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EXAMINING TEACHER PERCEPTIONS OF LEADERSHIP AND STUDENT
ACHIEVEMENT IN KENTUCKY SCHOOLS

By

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M.A.T., University of Louisville, 2005
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A Dissertation
Submitted to the Faculty of the
College of Education and Human Development of the
University of Louisville
in Partial Fulfillment of the Requirements
for the Degree of

Doctor of Philosophy

Department of Leadership, Foundations, and Human Resource Education
University of Louisville
Louisville, Kentucky

May 2014

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A Dissertation Approved on

April 9, 2014

By the following Dissertation Committee:

Dr. Namok Choi, Chair

Dr. Marco Muñoz

Dr. Blake Haselton

Dr. Ann Larson

DEDICATION

This dissertation is dedicated to my mentor

Dr. John L. Keedy

for guiding me through the doctoral journey, and
instilling in me a love for writing.

ACKNOWLEDGEMENTS

She is clothed in strength and dignity,
and she laughs without fear of the future.
Psalms 31:25

I would like to express my sincere and deepest gratitude to the chair of my committee, Dr. Namok Choi. From our first class together at the beginning of my doctoral program, you have encouraged me and helped me develop a love for statistics. Thank you for your knowledge, patience, and understanding. I have learned so much from you over the years, and hope to follow in your footsteps and become half the mentor you are to me. I consider you a life-long friend.

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ABSTRACT

EXAMINING TEACHER PERCEPTIONS OF LEADERSHIP AND STUDENT ACHIEVEMENT IN KENTUCKY SCHOOLS

Angela L. Newcomb

April 9, 2014

Leadership is crucial in schools, especially when implementing change. Research shows that leadership can have a positive effect, albeit indirect, on student achievement (Cheng, 1994; Heck, Larsen & Marcoulides, 1990; Hallinger & Heck, 1996; and Johnson, Livingston, Schwartz, & Slate, 2000). This indirect effect implies a need for teacher expertise and distributed leadership to increase teacher buy-in for reform movements in schools. Recent studies have attempted to tie leadership to student achievement (Heck, et al., 1990; Chen, 1994; Hallinger & Heck, 1996; Johnson, et al., 2000; Heck & Hallinger, 2009; Leithwood, Patten, & Jantzi, 2010; Supovitz, Sirinides, & May, 2010; New Teacher Center, 2011), hoping to clarify literature that at times is ambiguous and confusing (Leithwood, et al. 2010). Also, authors have cited little empirical research regarding the relationships between leadership and achievement (Leithwood, et al., 2010).

The purpose of this study was to examine the relationship between teacher perceptions of leadership constructs (Teacher Leadership and School Leadership) and student achievement on the Next-Generation Learner components of Kentucky's

accountability system. A non-experimental correlational design was used with a nonrandom sample of existing data. This study employed canonical correlation and 3 x 3 factorial MANOVA to identify relationships between the leadership variables and student achievement variables. The sample included a population of Kentucky teachers and students reported on the school level ($N = 1033$). Data were obtained from the 2013 administration of the Kentucky Teaching, Empowering, Leading, and Learning (TELL) Survey for leadership perceptions, and from the 2013 K-PREP test for student achievement data. The leadership variable set included the factors of Teacher Leadership and School Leadership, and the student achievement variable set included Achievement, Gap, and Growth scores from the K-PREP.

Results from the canonical correlation analysis indicated that there was a significant positive canonical correlation that was large in magnitude between both School Leadership and Teacher Leadership and all student achievement variables. Results from the MANOVA indicated a statistically significant difference between schools with high, medium, and low Teacher Leadership and all student achievement variables ($p = .020$), and post hoc comparisons indicated that the means were significantly different among all groups. Group Teacher Leadership means increased as student achievement scores increased. Implications and recommendations for teachers, school administrators, and higher education administrators are discussed.

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CHAPTER I

INTRODUCTION

Leadership is crucial in any organization, especially when implementing change. In particular, schools are dynamic environments that call for strong leadership to implement change during education reform movements. Reform in Kentucky schools is more critical than ever because most schools have not met the goal of proficiency set by the state department of education (Kentucky Department of Education, 2008a). Bottom-up reform cannot produce the type of drastic change needed to increase achievement at the school level. Change must start with leadership. Research shows that leadership can have a positive effect, albeit indirectly, on student achievement (Cheng, 1994; Heck, Larsen & Marcoulides, 1990; Hallinger & Heck, 1996; and Johnson, Livingston, Schwartz, & Slate, 2000). This indirect effect implies a need for teacher expertise and distributed leadership to increase teacher buy-in for reform movements in schools.

Organizations, including schools, cannot be viewed as independent entities and must be analyzed with consideration of their context (Pfeffer & Salancik, 1978). Organizational survival and effectiveness depends on the availability of resources, which is a constant dilemma in K-12 education. Problems relative to using and acquiring resources are often created by mandates from the state department of education. Teachers and administrators face increasing high percentages of at-risk students and find little funding support from outside resources. Schools dealing with struggling students,

with reduced support staff levels and with little funding for reform initiatives face internal turmoil and increased frustration between teachers and administrators. These teacher-administrator interactions become very detrimental to staff morale, and more importantly, to student learning. Therefore, the forefront of any school reform act must focus on developing a school culture which promotes continuous learning and growth, supported by collaboration.

Principals cannot become effective change agents alone. They must create opportunities to gain expertise and be able to delegate decision making to their instructional staff (Hart, 1994). Not only do these opportunities give teachers a sense of empowerment, but they also alleviate the stress associated with a lack of resources, through use of resources already in the school. This type of environment can overcome many of the obstacles around resource allocation. Staff can accept their current situation as reality, and focus on developing initiatives to increase student learning. In today's changing environment, leaders need a concrete guideline to help meet new challenges and to update standards and assessments. New regulations and laws pertain not only to accountability issues, testing methods and assessment, teacher certification requirements, and safety in schools, but also serve to update pre-existing methods in leadership skills.

Typically, leadership studies in school organizations have focused on the administrative level only, zeroing in on principals and superintendents (Ogawa & Bossert, 1995). Other school studies have investigated the flow of influence between principals and teachers, and have shown that high-achieving schools have teachers and principals that exchange instructional influence reciprocally (e.g., Murley, Keedy, & Welsh, 2008). Recent studies have attempted to tie leadership to student achievement

(Heck, et al., 1990; Chen, 1994; Hallinger & Heck, 1996; Johnson, et al., 2000; Heck & Hallinger, 2009; Leithwood, Patten, & Jantzi, 2010; Supovitz, Sirinides, & May, 2010; New Teacher Center, 2011), hoping to clarify literature that at times is ambiguous and confusing (Leithwood, et al. 2010). Also, authors have cited little empirical research regarding the relationships between leadership and achievement (Leithwood, et al., 2010). This dissertation follows this line of research with continued examination of the relationship between principal leadership and distributed leadership through teacher leaders, and student achievement.

Principal leadership must be investigated when studying instructional capacity building, but the author hypothesizes that action research to increase student achievement must start at the teacher level. Due to increased accountability measures, educators have a greater responsibility for improved student outcomes. The principal and the teacher have a collective responsibility for student accountability goals, and must relate to each other in collaborative ways in order to increase instructional capacity. Not only must teachers and principals exchange influence, but, in order to improve instructional practices, principals must remove barriers that prevent teachers from exchanging influence with other teachers. This form of teacher leadership, the sharing of effective practice in professional learning communities, could be the most effective and efficient method available for principals to increase instructional capacity and, in turn, students achievement in Kentucky's schools.

Background of the study

The need for teacher leadership corresponds to the need for principals to increase instructional capacity. Proponents of various teacher leadership models believe that

collaborative cultures will enhance student and school outcomes as a result of new leadership conceptualizations (Hart, 1994). Considering the scarcity of resources in the K-12 context, it is essential to draw on as many resources as possible. Giving teachers more voice and power is one way to use their expertise, a significant resource. Frost and Durrant (2003) suggested four arguments for teacher leadership: (a) school effectiveness; (b) school improvement; (c) teacher morale and retention; and (d) democratic values. They also suggested that teacher leadership should be learning-centered leadership rather than taking a managerial focus. This approach supports student growth and enables teachers to focus on the instructional aspect of their jobs rather than getting distracted by policy matters.

The need for principals to increase instructional capacity through teacher leadership became evident throughout contemporary reform efforts, which began with the publication of *A Nation at Risk* (National Commission on Excellence in Education, 1983). That report confirmed the belief that the United States must overhaul its educational system if the country hoped to continue as a world economic power. *A Nation at Risk* led to increased centralization in schools, with higher accountability begin placed upon district leaders and principals. Soon, critics of centralization emerged and contended that increasing student outcomes must be a collaborative effort, with teachers at the center of reform movements. *A Nation Prepared: Teachers for the Twenty-first Century* (Carnegie Forum on Education and the Economy, 1986), the education community's response to *A Nation at Risk*, promoted a decentralized approach to school leadership. According to Spillane and Thompson (1997), creating positive

relationships and human capital are both critical in increasing capacity, which validates distributed leadership.

Decentralization increases accountability at the district and the school level. The Kentucky Education Reform Act of 1990 (KERA) was one of the first and most extensive reform efforts in the country to increase accountability and decentralization. This act was passed as a result of the Kentucky case *Rose v. Council for Better Education* (1989) that declared Kentucky's schools unconstitutional and led to the sweeping reform efforts of KERA. KERA was unique in its implementation by not only reform the school finance system in Kentucky, but also the assessment system (Pankratz & Petrosko, 2000).

Until recently, Kentucky educators measured accountability by a formula that included a continuous improvement goal. This testing system, Kentucky Instructional Results Information System (KIRIS), was replaced by the Commonwealth Accountability Testing System (CATS) in 1998. These two systems were similar in their respective guidelines in expecting individual schools to meet goals set each biennium. In 2001, Congress passed the No Child Left Behind Act (NCLB) (National Commission on Excellence in Education, 1983) and established federal guidelines for schools to measure adequate yearly progress (AYP). Kentucky continued with the CATS accountability system by adding the requirements necessary to meet NCLB guidelines. This led to a dual-accountability system that formed a true "high stakes" assessment system in Kentucky. Principals were now doubly pressured to increase student outcomes, which led to increased decentralization and need for increased teacher leadership.

