacher effectiveness occur when a teacher is on the job for 8 to 23 years, so when teachers leave after a few years on the job, there is little return on investment (p. 105). Because Clotfelter et al. (2006) found that teacher experience had an effect on student achievement, all efforts should be explored to retain effective teachers.

The exploration of a changed career ladder with new, expanded roles and pay for teachers should be researched and plans implemented in school districts. Creating the conditions for teachers to stay in the profession needs to be a priority of school districts, while allowing for and promoting innovation. Hanushek, Kain, and Rivkin (2004) related that teacher turnover is an important predictor of student achievement. Too much disruption and loss of morale could lead to poor student achievement. Some of the role changes could be, as Hess (2010) suggested, to “allow effective educators to devote more

of their time to educating” (p. 99). Fullan (2016) summarized this notion, “in an indirect sense, teachers need to increase their capacity for dealing with change, because if they don’t, they are going to continue to be victimized by the relentless intrusion of external change forces” (p. 107).

School districts and policy makers should look to other countries and their recruitment and retention practices to examine a national policy when it comes to recruiting teachers, one with more flexibility and professionalism (Berry et al., 2013). School districts should encourage teachers to earn higher degrees and then reward and pay them accordingly. Because educational leadership certification had an impact in this study, school districts should redefine and redesign why teachers receive an educational leadership degree. Berry et al. (2013) exclaimed that teachers should not be forced to choose between teaching and leading (p. xxi).

There has been criticism of Florida’s Best and Brightest program (FLDOE, 2017), where teachers receive a supplement for their SAT scores, despite that the test might have been taken many years ago while the teacher was in high school. Use of this money, instead of paying teachers for outdated assessments, could be used to train teachers in leadership and for teachers to obtain leadership degrees and to earn higher degrees. There could be dialogue and an understanding of the shared value of the benefits of possessing an educational leadership degree and certification. Incentives and reward structures should be put into place for this to take place. There should be a shift in thinking that the reason to obtain educational leadership may not be to seek an administrative position, but to serve as a leader within the classroom and the school.

School level moderated behavioral agility and local VAM. This could suggest that teacher leadership is enhanced, or more applicable, as students mature. As students age, perhaps there is a need for increased leadership skills for teachers, or that students are at a level of maturity where they themselves are displaying leadership skills. It is recommended continued professional development and teachers leadership be reinforced in the higher grades.

Recommendations for Future Research

This study was an exploratory study and only the second time the combined survey instrument was used. For future research, the STQ^T and SLQ^T should be improved to gain additional research and expand on its purpose of assessing a teacher's leadership in the classroom. The reliability scores of the instrument could be improved, therefore increasing the validity of the instrument. Additionally, ensuring the language is easily understood and is refined to adequately describe the leadership construct is necessary. Specifically, the questions related to the reframing leadership skill should be examined. In this study, reframing yielded a negative correlation to local and state VAM ($r = -.267$). The embedded mechanism designed to assist with consistency of scoring are within the STQ^T and reframing. Future researchers using the instrument should disperse those questions among more of the subscales to guard against any inconsistencies.

The use of a teacher's ability to reframe also could be examined. The negative correlation of reframing needs additional exploration as has been discussed. Reframing is an important leadership skill that could help with the pressures of accountability and external forces. According to Bolman and Deal (2010), reframing is a "conscious effort to size up a situation from different points of view and then find a novel way to handle it"

(p. 3). The authors suggested that parents and students are in control when an inappropriate approach is used, or the situation may become worse when a misguided action is used. Additionally, “when we don’t know what to do, we do more of what we know—thereby digging ourselves into a deeper hole” (Bolman & Deal, 2010, p. 3). Reframing can help deal with the “endless series of ambushes, puzzles, and pitfalls...” (Bolman & Deal, 2010, p. 4).

While the sample size is sufficient, future researchers should increase the sample size as well as the diversity of sample size. A severely limited homogeneity of the sample size, such as in this study, can mar results and not be descriptive of the general population. Additionally, there were limited participants with educational leadership degrees, yet the findings indicated that leadership certification has a relationship with a teacher’s VAM score. Years experience matters too and when a split case was conducted for over 15 years of experience, the sample size was reduced.