Over the last twenty years, Kentucky's assessment program has evolved to such an extent that it is now one of the country's leading assessment programs in preparing

students for the future (KDE, 2011b). The assessment program has used resources in Kentucky as well as external sources to build a system that measures student achievement to both state and national standards. Over the course of its evolution, the Kentucky assessment program has included various forms of assessment components including brief constructed responses, essays, performance tasks, and portfolios in addition to conventional multiple-choice items.

The Kentucky General Assembly passed into law Senate Bill 1 in 2009 which significantly changed the state's curriculum standards to common core standards adopted by 47 other states and three territories. This began a reform initiative on the state's accountability system that included new dimensions of student achievement. By 2011, this initiative resulted in the creation of the Unbridled Learning Accountability model, which incorporated four strategic priorities for advancing the achievement of Kentucky students: (a) next-generation learners; (b) next-generation professionals; (c) next-generation support systems; and (d) next-generation schools and districts. The aim of this model is college and career readiness for all Kentucky students, which itself has been defined by the goals put forth by the Partnership for Assessment of Readiness for College and Careers national assessment consortium. In addition to measures of college and career readiness for Kentucky's next generation learners, the new accountability model factored student achievement growth measures and high school graduation rates. The Unbridled Learning model of accountability covered student achievement on the following: (a) reading, mathematics, science, and social studies in elementary and middle school grades; (b) writing in elementary, middle school, and high schools grades; and (c) end-of-course tests for high schools grades (KDE, 2011b).

The Kentucky Core Academic Standards (KCAS) were adopted to outline the minimum content required for all students before graduation from high school. For reading, mathematics, and writing, the content standards are the Common Core State Standards, while the standards for science and social studies remain from the previous curriculum framework as of 2014. The change allowed Kentucky's student achievement results to be compared to students in other states based on a common curriculum (Kentucky Department of Education [KDE], 2011a). Educators could now accurately determine where students in Kentucky schools rank nationally.

The Kentucky Performance Rating for Educational Progress (K-PREP) is the collection of tests created and administered to assess KCAS. K-PREP is a blend of norm-referenced and criterion-referenced test content that provides achievement indices at the state and national levels. Reports from Unbridled Learning included achievement categories, raw and scaled scores, and national percentile rank (KDE, 2011a). This overhaul of Kentucky's assessment system required a fresh perspective on student learning, and even more pressure on principals to ensure that students achieve the rigors standards of KCAS. It was now more important than ever for principals to embrace teacher leadership and determine the factors in schools that are most important to increase student learning.

Statement of the Problem

The accountability and assessment measures of KERA, NCLB, and Senate Bill 1 require schools to exhibit continuous progress toward goal achievement. This high stakes environment calls for principals and teachers to share responsibility for student achievement and school progress. One example is the shared leadership advocated in

KERA through Site Based Decision-Making (SBDM) Councils. (See discussion of SBDM councils in Chapter Two.) Another example of the consequences possible if AYP goals are not met according to NCLB guidelines includes but is not limited to possible job loss or demotion of both the principal and the teacher. These reform movements require the principal and the teacher to work together in different capacities with the focus on increased student achievement.

The model spotlighting the principal leading alone, as a manager or the sole instructional leader of a school, has long passed (Hallinger, 1992). The principal must employ influence-gaining strategies to increase instructional capacity and to improve student outcomes. Not only must principals gain influence from teachers, but they must also develop an instructional organization that allows for teacher leadership. This allows teacher leaders to share instructional influence with not only the principal, but also with their peers.

Examination of the flow of influence from teacher leaders to their peers is lacking in the literature. The flow of teacher leadership research clearly defines the targeted context of teacher leadership practice, including how and why the focus on teacher leadership emerged in the setting, how principals were involved in the teacher leadership process, and how the work of teacher leaders was situated (e.g., formal or informal, collective or individual, full- or part-time settings) within the improvement focus of the leadership (York-Barr & Duke, 2004). Even more lacking in the literature are empirical reviews determining the relationships between leadership (both principal leadership and distributed leadership through teachers) and student achievement. There are few methods of gathering data on leadership that are empirical and not descriptive; furthermore, there

are few empirical studies that examine the correlations between leadership variables and student achievement variables.

Principals cannot increase student learning alone nor can teachers working in isolation (Murley, Keedy, & Welsh, 2008). The research problem grounding this study posits that due to the increased accountability forced by school reform efforts, the principal and the teacher cannot steadily increase student outcomes if they each continue in their isolated and isolating roles. A two-way flow of influence must exist between the principal and the teacher, and also between teacher leaders and their peers, to increase instructional capacity.

Purpose of the Study

The purpose of this study was to examine the relationship between teacher perceptions of leadership constructs (Teacher Leadership and School Leadership) and student achievement on the Next Generation Learner components of Kentucky's accountability system (Achievement, Gap, and Growth). Specifically, is there a significant relationship between teacher perceptions of leadership constructs and student achievement? Furthermore, is there was a significant difference in student achievement when comparing schools with high, medium, and low teacher perceptions of leadership?

A non-experimental correlational design was used with a nonrandom sample of existing data. This study was considered non-experimental because no variable in the data set was manipulated. The sample was not considered random because no students or teachers were randomly assigned groups for experimental purposes. This study employed two quantitative research designs. First, pre-existing data was gathered from a cross-sectional survey study. Second, explanatory correlational research was conducted

to allow for examination of the extent to which perceptions of leadership and student achievement co-vary – that is, where changes in one variable reflect a change in the other. Specifically, canonical correlation and 3 x 3 factorial MANOVA were used to identify relationships between the leadership variables and student achievement variables. The sample included a population of Kentucky teachers and students. Data were obtained from the 2013 administration of the Kentucky Teaching, Empowering, Leading, and Learning (TELL) Survey for leadership perceptions, and from the 2013 Kentucky Core Content Test (KCCT) for student achievement data.

Reasons for school success are vast and varied. This study focuses on two elements of the school environment that can increase student achievement. One focus of the study is school leadership operationalized by survey questions from the TELL Kentucky Survey that loaded on the construct School Leadership through factor analysis. The second focus of the study is the variable of teacher leadership, measured by responses from the same survey that loaded on the construct Teacher Leadership in the factor analysis. Student achievement data were obtained from the 2013 K-PREP. Four research questions were asked:

1. Is there a significant canonical correlation between the leadership construct variable set (Teacher Leadership and School Leadership) and the student achievement variable set (Achievement, Gap, and Growth)?
2. Is there a significant interaction effect of Teacher Leadership and School Leadership on Achievement, Gap, and Growth scores?
3. Is there a significant main effect of Teacher Leadership on Achievement, Gap, and Growth scores?

4. Is there a significant main effect of School Leadership on Achievement, Gap, and Growth scores?

Significance of the Study

This study is significant for three reasons: (a) principals and teachers need more information about strategies to increase instructional capacity and student achievement; (b) graduate-level educational leadership and teacher education programs can benefit from the information; and (c) the results can help inform state, district, and school planning for professional development opportunities for principals and teachers.

First, principals and teachers need more information on effective and efficient ways to increase instructional capacity and student outcomes. Information on how teacher leadership can be effective in schools has been limited. Budget cuts are a continuing reality in Kentucky schools and teacher leadership is one way to utilize resources already in place. The principal alone cannot increase student outcomes nor can the teacher working in isolation. Kentucky's dual accountability system is "high stakes" and forces schools to continue moving toward proficiency, regardless of barriers to learning or a lack of funding. Educators need more information from successful schools in order to improve instructional practice, to assist in decision-making, and to remove barriers to student learning and teacher leadership.

Second, higher education programs must respond to the needs of teachers and principals. Kentucky supported professionally rewarding teaching careers through its redesign of all masters of education programs in the state. Because of regulations that went into effect in February 2008, all master's programs were required to have a core piece on teacher leadership beginning in December 2010. A teacher leadership

endorsement will be on the teaching certificates of those who complete the revised programs. This master's degree redesign helped Kentucky create a large cadre of teacher leaders who were able to support less seasoned (or differently educated) teachers. Kentucky envisions that, eventually, all mentor teachers will be required to hold the teacher leader endorsement (National Commission on Teaching and America's Future, n.d.). The results of this dissertation will help higher education leaders determine the best ways to train teachers to become instructional leaders. Also, educational administration program leaders will benefit from the information.

Third, the findings can assist those planning professional development opportunities for principals and teachers. Professional development has been an important component of school improvement and is one of the foundations of KERA. Districts and schools receive a state allocation for professional development and are continually searching for meaningful and quality learning opportunities. The findings of this study will help professional development planners and instructors as they strive to assist schools in improvement of student learning.

Limitations

Several limitations and delimitations exist with the study. First, the study used school-level data rather than student- and teacher-level data due to the nature of the TELL Survey. While this provided anonymity to the teachers taking the survey and probably aided in increasing the response rate, statistical analysis was somewhat limited. For example, using advanced methods like hierarchical linear modeling would not be appropriate and would not answer the research questions unless teacher-level data were utilized and matched with student-level data. Teacher-level data were provided by the

New Teacher Center, but only used for factor analysis to keep the anonymity of the teachers.

Second, the study used data from a cross-sectional survey design; therefore, teachers were surveyed at a particular point in time. Perceptions may change over time and throughout the school year. Additionally, as in all survey research, self-selection is a bias limitation (Dillman, 2000). It is possible that those teachers who did not respond differ in some way from respondents in their perceptions of leadership. The high response rate of 87% seemed to compensate for some of this limitation.

Third, the survey questions developed by the New Teacher Center addressed various types of leadership under one construct. For example, there are questions that address both instructional and managerial elements under the broader construct of Teacher Leadership. The literature is also lacking of a clear definition of Teacher Leadership, and there is still debate about which variables under principal leadership are most important (Leithwood, et al., 2010).

Despite the delimitations and limitations of the research, this study has significance and implications for educational leadership, as previously discussed. The TELL Kentucky Survey appears to be a valid and reliable instrument to gain insight into teacher perceptions of leadership in schools. Empirical studies conducted with this data bank are lacking, other than the report published by the New Teacher Center in 2011. The report on the data from the 2013 survey included only descriptive statistics and compared Kentucky teachers' responses to other states, which increases the generalizability of this study.

Definition of Terms

The definition of terms used in a study is a critical aspect of research design. Because educators may use different terms for the same meaning, depending upon the teacher's education, geographical location, and grade-level context, the definition of terms is extremely important in educational research. The terms used in this study are defined below.

Accountability Index

An accountability index was the school score used in Kentucky's Commonwealth Accountability Testing System (CATS). The school accountability index was based on progression in five areas: (a) Kentucky Core Content Tests (KCCT); (b) Writing Portfolios; (c) Alternate Portfolios; (d) Nonacademic Index, which included attendance, retention, dropout rates, and successful transition to adult life; and (e) Norm-Referenced Tests assessing reading, language arts, and mathematics (KDE, 2007a).

The CATS standards were applied to scores during the 1999-2000 school year to determine a starting point or baseline for schools. Checkpoints were determined each biennia, based upon the goal of school scores reaching 100 by the end of the school year 2013-2014. The schools with an accountability index at or above the goal value were meeting the goal, while those below the goal value to an index of 80 were progressing. Schools below the goal value are eligible for financial and professional help from the state department (KDE, 2007a).

The categories used to report student results were Novice, Apprentice, Proficient, and Distinguished. Novice students demonstrate minimal or limited knowledge and reasoning. Apprentice students display some basic content knowledge and reasoning.

Proficient students demonstrate broad content knowledge and the ability to apply that knowledge. Distinguished students have a comprehensive knowledge of content and demonstrate in-depth and insightful answers (KDE, 2007a). The accountability index was based on a formula that weighs student performance in terms of these four performance standards: (a) Novice equals 0 points; (b) Apprentice equals 0.4; (c) Proficient equals 1.0; and (d) Distinguished equals 1.4. The goal for all Kentucky schools is to have one hundred percent (100%) of their students at the Proficient level, giving each school an accountability index of 100 points. This term was no longer used in the Next-Generation Learners model.

Achievement

This score reported student performance in the five content areas of reading, mathematics, science, social studies, writing (also on-demand language mechanics). The basis of points awarded was the Novice, Apprentice, Proficient, and Distinguished (NAPD) calculation's arbitrary marking ranking system of Novice, Apprentice, Proficient/Distinguished. Students must be enrolled a full academic year (100 days) to be considered (KDE, 2014).

Adequate Yearly Progress

Adequate Yearly Progress (AYP) was used to determine when a school had met its annual accountability goal in the No Child Left Behind system. Four components were used to determine whether a school or a district achieves AYP: (a) must meet annual measurable objective (AMO) in reading and mathematics; (b) must show progress on the Accountability Index at the elementary and middle school levels; (c) must show progress toward one hundred percent (100%) graduation rate at the high school level; and

(d) must have assessed at least ninety-five percent (95%) of enrolled students and subpopulations of sufficient size (e.g., special education students, English language learners) (KDE, 2007b).

While the CATS and the NCLB guidelines required schools to achieve the same goal of proficiency by 2014, there were several differences in the means permitted to reach that goal. Some of these differences are outlined in the definition of terms in this section while others are discussed in Chapter II. These differences led to the term “dual accountability system” used by educators to describe accountability measures for Kentucky schools since NCLB requirements were added in 2002.

Annual Measureable Objective (AMO)

The Annual Measurable Objective (AMO) was calculated using the state mean percent of proficient/distinguished and subtracting one standard deviation by level (Elementary, Middle, and High) for Reading and Mathematics (KDE, 2014).

Commonwealth Accountability Testing System

Commonwealth Accountability Testing System (CATS) was implemented in all Kentucky schools in 1998, replacing KIRIS, the existing accountability system. CATS is a high-stakes accountability system with intermediate targets set biennially since 2002. All Kentucky schools and all students are expected to demonstrate improvement and the state has means in place to determine if improvement is occurring. The goal for CATS is for all Kentucky schools to reach proficiency by 2014. CATS was specifically designed to measure school progress toward that goal (KDE, 2007a).

Flow of Influence

According to Ogawa and Bossert (1995), reciprocal flow of influence is the social interaction by which leadership is exchanged within an organization. The flow of influence creates equilibrium if the exchange is mutual. Examination of this influence is crucial when studying teacher leadership as the concept of teacher leadership is defined in terms of influence rather than in terms of authoritative power.

Gap

Gap was the grouping of students mandated by federal guidelines; i.e. African-American, Hispanic, Native American, students with disabilities, poverty (students qualifying for free or reduced lunch), and limited English proficiency, assigned arbitrary performance levels of Novice, Apprentice, Proficient, and Distinguished. Students must be enrolled a full academic year (100 days) to be considered, and were only accounted for in one Gap group (KDE, 2014).

Growth

Growth was the Student Growth Percentile when compared to an individual student's score to the student's academic peers utilizing two years of test scores. Growth was reported solely from the grade levels 4 – 8 and 11 on the subjects of reading and mathematics. Students must be enrolled a full academic year (100 days) to be considered (KDE, 2014).

Instructional Capacity Building

Newmann, King and Young (2000) define instructional capacity building as “the collective power of the full staff to improve student achievement school wide” (p. 261). Capacity building requires more than increasing direct teaching techniques and

improvements in traditional classroom practices. It requires decision-making skills based upon a deep understanding of learning content and an unwavering command of instruction practices that are executed in the complex classroom environment (Spillane & Thompson, 1997).

Kentucky Education Reform Act

Kentucky Governor Wallace Wilkinson signed House Bill 940, which became known as the Kentucky Education Reform Act of 1990 (KERA) (Pankratz & Petrosko, 2000). Virtually every area of the Kentucky K-12 public school system was revised, from finance to accountability. The Act has been viewed as one of the most comprehensive reform initiatives in the nation (Pankratz & Petrosko, 2000). KERA has increased school accountability and responsibility for school leaders.

K-PREP

K-PREP tests were blended norm-references and criterion-referenced measures that provided national percentiles and student performance levels of Novice, Apprentice, Proficient, and Distinguished. Tests were given in grades 3 – 8 in reading, mathematics, science, social studies and writing. One-demand writing was also administered in grades 10 and 11. The number of students listed in the Assessment results reflected students tested at a school. This number may have differed from the Accountability tab on the school report card. Schools were required to test all students, but were only accountable for students enrolled a full academic year (KDE, 2014).

NAPD Calculation

The NAPD calculation was derived from the following formula: Novice = 0; Apprentice = .5; Proficient/Distinguished = 1. Schools received a bonus of .5 if there were more distinguished than novice (KDE, 2014).

Next-Generation Learners

Next-Generation Learners was one of three components of Kentucky's accountability system in 2014. The component included multiple measures of student performance on tests and student accomplishments of graduation and readiness for college and career. Reporting was organized into five categories: Achievement, Gap, Growth, College/Career Readiness, and Graduation Rate (KDE, 2014).

No Child Left Behind

In 2003, the United States Congress amended the Elementary and Secondary Education Act (ESEA) through the passage of legislation known as No Child Left Behind (NCLB). NCLB requires that all children must meet the goal of proficiency, as defined by each state, by the year 2014. Each state has developed benchmarks to measure progress and to determine that each child is progressing. States are required to gather and to analyze data, to identify subpopulations, and to design instructional delivery accordingly, so that all students may achieve (United States Department of Education, 2003).

An individual school or an entire district that does not meet the state-defined standard for proficiency, or what has become known as adequate yearly progress (AYP), for two straight years is considered to be in need of improvement. While Kentucky already had an assessment and accountability system in place (CATS) when NCLB was

passed, the state was required to implement the accountability process mandated by NCLB as well. This dual accountability system is discussed in depth in Chapter II.

Proficiency

Proficiency is an index, or score, of 100 on a 140 point scale. A student is scored against the following rubric, created by the Kentucky Department of Education (2007a):

1. Student demonstrates broad content knowledge and applies it.
2. Student clearly communicates with relevant details.
3. Student uses problem solving strategies.
4. Student demonstrates critical thinking skills.

Senate Bill 1

Senate Bill 1 was introduced in the 2009 regular session of the Kentucky General Assembly by Senator Ken Winters and co-sponsored by Senators David Williams, Dan Kelly, Vernie McGaha, Katie Stine, Damon Thayer and Jack Westwood. This bill amended KRS 158.6453 to revise the state assessment system to be implemented in the 2011 – 2012 school year (KDE, 2014).

Teacher Leadership

Teacher leadership has a variety of definitions found in the literature, which were often found to have a multitude of meanings and were quite vague. For the purposes of this study, teacher leadership was defined by the eight items forming the Teacher Leadership construct from the 2013 TELL Kentucky Survey found in Appendix A.

TELL Kentucky Survey

TELL Kentucky was a statewide, anonymous, online survey of school based educators, administered in the spring of 2011 and 2013, to assess teaching conditions at

the school, district and state levels. Data were only available for schools that met TELL Kentucky's 50% response rate for reporting (KDE, 2014).

Unbridled Learning

Unbridled Learning was the name given to the new era in public education in the Commonwealth of Kentucky designed to ensure every child reaches his or her potential and graduated from high school ready for college and career (KDE, 2014).

CHAPTER II

LITERATURE REVIEW

The purpose of this review of literature is to provide insight into the myriad of issues facing educators that lead to a need for distributed instructional leadership through teacher leaders. The literature is presented in four sections: (a) Education Reform, (b) School Accountability, (c) Principal Instructional Leadership, (d) Teacher Instructional Leadership, and (e) Leadership and Student Achievement.