In addition to the key findings, it is interesting that local VAM was higher than state VAM in all aspects of this study. A possible cause is that there was a preponderance of elementary school teachers participating in the study. Many of the elementary teachers receive a local VAM from i-Ready reading and math assessments, and in the district of study scores have been lower due to the rigorous nature of these assessments. VAM scores from i-Ready assessments traditionally have been lower than other VAM scores within the district of study. The mean score of local VAM was a 2.8 out of 4.0, while the state VAM mean was 3.0 out of 4.0.

Additional exploration of the variables and their positive or negative effect on local and state VAM can continue to be examined. Reframing had a negative relationship

with local VAM and no correlation to state VAM and should be examined. Warkentien (2016) found the opposite to be true. Reframing has the ability to help teachers navigate the complex and chaotic education arena. According to Bolman and Deal (2010),

Educators continually grapple with problems without solutions and solutions without problems. Teaching and learning are complex, and many of the toughest challenges—such as balancing caring and achievement or teaching as a science versus teaching as an art—are elusive. (p. 133)

Pisapia (2009) noted that open-mindedness can be related to leader effectiveness.

Teachers should be given the tools to deal with these complex challenges. Bolman and Deal (2010) continued,

every classroom is a miniature community, and each school is a distinctive culture. Trying to balance excellence, caring, justice, and faith is an ongoing dance on a wobbly tightrope. But the moral obligation to attend to these intangible issues is the centerpiece of leadership. (p. 133).

Limitations

The following limitations caution the researcher's work and should be kept in mind by the reader and future researchers when reaching conclusions regarding this study. The non-random sample was severely limited by the homogeneity, as many of the subjects were Caucasian females from elementary schools. This limited the generalizability of the study and did not serve as a diverse representation of the teaching population of the county of study nor of other counties in Florida. Additionally, 33 of the subjects received a state VAM and this created an issue of power when examining correlations and multiple regressions.

The instrument used was a self-rating measurement, which also could cause reliability issues. The amount and length of the survey questions could have impeded an authentic evaluation of strategic thinking and leadership ability. Lastly, there was a limitation regarding the narrow nature of existing literature and studies on the topic.

From this research, it is clear that classroom teachers display leadership skills within the classroom, and this study has contributed to the limited research base on classroom teacher leadership and student achievement.

APPENDICES

Appendix A. Consent Form


The Classroom Teacher Leader: The Effect of Teacher Cognitive and Behavioral Agility on Student Achievement

Investigator(s): Dr. John Pisapia, Principal Investigator and Mary K. White, doctoral student

Thank you for participating in this survey. The purpose of this study is to explore the relationship between a teacher's cognitive and behavioral agility and student achievement as measured by your VAM score. Your participation consists of completing and submitting the survey below. It should take you no more than 15-20 minutes to complete. Your participation in the survey is your choice and you may choose not to participate. You are free to withdraw from the study any time without penalty. The risk involved with participating in this study is a possible breach of confidentiality. Securing all collected data on a password-protected site with the only access belonging to the principal researcher and the third party data collection will help to keep your information secure. The doctoral student will have access to the survey data and will receive survey data and VAM as anonymous numbers. The researcher will not have access to identifying information.

Your name is required on the survey so that your responses to the survey can be connected to your VAM score. A third party within the Assessment and Accountability department of the Martin County School District will collect all data information including your survey responses and VAM scores then assign an anonymous number for use in the dissertation study.

If you experience problems or have questions regarding your rights as a research subject, contact the Florida Atlantic University Division of Research at (561) 297-0777. For other questions about the study, you should call Dr. John Pisapia, principal investigator at (561) 297-3556; or doctoral student Mary White at (772) 219-1200. By completing and returning the attached survey, you give consent to participate in this study. Only the participant completing the survey is authorized to provide consent.