The first section traces the roots of school administration decentralization, through the history of reform efforts beginning in the 1980s with *A Nation at Risk*, and ending with Senate Bill 1 and the new accountability system in Kentucky. This section focuses on decentralization efforts (i.e., School Based Decision Making) and accountability measures that resulted from the reform movements. The literature shows a shift in leadership from top-down management to decentralization.

The second section describes how the school accountability system has evolved in Kentucky. Different student assessment systems are detailed in the review, including CATS and KCCT. This builds the case for high-stakes accountability for schools and principals, and further describes the need for decentralization for principals to achieve instructional goals.

The third section examines the evolution of the role of the principal from manager to instructional leader to leader of leaders, with a focus on distributed instructional leadership. Studies are cited that show the indirect effect of principals on student success, supporting the need for teacher leadership. This section concludes with a summary of the literature on relationships between principals and teachers.

The fourth section of the literature review discusses teacher instructional leadership. The review begins with a discussion of the possible effects of teacher leadership on teacher colleagues, students, and teacher leaders and the need for further research to examine these effects. The review discusses the factors that enable or inhibit teacher leadership. For the purposes of this study, this discussion defines teacher instructional leadership. The importance of teacher leadership is discussed in terms of school accountability, use of resources, and instructional capacity building.

The last section of the literature cites articles that link leadership to student achievement, including both principal and teacher leadership. Authors cite little empirical research investigating the relationship between leadership and achievement, with most of the studies being descriptive in nature. The studies in this section show indirect effects of leadership on student achievement, which calls for research on both school and teacher leadership to see results on student learning.

Education Reform and Accountability

Four education reform movements provided the context of this study: (a) *A Nation at Risk*, (b) *A Nation Prepared*, (c) Kentucky Education Reform Act of 1990, and (d) No Child Left Behind. These reform movements established demands for instructional improvements in school systems and drove assessment reform in Kentucky

that lead to decentralization. The following subsections describe the demands that these reforms placed on teachers and administrators.

From *A Nation at Risk* to A Nation Prepared

Secretary of Education T.H. Bell created the National Commission on Excellence in Education (NCEE) on August 26, 1981 to examine the quality of education in America and to report practical recommendations for educational improvement. The Commission was created as a result of widespread public scrutiny of the nation's educational system and prompted the first school reform efforts in the 1980s. This criticism was caused by "our once unchallenged preeminence in commerce, industry, science, and technological innovation being overtaken by competitors throughout the world" (National Commission on Excellence in Education, 1983, p. 7).

The Commission responded to this call by publishing *A Nation at Risk* (National Commission on Excellence in Education, 1983). They cited reasons for drastic reform efforts: (a) international comparisons of student achievement showing American student scores declining, especially in science and math; (b) high rates of illiteracy; (c) low performance of gifted students; (d) lack of "high order" intellectual skills of high school students; and (e) complaints from business and military leaders who were required to spend millions of dollars on remedial education and training programs (National Commission on Excellence in Education, 1983). The Commission discussed findings and recommendations of four important aspects of the educational process: (a) content, (b) expectations, (c) time, and (d) learning (National Commission on Excellence in Education, 1983).

The Commission concluded that curricula in high schools were diluted, with few students taking advanced courses. The report showed most students migrating in large numbers to “general track” courses. Notable deficiencies in expectations included: (a) decreases in homework; (b) increases in grades, though average student achievement declined; (c) lack of required completion of advanced science, math, and foreign language courses; (d) lower requirements for college entrance; and (e) lack of rigor in textbooks. Evidence presented to the Commission demonstrated three disturbing facts about the use of time in American schools: (a) compared to other nations, American students spent much less time on school work; (b) time spent in the classroom and on homework was often used ineffectively; and (c) schools were not doing enough to help students develop the study skills required to use time well. Regarding teaching, the Commission found that (a) not enough of the best students were being attracted to the teaching profession, (b) teacher preparation programs needed substantial improvement, (c) the professional working life of teachers was unacceptable, and (d) a serious shortage of teachers existed in key fields like science and math.

Recommendations included specific state and local requirements for high school graduation, including increased time in core content subjects and a foreign language requirement for college-bound students. The Commission recommended that schools, colleges, and universities adopt higher expectations for academic performance and student conduct, and more rigorous college admission requirements. Recommendations included more time devoted to core content. This required school leaders to ensure more effective use of the school day, a longer school day, or a lengthened school year. The Commission recommended seven strands to improve teacher preparation and increase

professionalism, including higher standards for teacher education programs, increased salaries, and longer contracts to provide more time for professional growth.

The final recommendation from the Commission called for increased accountability for educators and elected officials to provide the necessary leadership and fiscal support to achieve the proposed reforms, which led to an increase in centralization at the school and district level. The principal's role as school manager was no longer sufficient to meet the demands of increased accountability. *A Nation at Risk* suggested that principals act as instructional leaders in their buildings by becoming experts in curriculum and pedagogy and share their knowledge with their staff. This shift from principal as manager to instructional leader was an important step in school reform, and led to an increase in instructional accountability on the school principal.

Critics of *A Nation at Risk* emerged soon after its publication. The main complaints were that the report lacked solutions and did not address many of the items on President Reagan's education agenda, such as vouchers and tuition tax credits (Bracey, 2003). In February 1992, a small international comparison completed by the Educational Testing Service (as cited in Bracey, 2003) found that American student scores were near the international average, but at a rather low rank, citing economic competitors that ranked higher than Americans in assessment data. This report led many educators and government officials to speak in favor of high stakes accountability. According to Bracey, "The National Commission on Excellence in Education, and many school critics as well, made a mistake that no educated person should – they confused correlation with causation" (p. 619).

One decade after the publication of *A Nation at Risk*, Commissioner Bell reflected on the failures of the top-down reforms and suggested future reforms for the 1990s (Bell, 1993). He observed that before *A Nation at Risk*, teachers were being blamed for problems that they did not cause:

The cataclysmic change in the quality of students' lives outside of school and the steady erosion of parental support and community interest in education made it almost impossible for schools to succeed. In the face of these conditions, teachers were making heroic efforts. The intent of *A Nation at Risk* was to call the attention of the American people to the need to rally around their schools. No one intended teachers to receive the blame that was heaped upon them. (p. 593)

Commissioner Bell also noted that few teachers were consulted in policy changes which resulted in reduced standards and lower expectations. The top-down initiatives by the states failed to come anywhere near meeting the expectations of those who sponsored the legislation, and soon leaders realized that gains in student achievement could not be attained simply by changing standards and mandating procedures and practices. Bell recommended a much more massive system-wide effort that engaged parents, neighborhoods, and communities. A key aspect of this plan was the implementation of teacher leadership: "In the next four to five years, teachers will also be central as leaders and as pioneers in school improvement and innovation" (Bell, 1993, p. 596).

The Carnegie Forum on Education and the Economy created a Task Force on Teaching as a Profession to meet the challenges of *A Nation at Risk*. Fourteen months later, the Task Force called for drastic changes in education policy with *A Nation Prepared: Teachers for the 21st Century* (1986). Recommended changes included the

redesign and revitalization of the teaching profession. The Task Force recommended that teachers have a broad base of knowledge as well as specialty knowledge in their subject area, with a bachelor's degree in the arts and sciences as a prerequisite for teaching. Additional recommendations for improving professionalism included new teacher preparation programs that culminated in a master's in teaching degree, and development of a National Board for Professional Teaching Standards. The Carnegie Task Force supported Commissioner Bell's ideas about teacher leadership by noting that teachers were key factors in school reform, and that well-prepared educators should take new roles in school restructuring.

Kentucky Education Reform Act

One of the first reform movements that supported the call for decentralization made by Commissioner Bell and the Carnegie Task Force was the Kentucky Education Reform Act of 1990. The Kentucky Supreme Court's decision in *Rose v. Council for Better Education* (1989) was a landmark case with a constitutional mandate reaffirming the fundamental right of every child in the Commonwealth to an adequate education. The decision declared Kentucky's entire system of public schools unconstitutional, which ultimately led to what was arguably the most radical state education reform in history. The court also reaffirmed that the legislature had the sole responsibility to define and provide the elements of an efficient system of public schools.

The Kentucky General Assembly responded to the case with two programs: Support Education Excellence in Kentucky (SEEK) and the Kentucky Education Reform Act (KERA) (Kentucky Education Reform Act, 1990). This response was unique in its attempt to integrate school finance reform with reforms in curriculum and school

governance. Instead of simply providing additional funding to school districts, KERA provided an expanded role for the Commonwealth in mandating curricula and evaluating school performance. The major renovations related to curriculum, included in KERA, were: (a) the restructuring of primary schools, (b) the implementation of standardized student assessment statewide, (c) the encouragement of increased use of technology, (d) and the introduction of school-based decision-making, which provided a formal structure for decentralization regarding curriculum, personnel, and instruction.

Site-based management was a widespread reform measure (David, 1989; Malen, Ogawa, & Kranz, 1990) and was defined as “a form of decentralization that identifies the individual school as the primary unit of improvement and relies on the redistribution of decision-making authority as the primary means through which improvements might be stimulated and sustained” (Malen, et al., 1990, p. 290).

Murphy and Beck (1995, as cited in Leithwood & Menzies, 1998) suggested that site-based management usually took one of three forms: administrative, professional, or community control. The authors hinted at a fourth form called “balanced control site-based management” (p. 327). Kentucky is an example of this form of management because parents, teachers, and administrators serve on SBDM councils. The advantage is the use of teacher expertise along with gained values and preferences of parents and the local community (Leithwood & Menzies, 1998).

The original concept of Kentucky’s SBDM councils suggested an innovative type of teacher empowerment, recommending that to increase student outcomes, teachers should be involved in instructional decisions at the building level because they have the most direct effect on student learning. SBDM councils consist of one administrator, three

teachers, and two parents. Teachers and parents are elected representatives. Teachers are elected by teachers with a majority vote, and parents are elected by parents with a plurality vote. Classified staff members may also serve on the council, but have no vote. The councils make decisions on curriculum, instruction and instructional materials, discipline, extracurricular programs, personnel, and the school budget (Kentucky Department of Education, 2011).

The constituent groups within SBDM councils did not have a history of collaboration. Lindle (1992) described the developing relationships among constituent groups at the end of the pilot year of SBDM implementation in Kentucky. The participants were a randomly selected group of pilot council members ($N = 385$). The sample was stratified on their positions as parents, teachers and principals. Participants were mailed surveys with demographic and categorical questions concerning training and meeting procedures and perceptions of satisfaction with council communications. Twelve items pertaining to the context of Kentucky's School Councils were designed using Hecht's 1978 Communication Satisfaction Inventory (as cited in Lindle, 1992). A small Delphi panel ensured validity of the modified instrument. The scale achieved acceptable reliability with a Cronbach's alpha of 0.84.

The researcher accomplished a 55% response rate with equal cell size across SBDM council positions (Lindle, 1992). The scores were disaggregated based on demographic data, and mean responses were compared statistically using non-parametric and parametric tests of group differences. In general, respondents were positive about SBDM and concerned about parent involvement and its effects on the implementation of KERA. There were significant differences in perceived communication satisfaction

among groups of council members based on age and position ($p < 0.014$). An ANOVA of communication satisfaction over Council position also was significant at $p < 0.000$. Post-hoc testing revealed that principals scored significantly above teachers and parents ($p < 0.05$) and were more satisfied with council procedures. This result could be caused by the fact that principals chair SBDM councils. These results suggested a beginning in socially constructed norms for SBDM council member communications. The author suggested reason for discrepancies in perceptions; comments by parents and teachers expressed frustration with time spent on by-law development. This is an example of an accomplishment to which principals might attach more satisfaction than would others (Lindle, 1992).

David (1994) assessed the progress of Kentucky's SBDM and its effects on decentralization. The researcher conducted a five-year study to understand how SBDM contributes to the ultimate goal of transforming curriculum and instruction to improve student performance. The sample consisted of thirteen schools in nine districts across the Commonwealth, reflecting different geographic areas and sizes. Most of the schools were elementary or middle schools, with one high school participating. The researcher interviewed teachers, administrators, parents, school board members, superintendents, community members, and central office administrators. The specific methods for conducting the research were not reported.

SBDM had been both a major force in communicating the importance and urgency of KERA across the state and a critical link between schools and the community during the first year of the study (David, 1994). Challenges faced by SBDM councils during early implementation were notable: (a) shifting from adversarial relationships to

partnerships, (b) focusing decisions on teaching and learning, (c) increasing effective professional development, and (d) finding a balance between district and state requirements while keeping the school's autonomy. Some schools embraced the concept of SBDM immediately, while others were hesitant for a variety of reasons, including fear of administrative resistance and a sense of being overwhelmed with responsibilities. Some teachers did not see the need for developing SBDM councils because they were satisfied already with their level of involvement in decision-making. Some school faculty had issues with gaining parent involvement in SBDM; a few school faculties had to postpone their council elections due to lack of parent representation on the ballots, particularly for minorities and parents with low socioeconomic status. The most successful SBDM councils were led by principals who already had facilitative and participatory leadership, which led to smoother transitions to shared decision-making (David, 1994).

In the third-year study, David (1995) identified schools with evidence of changes in classroom practices. The researcher continued to analyze public council minutes by conducting interviews with council members. Council decisions still focused on student discipline, extracurricular activities, and facilities. The researcher summarized policies that allowed councils to focus on more in-depth instructional issues. These included: (a) policy boards; (b) working committees; (c) two-way communication; and (d) site leadership. Councils successful in impacting instruction shared leadership with other teachers in the school through committee work. Barriers to effective councils included: (a) tendencies to micromanage; (b) limited parent involvement; (c) insufficient time; and (d) insufficient information. Changes in classroom practices included: (a) more frequent

and lengthier writing; (b) more hands-on activities; (c) practice responding to open-ended questions; (d) practice in performance events; (e) more connections across subjects; and (f) less teacher talk (David, 1995).

Talley and Keedy (2006) examined the impact of SBDM council contributions to instructional capacity in Kentucky. The researchers used comparative case study design and selected three high schools through purposive sampling using four selection criteria. The research used interview, observation, and document mining to collect data. Researchers used inductive analysis to develop a database from observation field notes, interviews, and document analysis. Multiple methods of data collection, sites, and sources of data resulted in triangulation and ensured constant comparative analysis of the data.

These results aligned with those of the previous studies of Kentucky SBDM effectiveness (David, 1994, 1995). The researchers found four conditions that existed across the three schools that enabled instructional capacity: (a) council collaboration with committees throughout the school resulted in many teachers throughout the building becoming involved in decision making, not just the selected council members; (b) principals modeled collegial interactions with their staff that promoted shared decision-making; (c) councils used assessment data to focus on student achievement; and (d) councils promoted staff accountability and ownership for student achievement (Talley & Keedy, 2006). Other studies supported their findings of council collaboration through committees of staff members (Heck & Brandon, 1995) and facilitative leadership with a culture of shared decision-making (Somech, 2005).

KERA was one of the first reform movements in the country to require decentralization and shared-decision making in schools. The literature reveals the difficulties in implementing this type of reform, though schools with facilitative leaders were more successful. The result of increased decentralization and shared decision making through KERA was increased accountability on educators. The next section describes the evolution of student assessment for school accountability in Kentucky.

KERA mandated increased school accountability based on an assessment system that measured student progress. This assessment system held teachers as well as principals accountable for student progress. A comparison of the assessment systems mandated under KERA, NCLB, and Senate Bill 1 follows.

School Accountability and KERA

Kentucky Instructional Results Information System (KIRIS). The Kentucky Instructional Results Information System (KIRIS) was the first assessment and accountability system dedicated to measuring student achievement under KERA. KIRIS was an ambitious accountability system using objective questions, extensive writing prompts, and even group projects (Hoyt, 1999). KIRIS was criticized for a number of reasons. Evidence of fraud surfaced in some districts, possibly as a result of bonuses provided to schools and teachers for high performance (Hoyt, 1999). Critics argued that the increase in KIRIS scores was an overestimate of the increase in performance by Kentucky students. The Office of Education Accountability and the General Assembly appointed measurement specialists to investigate the technical quality of KIRIS in 1994. The panel found that the test frameworks did not clearly communicate what students were expected to know, the tests were not adequately reliable, the performance standards

lacked standardization, and writing portfolio scores were not reliable (Hambleton, Jaeger, Koertz, Linn, Millman, & Phillips, 1995).

Hoyt (1999) evaluated KERA in light of the emphasis of the original state Supreme Court case on equity in both financing and performance. The researcher used the Gini coefficient to compare equity in funding among districts across the state, which was 0.1001 in 1990, compared to 0.0700 in 1995. A Gini coefficient of zero means there is no difference in distribution across groups. Kentucky's equality of funds distribution ranked second only to West Virginia when compared to those of neighboring states. The author cited that there was little evidence to support any measurable increase in student achievement when considering test scores, dropout rates, and graduation rates.

Commonwealth Accountability Testing System (CATS). In 1998 the State Legislature directed the Kentucky Board of Education to redesign the state's assessment and accountability system, which resulted in the Commonwealth Accountability Testing System, or CATS (Seiler, et al., 2005). Part of the statutes and regulations for the redesign required that Kentucky teachers play a significant role in the restructuring of the assessment system supporting the decentralization movement. The CATS advisory groups responded to concerns about the previous testing system by instituting multiple measures of school progress spread across more grade levels. The new CATS system included two types of assessment for students: the Kentucky Core Content Test (KCCT) and the Comprehensive Test of Basic Skills, Fifth Edition (CTBS/5). The CTBS/5 was a national norm-referenced basic skills test administered to students in grades 3, 6, and 9 in reading, language arts, and math. Kentucky Core Content Test (KCCT) was the criterion-referenced assessment administered to students in grades 3 through 12.

The KCCT represented the bulk of the CATS assessment and began with learning goals. To measure student achievement of the goals, academic expectations were created for each goal. Based on the Academic Expectations, the Program of Studies outlined the minimum content required for all students before graduating from high school. The Core Content for Assessment was the essential content drawn from the Program of Studies that all students should know as represented in the state assessment. Standards were developed for specified performance in eight domains: reading, writing, mathematics, science, social studies, arts and humanities, and practical living and vocational studies. KCCT consisted of multiple choice items, open-response questions, and on-demand and portfolio writing (KDE, 2007a).

The purpose of KCCT was to measure how well schools educated students to master the core content (Seiler, et al., 2005). The performance of students on KCCT made up the majority of a school's accountability index. Students were divided into four categories based on their performance on each section of the test: (a) novice, (b) apprentice, (c) proficient, and (d) distinguished. The school accountability indexes were figured by including a non-cognitive domain score that includes retention and drop-out rates, attendance, and other non-academic factors. Schools that met or exceeded established goals were eligible for financial rewards, and those not meeting goals were subject to consequences (Seiler, et al., 2005). The long-term goal for each school and district was to reach proficiency by 2014. Proficiency was defined as a score of 100 or greater on a 140-point scale. Statistical procedures were used to calculate intermediate goals based on school progress. Schools were measured every two years to determine if adequate progress had been made. Schools that were closer to 100 had smaller

increments of improvement to achieve than schools scoring lower. Schools were categorized as meeting goal, progressing, or in need of assistance. Schools meeting goal or progressing were eligible for rewards based on other conditions. Schools in need of assistance received consequences that ranged from state department reviews to transfer of staff and administrators (KDE, 2007a).

Kentucky was ahead of the federal government with accountability measures implemented through KERA. The following subsection summarizes the major initiatives of the NCLB, and how Kentucky educators merged NCLB mandates into existing KERA legislation.