 Institutional Review Board	869332-2	
	Approved On:	April 21, 2016
	Expires On:	April 21, 2017

Appendix B. STQ/SLQ Survey

The Classroom Teacher Leader: The Effect of Teacher Cognitive and Behavioral Agility on Student Achievement

* Required

Introduction and Background Information

Thank you for participating in this survey. The purpose of the study is to explore the relationship between a teacher's cognitive and behavioral agility and student achievement as measured by your VAM score. Your participation consists of completing and submitting the survey below. It should take no more than 15-20 minutes to complete. Your participation in the survey is your choice and you may choose not to participate. You are free to withdraw from the study anytime without penalty. The risk involved with participating in this study is a possible breach of confidentiality. Securing all collected data on a password-protected site with the only access belonging to the principal researcher and the third party data collection will help keep your information secure. The doctoral student will have access to the survey data and will receive data and VAM as anonymous numbers. The researcher will not have access to identifying information.

Your name is required on the survey so that your responses to the survey can be connected to your VAM score. A third party within the Assessment and Accountability department of the Martin County School District will collect all data information including your survey responses and VAM scores then assign an anonymous number for use in the dissertation study.

If you experience problems or have questions regarding your rights as a research subject, contact the Florida Atlantic University Division of Research at (561) 297-0777. For other questions about the study, you should call Dr. John Pisapia, principal investigator at (561) 297-3556; or doctoral student Mary White at [REDACTED]. By completing and returning the attached survey, you give consent to participate in this study. Only the participant completing the survey is authorized to provide consent.

1. **Name:** *

3. Grade Level Teaching Assignment: (choose the grade level placement that is most appropriate for you.) *

Mark only one oval.

- Kindergarten
- 1st
- 2nd
- 3rd
- 4th
- 5th
- 6th
- 7th
- 8th
- 9th
- 10th
- 11th
- 12th
- Other

4. Primary Teaching Assignment: *

Mark only one oval.

- Mathematics
- English Language Arts (ELA)
- Science
- Social Studies
- CTE
- Performing Arts
- Visual Arts
- Physical Education
- Computer Science/Technology
- Foreign Language
- English Language Learners
- Exceptional Education
- Guidance Counselor
- Media Specialist
- Other

5. Age: *

6. Gender *

Mark only one oval.

- Male
 Female

7. Highest degree earned: *

Mark only one oval.

- High School Diploma
 Associate's Degree
 Technical Degree
 Bachelor's Degree
 Master's Degree
 Specialist Degree
 Doctor of Education
 Doctor of Philosophy
 Other degree

8. What university did you earn your Bachelor's Degree (if applicable): *

9. Which best defines your undergraduate degree? *

Mark only one oval.

- Education
 Math
 Science
 ELA
 Social Studies
 Performing Arts
 Criminal Justice
 Business
 Liberal Arts
 Psychology/Social Sciences
 Computer Science
 Non-degree Local Certification (CTE)

10. Teacher Certification: *

Mark only one oval.

- In State
 Out-of-state
 Local Certification (CTE)

11. Do you have an Educational Leadership or Supervision Certificate? *

Mark only one oval.

Yes

No

12. If you have an Educational Leadership Certificate, what University did you complete the program through?

13. Did you take the Florida Educational Leadership Exam (FELE)? *

Mark only one oval.

Yes

No

Classroom Leadership Actions Survey

In this section you will find 53 questions about the behaviors and tactics leaders can use in performing their organizational role. Please choose how often you use the actions found on the following scale when performing your role. For example, you would choose a "1" for an action you almost never use, and a "3" for one that you use sometimes, and a "5" for an action you almost always use.

14. *

Mark only one oval per row.