No Child Left Behind and Accountability

In 2002, the federal government adopted the No Child Left Behind Act (NCLB) that mandated states to establish education standards and assessments. Each state was required to set annual goals to assess student progress in reading and math. The ultimate goal of the legislation was to have students in each state reach a predefined level of proficiency by the 2013-2014 school year (United States Department of Education, 2003). The education standards and assessment that had evolved in Kentucky in the late 1990s were similar in many ways to the provisions that were mandated in NCLB. In 2003, the Kentucky Board of Education decided to retain CATS, unchanged, and to incorporate the additional requirements of NCLB. This included adding reading and math assessments at every grade level (Seiler, et al., 2005).

NCLB allowed states to define proficiency, denoted by a certain score on the assessments. Kentucky used the same definition for NCLB as it did for CATS (KDE, 2007b). To achieve the goal of proficiency for all students by 2014, all public schools

and districts were required under NCLB to demonstrate satisfactory improvement each year toward that goal. Based on NCLB criteria, KDE established specific goals for each school for adequate yearly progress (AYP) in math and reading. Schools were held accountable on biennial cycles on CATS versus yearly accountability on NCLB (Seiler, et al., 2005).

Reducing achievement gaps among different groups was another primary goal of NCLB (United States Department of Education, 2003). Schools were required to make AYP, not just among the student population as a whole, but also among different subgroups including minorities, economically disadvantaged students, students with disabilities, and English language learners. Student subgroups were held to the same proficiency expectations as the whole school. If a school met AYP as a whole but not for a particular subgroup, the school was deemed as not meeting its goal under NCLB. The Kentucky General Assembly passed Senate Bill 168 in April 2002 that required Kentucky SBDM councils to address gaps in achievement among subgroups but also noted that a school could still meet its CATS performance goal even if a particular subgroup fails to meet that goal, which lead to some interpretation issues with achievement. A school could meet CATS goals but not meet NCLB goals, and vice versa (Seiler, et al., 2005).

As had happened with KERA, NCLB led to an increase in accountability measures for Kentucky principals and teachers. According to the 2008 NCLB AYP Report, Kentucky had only met 80 percent of its target goals, had not made AYP in reading or mathematics, and was in Tier 3 consequences for the third year (KDE, 2008b). Kentucky middle school students scored a total academic index on the KCCT test of 86.5 (KDE, 2008a). Principals still needed to make drastic gains in achievement to reach

proficiency by 2014 though middle school achievement in Kentucky had increased slightly over the past few years. School principals could not accomplish these gains in achievement without the support and instructional expertise of their teachers (Murley, Keedy, & Welsh, 2008).

Senate Bill 1 and Accountability

Over the last twenty years, Kentucky's assessment program has evolved to such an extent that it is now one of the country's leading assessment programs in preparing students for the future (KDE, 2011b). The assessment program has used resources in Kentucky as well as external sources to build a system that measures student achievement to both state and national standards. Over the course of its evolution, the Kentucky assessment program has included various forms of assessment components including brief constructed responses, essays, performance tasks, and portfolios in addition to conventional multiple-choice items.

The Kentucky General Assembly passed into law Senate Bill 1 in 2009 which significantly changed the state's curriculum standards to common core standards adopted by 47 other states and three territories. This began a reform initiative on the state's accountability system that included new dimensions of student achievement. By 2011, this initiative resulted in the creation of the Unbridled Learning Accountability model, which incorporated four strategic priorities for advancing the achievement of Kentucky students: (a) next-generation learners; (b) next-generation professionals; (c) next-generation support systems; and (d) next-generation schools and districts. The aim of this model is college and career readiness for all Kentucky students, which itself has been defined by the goals put forth by the Partnership for Assessment of Readiness for College

and Careers national assessment consortium. In addition to measures of college and career readiness for Kentucky's next generation learners, the new accountability model factored student achievement growth measures and high school graduation rates. The Unbridled Learning model of accountability covered student achievement on the following: (a) reading, mathematics, science, and social studies in elementary and middle school grades; (b) writing in elementary, middle school, and high schools grades; and (c) end-of-course tests for high schools grades (KDE, 2011b).

The Kentucky Core Academic Standards (KCAS) were adopted to outline the minimum content required for all students before graduation from high school. For reading, mathematics, and writing, the content standards are the Common Core State Standards, sponsored by the National Governors Association (NGA) and the Council of Chief State School Officers (CCSSO), while the standards for science and social studies remain from the previous curriculum framework as of 2014. The change allowed Kentucky's student achievement results to be compared to students in other states based on a common curriculum (KDE, 2011b).

The Kentucky Performance Rating for Educational Progress (K-PREP) is the collection of tests created and administered to assess KCAS. K-PREP is a blend of norm-referenced and criterion-referenced test content that provides achievement indices at the state and national levels. The criterion-referenced test (CRT) portion of K-PREP is built using test content written specifically for Kentucky's assessment. Student performance from the CRT portion is divided in the four achievement categories used in the previous testing systems: (a) novice, (b) apprentice, (c) proficient, and (d) distinguished. These performance standards were derived to indicate the mastery level needed to be considered

on track for college and career readiness at pre-secondary levels. In contrast, the norm-references portion consists of test content from the Stanford Achievement Test Series, Tenth Edition, hereafter Stanford 10, and uses existing score norms to report Kentucky student achievement on a national scale. Reports from Unbridled Learning included achievement categories, raw and scaled scores, and national percentile rank (KDE, 2011b).

The Kentucky Core Content Test would be modified to reflect an interim assessment period between 2009 and 2011. The interim period would include a criterion referenced test in 2009 and would add a norm-referenced test to be administered in the spring of 2010. The results of the norm-referenced test would be used as a baseline for longitudinal student data for 2011 and beyond. However, the state assessment in 2009 was limited to a criterion referenced test. A norm-referenced assessment was delayed until 2010. The accountability for narrowing the achievement gap and increasing student scores continued during the interim period (KDE, 2011b).

Summary

In summary, this section traced the history of reform efforts, starting with *A Nation at Risk*. Early reform efforts lead to an increase in centralization and accountability for the district office and the school principal. Critics soon emerged, suggesting that teachers should be involved in decision making since they have the closest contact with students. The next wave of reform efforts called for decentralization that lead to shared-decision making such as SBDM councils. Along with decentralization came high-stakes accountability through rigorous student assessment systems that evolved with various state and federal laws. To produce results, principals who have a

facilitative style of leadership have better results with implementing shared-decision making. The next section of this review summarizes important components of principal leadership in terms of distributed instructional leadership.

Principal Instructional Leadership

Leadership is second only to teacher quality when considering factors that can increase student achievement (Leithwood, et al., 2004). Frost and Durrant (2003) illuminated leadership using three key words: (a) values, (b) vision, and (c) strategy. The current discourse about leadership moves the model beyond the limitations of the typical hierarchical one and towards the assumptions that teacher participation implies responsibility, mutual accountability and collaboration. This move towards distributed leadership supports teacher leaders working amongst their peers to increase instructional capacity. Principals who were educated and socialized under power-centered role expectations often lack the skills and knowledge necessary to practice distributed leadership (Hart & Murphy, 1994). There is a growing recognition that the principal cannot lead alone (Smylie, Conley, & Marks, 2002) and cannot be considered the visionary leader in a schoolhouse (Hart, 1994).

There has been a long-standing belief that principals have significant impact on teachers and students, but the nature and degree of their effect is still open to debate. Various studies have shown the indirect effects of principal leadership on student achievement (Cheng, 1994; Hallinger & Heck, 1996; Heck, Larsen, & Marcoulides, 1990; and Johnson, Livingston, Schwartz, & Slate, 2000) which further supports using teacher leaders to increase instructional capacity. The following sections describe various components of principal leadership.

The History of the Principalship

The principalship evolved from manager to leader of leaders over the course of a few decades to meet the demands of education reform movements. Hallinger (1992) described the trends in the function of the school principal from the 1960s to present. Historical accounts suggest that the role of the principal has remained relatively stable over the past century, but successful principals have adapted to various reform efforts. The predominant role of American principals from the 1920s to the 1960s was administrative manager, due to trends toward school consolidation, corporate management, and the political nature of education. The majority of principals were expected to focus on management rather than the instructional arena.

The role of the principal took a new definition of program and curriculum manager in the 1960s and 1970s due to science and math reform, and federal regulations for special education. During these decades, principals assumed a new set of responsibilities that included assisting in staff development and providing direct classroom support for teachers (Hallinger, 1992). The American public's interest in improving student achievement and the documented importance of principal leadership in the 1970s led to the development of instructional leadership in school principals.

In contrast to the principal as manager, the instructional leader was viewed as the primary source of knowledge for development of the school's educational program. By the mid-1980s, virtually every state boasted an effort aimed at developing instructional leadership in principals (Hallinger, 1992). The principal was expected to be knowledgeable in curriculum and instruction, and be able to intervene directly with teachers in making instructional improvements. High expectations for teachers and

students, close supervision of classroom instruction, co-ordination of the school's curriculum, and close monitoring of student progress became synonymous with the role definition of an instructional leader (Hallinger, 1992). However, missing from the literature were reports from effective schools, documenting how leaders helped their schools become successful. A top-down orientation to change was implicit in most policy-driven translations of effective schools research during this period. Cuban (1988, as cited in Hallinger, 1992) asserted:

None of the richly detailed descriptions of high performers can serve as a blueprint for teachers, principals, or superintendents who seek to improve academic achievement. Constructing a positive, enduring school climate remains beyond the planner's pen. Telling principals what to say or do in order to boost teacher expectations of students or to renovate a marginal faculty into one with esprit de corps remains beyond the current expertise of superintendents or professors. Road signs exist, but no maps are yet for sale. (p. 132)

Instructional leadership conveys a meaning which encompasses only a portion of those activities now associated with effective school leadership (Hallinger, 1992). Educators started to question the role of the principal as the sole instructional leader. Reformers recommended decentralization of authority over curricular and instructional decisions from the school district to the school site, expanded roles for teacher and parents in the decision-making process, and increased emphasis on complex instruction and active learning. The following section summarizes literature on distributed leadership in effective schools.

Distributed Instructional Leadership

Spillane (2006) described distributed leadership as “more than shared leadership” (p. 3). Too often studies do not focus on leader interactions in organizations. Leader, follower, and their context interactions are important when examining a distributed perspective. Ogawa and Bossert (1995) suggested that leadership should be conceptualized as an organizational quality and a systemic characteristic. Leadership is not one dimensional, but instead has four basic dimensions: (a) function; (b) role; (c) the individual; and (d) culture. All of these aspects of leadership in schools can be examined to determine effectiveness. Ash and Persall (2000) used the term “leader-full” organization (p. 15) where principals create a culture and infrastructure that supports leadership opportunities for everyone, and requires a completely different set of leadership skills than previously considered. Developing teacher leaders to increase the instructional capacity of schools is the goal of this type of distributed leadership.

Ash and Persall (2000) developed the “Formative Leadership Theory” (p. 16) based on the belief that numerous leadership possibilities and many leaders exist within the school. This concept is based on the teachers being leaders, and the principal being a leader of leaders. Principles that drive this theory include team learning, trust, encouraging support and innovation, focus on people and processes, proximity, visibility, and empowerment (Ash & Persall, 2000). This definition of principal leadership varies greatly from the original managerial style of principals before the reform movements of the 1990s, and is more in-line with the reform efforts of KERA and NCLB.

Advocates of school restructuring suggested that school leadership has a diffuse nature. Sergiovanni (1990, as cited in Hallinger, 1992) has noted the term “instructional

leader suggests that others have got to be followers. The legitimate instructional leaders, if we have them, ought to be teachers. And principals ought to be the leaders of leaders: people who develop the instructional leadership in their teachers.” According to Hallinger (1992) underlying these proposed changes is the assumption that “those adults who are closest to the students – staff members and parents – are in the best position to make wise judgments about changes that are needed in the educational program of the school” (p. 38).

Leithwood and his colleagues (1994) also supported the need for distributed leadership and distinguished between the “instructional” leader and the “transformational” leader. They suggested several ways in which a restructured school could change the contextual needs for leadership. These included the source of the school’s goals for improvement, the nature of the principal’s implementation function, and the source of teacher expertise for school improvement.

The instructional leader attempted to focus teacher effort on the goal of improved student learning and was accepted by the principal as a “given”; teacher efforts had either been defined by policy makers or was derived by the principal’s personal vision. The goals were not a collaborative effort among school constituents. Instructional leaders had the ability to get others to accept the problem and to bring teachers’ practice in line with efforts to address it. On the other hand, transformational leaders based school goals on problems identified by those who interact on a daily basis with students. Subsequent changes were conceived by those inside the school, rather than by district, state or federal policies (Leithwood, Begley, & Cousins, 1994). Transformational leaders increased the

instructional capacity of the school by using the expertise of teachers and giving them ownership in instructional decisions.

Despite the differences in program manager and instructional leader, both roles were managerial in nature. These roles required management of prepackaged solutions designed to address preassigned problems. In restructured schools, the focus shifts to true leadership, instead of management, by focusing on capacity building and collective problem solving. In restructured schools, the transformational leader tapped into the expertise and leadership of teachers (Leithwood, Begley, & Cousins, 1994).

Leithwood (1992) supported the view of organizational leadership: “At the reigns of today’s new schools will not be one but many leaders who believe in creating the conditions that enable staff to find their own directions” (p. 8). The restructuring of schools is analogous to the shift in large businesses and industries that begun in the early 1980s, from organizations that implemented a switch from top-down management to employee participation (Ouchi, 1981). Considering this, it was surprising that schools did not catch on to the trend until the 1990s.

Transformational leadership provides the incentive for people to attempt improvements in their practices, and therefore is often considered value added. Transformational leaders are in continuous pursuit of three different goals: (a) helping staff members develop and maintain a collaborative, professional school culture; (b) fostering teacher development; and (c) helping staff members solve problems together more effectively (Leithwood, 1992). This can be distinguished from instructional leaders, whose main focus is first-order changes, such as improving the technical, instructional activities of the school through the close monitoring of teachers’ and

students' classroom activities. Transformational leaders focus on second-order changes such as building a shared vision and mission, improving communication, and developing a structure for collaborative decision making. Schools are complex systems, often reliant on both types of leadership to be successful.

Marks and Printy (2003) suggest that when transformational and instructional leadership coexist in an integrated form of leadership, the influence on school performance is substantial. Shared or distributed instructional leadership is “an inclusive concept, compatible with competent and empowered teachers” (p. 374). The authors examined the potential of active collaboration between principals and teachers around instructional matters to enhance the quality of teaching and student performance. They asked three research questions:

1. What is the relationship between transformational and shared instructional leadership in restructuring elementary, middle, and high schools?
2. How do schools with varying approaches to leadership differ according to their demographics, organization, and performance?
3. What is the effect of transformational and shared instructional leadership on school performance as measured by the quality of pedagogy and the achievement of students?

The Center on Organization and Restructuring of Schools selected 24 elementary, middle, and high schools, 8 at each grade level, from a pool of 300 nationally nominated schools to participate in the School Restructuring Study (SRS). Most schools were urban and had substantial proportions of economically disadvantaged and minority students. Compared with public schools nationally, the schools in this study were larger with

NAEP achievement in reading and mathematics at or above average for elementary and middle schools and below average for high schools. The high school achievement was explained by the sample which included mostly 9th and 10th graders that took a test that was normed for 12th graders (Marks & Printy, 2003).

The Marks and Printy study (2003) employed several quantitative and qualitative instruments that were part of the SRS design. Teachers responded to a survey about instructional practices, professional activities, and perceptions of their school and its organization with an 80% response rate. Researchers also collected data through interview, observation, and document mining.

The authors discussed construct validity issues with operationalizing leadership based on data gathered from the SRS study. The authors addressed these concerns by gathering a panel of experts and coding survey items based on specific constructs of transformational and shared instructional leadership. The independent variables in the study were leadership and school demographics. The level of leadership was determined through interview and observation, through a systematic coding process that ensured validity, and through teacher survey items. The dependent variables included pedagogical quality, assessment task, and academic achievement. Pedagogical quality was constructed as an index that sums the teachers' scores on two components of pedagogy collected from the surveys: classroom instruction and assessment tasks. The Cronbach's alpha was .85. Assessment tasks were summed ratings on seven standards for authentic assessment and had an internal consistency of 0.79. Academic achievement was a measure of authentic student performance of averaged student scores in math and

social studies on three standards of intellectual quality with an internal consistency of .72. Control variables included classroom compositional measures (Marks & Printy, 2003).

The researchers used scatterplot analysis, one-way ANOVA, and hierarchical linear modeling to determine the effect of transformational and shared instructional leadership on school performance as measured by the quality of pedagogy and student achievement. The scatterplot analysis addressed the relationship between transformational and shared instructional leadership, and found that transformational leadership is a necessary, but insufficient condition for shared leadership. In other words, principals that provide no structure for shared decision making, building consensus, and promoting collaboration will not be capable of sharing instructional decisions with teachers. Other schools demonstrated high transformational leadership, but low shared instructional leadership, with principals focusing on restructuring in other ways than instruction. Seven schools from the sample show “integrated” leadership and scored high on both transformational and shared instructional leadership. These schools showed average pedagogy quality and authentic achievement of 0.6 standard deviation higher than in other schools (Marks & Printy, 2003). Though these findings cannot be generalized, they suggest that principals who share instructional decisions with teachers are more likely to have higher instruction quality, and therefore higher student achievement.

The Marks and Printy (2003) study has been cited as particularly relevant in the literature due to leadership being assessed on measures of both instructional and transformational leadership (Robinson, Lloyd, & Rowe, 2008). However, the impact of leadership looks very different through a quantitative rather than a qualitative lens.

Robinson, Lloyd, and Rowe (2008) conducted a meta-analysis to address the paradoxical differences between the qualitative and quantitative evidence on leadership impact. The authors focused on identifying the relative impact of different types of leadership. They used two different strategies to identify the types of leadership and their impact. They first compared instructional leadership to transformational leadership; these two types were chosen because they dominate the literature in terms of outcomes. The second strategy involved an inductive approach that analyzed each survey item, regardless of the identified leadership theory, and identified five leadership dimensions.

The authors searched the international literature for empirical English-language articles that examined the impact of leadership on academic or nonacademic outcomes. The search involved three strategies: (a) electronic keyword search, (b) hand or electronic search of table of contents and abstracts of educational leadership journals, and (c) screening of reference lists from relevant publications. The search yielded 27 studies, published between 1978 and 2006. The majority of the studies were conducted in U.S. schools. Twelve of these studies examined leadership from a distributive perspective.

The first research question about the relative impact of instructional and transformational leadership was answered by categorizing each study according to the theoretical framework that informed the conceptualization and measurement of leadership. The second research question about the impact of different leadership dimensions was addressed by using specific leadership practices rather than broad leadership theories as the unit of analysis.

The effect size statistics for the transformational studies fell in weak to small impact range. One study by Griffin in 2004 (as cited by Robinson, Lloyd, & Rowe,

2008) showed that principals had a moderate to large indirect effect (0.68) on school-level residual test scores via their influence on staff satisfaction. These findings supported the indirect effect of the principal on student outcomes, and further indicated a need to examine the effect of teacher leadership. Effect sizes of instructional leadership ranged from weak to large (0.00 to 0.42) and depended largely on the type of study. Between-group designs reported larger effect sizes. Also, high-performing schools reported that leadership was “more focused on teaching and learning, to be a stronger instructional resource for teachers, and to be more active participants in and leaders of teacher learning and development” (p. 658). The authors cautioned making comparisons of the effect sizes between the two types of leadership because the transformational studies focused on social outcomes, while the instructional leadership studies focused more on academic outcomes.