	Almost Never (1)	Once in a while (2)	Sometimes (3)	Often (4)	Almost Always (5)
I consider many perspectives before making a decision	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I review past decisions to inform future choices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I try to identify patterns in the information available	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I search for solutions that reinforce my views	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I reconstruct the situation in my mind	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I choose the first solution that comes to my mind	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
After the situation was resolved, I think about how I could have handled it differently	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I look for fundamental long-term corrective measures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I look at the whole problem before examining the details	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I explore new ideas to find a more positive solution	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I investigate the relationship between the causes and the symptoms before taking action	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I rethink the situation from another point of view	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I decide how to solve the problem before considering other points of view	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I look for similarities between my past experiences and the current problem	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I try to understand how a problem worked out after it was resolved	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I look for fundamental changes in the organization's structure that could lead to significant improvements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I try to understand how the people in the situation are connected to each other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I try to understand how the facts in the situation are related to each other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I insist on my first impression even after alternatives are identified	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Almost Never (1)	Once in a while (2)	Sometimes (3)	Often (4)	Almost Always (5)
I thought about why I succeeded or failed after the situation was resolved	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I create a plan to solve the problem before considering other points of view	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I explore emotions involved to find a more positive solution	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I negotiate with students to get things done	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am honest with students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I associate with teachers that have influence	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I encourage students to do "what is right"	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I try to find mutually agreeable solutions to classroom problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I develop relationships with influential students to help motivate the rest of the class	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I consider student opinions even when they go against my beliefs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I respect the privacy of students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I develop alliances with school administrators	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I encourage students to become leaders	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I enforce classroom rules and policies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I try to create win-win solutions when dealing with students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I stand firm when classroom decisions are based on principle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I establish classroom rules	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am candid with students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I create incentives to recognize good work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I empathize with student perspectives	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I help students anticipate future opportunities resulting from their classwork	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I hold students responsible for their class obligations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I monitor the work of students and take quick corrective action when mistakes are made	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I try to balance students' needs and class objectives	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Almost Never (1)	Once in a while (2)	Sometimes (3)	Often (4)	Almost Always (5)
I seek access to people in the school who have influence over getting things done	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I work to create a shared vision with students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I let students know what is expected of them	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I emphasize the school's values in my classroom	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I negotiate differences with students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I give and take in equal measure in dealing with students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I encourage creativity and independent thought in my classroom	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I try to preserve relationships with students by compromising	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I work hard to get students to understand the importance of course content for their future	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I hold students accountable for their class obligations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix C. IRB Approval



Institutional Review Board
Division of Research
777 Glades Rd.
Boca Raton, FL 33431
Tel: 561.297.0777
fau.edu/research/researchint

Michael Whitehurst, Ed.D., Chair

DATE: April 21, 2016

TO: John Pisapia, PhD
FROM: Florida Atlantic University Social, Behavioral and Educational Research IRB

IRBNET ID #: 869332-2
PROTOCOL TITLE: [869332-2] The Classroom Teacher Leader: The Effect of Teacher Cognitive and Behavioral Agility on Student Achievement

PROJECT TYPE: *New Project*
ACTION: APPROVED

APPROVAL DATE: April 21, 2016
EXPIRATION DATE: April 21, 2017

REVIEW TYPE: Expedited
REVIEW CATEGORY: Expedited review category # B7

Thank you for your submission of Response/Follow-Up materials for this research study. The Florida Atlantic University Social, Behavioral and Educational Research IRB has APPROVED your *New Project*. This approval is based on an appropriate risk/benefit ratio and a study design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

- This study is approved for a maximum of 1,300 subjects.
- It is important that you use the approved, stamped consent documents or procedures included with this letter:
 - Revised Protocol (stamped)
 - Consent Paragraph (stamped)
 - Invitation to Participate (stamped)
- ****Please note that any revision to previously approved materials or procedures, including modifications to numbers of subjects, must be approved by the IRB before it is initiated.** Please use the amendment form to request IRB approval of a proposed revision.
- All SERIOUS and UNEXPECTED adverse events must be reported to this office. Please use the appropriate adverse event forms for this procedure. All regulatory and sponsor reporting requirements should also be followed, if applicable.
- Please report all NON-COMPLIANCE issues or COMPLAINTS regarding this study to this office.
- Please note that all research records must be retained for a minimum of three years.
- **This approval is valid for one year.** A Continuing Review form will be required prior to the expiration date if this project will continue beyond one year.

If you have any questions or comments about this correspondence, please contact Judith Martinez at:

Institutional Review Board
Research Integrity/Division of Research
Florida Atlantic University
Boca Raton, FL 33431
Phone: 561-297-0777
researchintegrity@fau.edu

* Please include your protocol number and title in all correspondence with this office.

**This letter has been electronically signed in accordance with all applicable regulations,
and a copy is retained within our records.**

Appendix D. School District Approval

April 25, 2016

To the Florida Atlantic University (IRB):

I am familiar with Mrs. Mary White's research project entitled The Classroom Teacher Leader: The Effect of Cognitive and Behavioral Agility on Student Achievement.

I understand [REDACTED] involvement includes using the Strategic Thinking Questionnaire and the Strategic Leadership Questionnaire to the teachers in [REDACTED]. The survey contains 53 items that measures the teacher's use of thinking actions (reflection, reframing, and systems thinking) and a teacher's use of leadership actions (managing, transforming, bridging, bartering, and bonding). Additionally, I understand that Mrs. White will be using teacher VAM data from the 2014-15 school year.

I understand that this research will be carried out following sound ethical principles and that participant involvement in this research study is strictly voluntary and provides confidentiality of research data, as described in the protocol. I understand that the Assessment and Accountability Coordinator is serving as the third party for data collection. This department will link the surveys to the VAM data and give Mrs. White anonymous data.

Therefore, as the institutional authority of the [REDACTED] [REDACTED] I agree that Mrs. Mary White's research project may be conducted at (or in collaboration with) our agency/institution/office. I am interested in the data for our work within the school district.

Sincerely,

[REDACTED]

Appendix E. Recruitment Email

Invitation to Participate in a Research Study—The Classroom Teacher Leader: The Effect of Cognitive and Behavioral Agility on Student Outcomes.

Greetings! We invite you to participate in a research study being conducted as part of a doctoral dissertation study at Florida Atlantic University. The purpose of the study is to examine the relationship between a teacher's cognitive and behavioral agility and student achievement as measured by a teacher's VAM score. Cognitive agility is defined as the use of the thinking skills of reframing, reframing, and systems thinking. Behavioral agility is defined as the use of a wide variety of influencing actions such as bridging, bartering, managing, and transforming.

You will be asked to complete a self-assessment of your cognitive and behavioral agility using an online version of the Strategic Leadership Questionnaire (SLQ) and Strategic Thinking Questionnaire (STQ). These surveys are combined into one survey that will take about 15-20 minutes to complete.

Why am I being asked to participate?

You are being asked to participate in this study because you have been identified as a teacher in a school district participating in this research. No identifiable information will be collected from the returned surveys. All responses and VAM data will remain anonymous, as a third party will complete data collection. The researcher conducting the research will not see identifying information in survey responses or VAM scores.

What would I need to do if I agree to participate?

If you agree to participate, we would like you to complete a short online survey related to cognitive and behavioral agility. In all honestly, the survey takes about 15 minutes. We hope you take the time to complete it as an accurate rating of your cognitive and behavioral agility. Again, thank you for answering honestly as these are important variables in this study.

By taking the survey, you are confirming your consent to participate in the study.

How will my confidentiality be protected?

The study is being administered online, and you are being asked to provide answers to the survey questions over the Internet. Information provided via the Internet may be viewed by individuals who have access to the computers where the information is collected or stored or may be viewed by unauthorized persons. All of your survey responses will be collected using a secure website and will be saved on a password-protected computer. A third party will be used to collect survey responses and connect your VAM information to survey responses. The third party collecting the data will make the data anonymous and the researcher will not have access to identifying information related to the survey responses or VAM.

What if I do not wish to participate?

Taking part in this research study is completely voluntary. If you do not wish to participate in this study, you can simply discard this email. You may end your participation at any time.

Who should I contact if I have any questions?

If you have questions about the research study itself, please contact the principal investigator, Dr. John Pisapia (phone: 561-297-3556 or email jpisapia@fau.edu), or doctoral student, Mary White (phone: [REDACTED] or email mwhite70@fau.edu)

Thank you so much for your consideration of this research study.

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