In summary, there is evidence that distributed instructional leadership may enhance student outcomes, especially in the realm of achievement (Marks & Printy, 2003). Placing teachers at the forefront decision making regarding instruction could allow their expertise to enhance instruction and increase student learning. This requires a strong relationship of trust between the principals and teachers. An examination of the literature of relationships between principals and teachers follows.

Principal-Teacher Relationships

Exchange theory, commonly applied in leadership studies, provides a perspective similar to that of transactional leadership (Burns, 1978), and stresses the importance of examining the influences and relationships between principals and teachers. Recent assessments suggest that enabling others to exercise leadership is an essential dimension

of capacity building in which the emphasis shifts from creating and managing structures as means of control, to a view of structure as the means to build the cultures that nourish learning and achievement at all levels in the school (Earl & Lee, 2000; Harris & Lambert, 2003; Jackson, 2000).

Studies have shown that various types of teamwork and shared-decision making affect teacher commitment and relationships in different ways. Governance teams, such as Site Based Decision Making councils, have been shown to increase levels of organizational commitment, but not as significantly as team teaching (Dee, Henkin, & Duemer, 2003; Dee, Henkin, & Singleton, 2006).

Previous literatures of business, health care, social services, and education suggest that empowerment and employee performance have a positive relationship. Teacher empowerment is extremely important to administrators because teachers have direct contact with the students, and therefore are in the best position to make decisions (Chion-Keeney, 1994 add to reference list). Though benefits of teacher empowerment include effective implementation of school reforms and improvement in student performance (Martin & Crossland, 2000; Short, 1992), research suggests that most schools have environments that are not particularly empowering (Hallinger & Richardson, 1998). Empowerment can be examined through a structural and psychological frame. The structural perspective focuses on shared governance, while the psychological perspective focuses on intrinsic motivation and self-efficacy. The literature suggests the need to investigate further relationships between school team structures, teacher empowerment, and teachers' sense of connectedness and dedication to the school.

When the organizational structure of a school allows collaboration and decision making among teacher teams, professional performance may improve and be evident in student outcomes and teacher morale. Dee, Henkin, and Duemer (2003) investigated empowerment as a mediating variable between team participation and organizational commitment. The authors asked three research questions:

1. Does participation in teamwork – team teaching, curriculum development, school governance/administration, school-community relations – affect levels of teacher empowerment?
2. Does empowerment affect teacher commitment to the school organization?
3. Does team participation affect teacher commitment to the school organization, either directly or indirectly, through empowerment?

The administration of survey random selection of eight elementary schools (50% of all elementary schools) in an urban district located in a southwestern US city (population of approximately 200,000). This particular district was selected because it had recently implemented a type of SBDM council at each school. Surveys were distributed and returned through the internal mail system. All full-time teachers in the selected schools received the survey. The authors reported that no administrators had access to the survey or data at any time during the data collection process. The response rate was 61 percent, or 210 teachers. The researchers did not indicate the method of survey distribution in terms of how many times a teacher had an opportunity to respond to the survey.

The authors used Spreitzer's Multidimensional Measure of Empowerment (1992, 1995, as cited by Dee, Henkin, & Duemer, 2003) 12-item instrument consisting of three

items assessing each of the four dimensions of empowerment using a 7-point Likert scale. The four dimensions of empowerment were: (a) meaning, (b) competence, (c) self-determination, and (d) impact. Content validity for the instrument was developed through a review of previous literature and extensive interview data that revealed the four dimensions. First- and second-order confirmatory factor analysis was used to establish convergent and discriminant validity of the empowerment items. Test-retest and internal consistency were used to assess reliability. Cronbach's alpha coefficients ranged from 0.79 to 0.88. Adjusted goodness of fit value of 0.93 was determined through path analysis.

The authors used Mowday and Steer's Organizational Commitment Questionnaire (1979, as cited by Dee, Henkin, & Duemer, 2003) 15-item instrument to assess a person's identification with, and involvement in, a particular organization. The authors assessed construct validity through factor analysis. Positive associations with measures of organizational attachment and motivation demonstrated convergent validity. Discriminant validity showed that the measure was negatively associated with turnover and absenteeism. Content Validity was not reported. The authors assessed reliability through test-retest with Cronbach's alpha coefficients ranging from 0.82 to 0.93.

The researchers asked respondents the extent to which they were involved in each of the four teamwork activities (team teaching, curriculum development, school governance, and school-community relations) in a 5-point Likert scale response. The researchers gathered these four activities through previous research, which suggests that the instrument had some extent of content validity. Construct validity and reliability were not reported. The demographics on the survey included gender, age, racial/ethnic

identification, education level, number of years of teaching experience, and number of years at current school (Dee, Henkin, & Duemer, 2003).

The authors determined construct validity through principal component factor analysis. Varimax rotation was used to determine if the data reflected Spreitzer's four-factor structure. The authors determined reliability with Cronbach's alpha coefficients for each dimension of empowerment, the total empowerment scale, and the organizational commitment measure.

Empowerment was regressed upon independent (teamwork activities) and control (demographics) variables through ordinary least squares regression analysis. Direct and indirect effects of the independent variables were determined through path analysis. Hypothesis testing used an alpha level of 0.05. The four primary teamwork functions served as interval level independent variables: (a) team teaching, (b) curriculum development, (c) school governance, and (d) school-community relations. The dependent variables were the four dimensions of empowerment and the total empowerment scale. Control variables included gender, age, education level, teaching experience, and time at current school (Dee, Henkin, & Duemer, 2003).

The factor analysis supported Spreitzer's four-factor structure and accounted for 90.4% of the variance (1992, 1995, as cited in Dee, Henkin, & Duemer, 2003). The authors noted that this could have been inflated due to item sequences. The regression analyses of the four empowerment dimensions ($\alpha = 0.05$) yielded a model R^2 of 0.290 for Meaning Significant Values. Master's degree recipients reported higher levels than bachelor's degree recipients and team teaching had a positive association. Competence Significant Values had a model R^2 of 0.256 with master's degree recipients reporting

higher levels than bachelor's degree recipients, and respondents with four or less years of teaching experience reporting lower levels than those with 11 or more years. Again, master's degree recipients reported higher levels of self-determination (model $R^2 = 0.365$) than those with bachelor's degrees. Team teaching and community teamwork were positively associated with self-determination. Subjects with eleven or more years of experience reported higher levels of impact (model $R^2 = 0.512$) than respondents with five to seven years of experience. Team teaching, administrative teamwork, and community teamwork were positively associated with impact. Total Empowerment Scale (model $R^2 = 0.537$) indicated that master's degree recipients reported higher levels of empowerment than bachelor's degree recipients. Respondents with five to seven years of experience reported lower levels of empowerment than respondents with eleven or more years of experience. Team teaching, administrative teamwork, and community teamwork were positively associated with empowerment.

The authors used path analysis to determine the magnitude and significance of effects of empowerment and teamwork participation on organizational commitment. Five separate path analyses were performed on the four dimensions of empowerment and the total empowerment scale. Researchers noted that no causal relationships should be drawn due to the cross-sectional nature of the study. Meaning ($Beta = 0.221$), self-determination ($Beta = 0.396$), and impact ($Beta = 0.480$) all had significant, positive effects on organizational commitment. The total empowerment score also had a significant, positive effect on organizational commitment. Team teaching had a positive direct and indirect effect. Administrative and community teamwork and having a

master's degree had a positive indirect effect. Having five to seven years teaching experience had a negative indirect effect.

In summary, Dee, Henkin, and Duemer (2003) teamwork had positive effect on meaning, self-determination, impact, and total empowerment. Competence was affected by education level and years of teaching experience. Team teaching had the strongest effect on empowerment, with community teamwork and administrative teamwork also having a positive effect. Curriculum development had no significant effect on empowerment, probably due to conformity of state guidelines and high-stakes testing. Meaning, self-determination, impact, and total empowerment scores had positive effects on commitment. This suggested that increasing feelings of empowerment may increase commitment, which would in turn decrease burnout and turnover. Some variables (education level, experience, administration teamwork and community teamwork) mediated commitment through empowerment. Team teaching had both direct and indirect effects on commitment.

Dee, Henkin, and Duemer (2003) suggested that various types of teacher leadership could increase feelings of empowerment if implemented correctly. Team structures that enabled teachers to feel empowered could meet affective needs of the teachers and therefore increase their commitment to the school. Professional development on team dynamics was important when implementing new team structures in a building. Teachers should have the opportunity to learn about themselves and their collaboration styles in order to be more effective.

This suggests that principals must embed shared-decision making throughout their staff. Models of shared decision making such as SBDM councils are just one step to

providing a leadership model for teachers that will increase empowerment and trust, in turn improving relationships between principals and teachers. Principals should explore options of enhancing teacher professionalism in classrooms, committees, and leadership positions. More importantly, team teaching involves instructional decisions; this provides more evidence that teachers should hold instructional leadership positions rather than be limited to managerial or committee work. Team teaching increasing teacher commitment also suggests that teachers can be empowered in informal leadership positions, such as four teachers working together on a team.

Principals that embraced shared-decision making ultimately gave up some of their power that traditionally came with the position. The concept of power in organizations was a great debate among researchers. Pfeffer (1981) suggested that power was a structural and social phenomenon. Hierarchical structure gave legitimate power to supervisors, managers, and administrators. For example, when a principal designated a certain teacher as content lead, he or she gave that teacher legitimate power over the department. This would not necessarily mean the content lead had social power. There are often informal organizations that disrupt the power hierarchy. Social power could become legitimate over time, so that those within the setting expected and valued a certain pattern of influence. This implied that teachers could lead informally through social power. The complicated relationship among leadership, power, and teacher empowerment caused a variety of relationships to exist between principals and teachers.

Short and Johnson (1994) examined the nature of the relationship between leader power and the amount of conflict with teachers' perceptions of their level of empowerment. Three research questions were asked:

1. What power bases used by the school leader are associated with teacher empowerment?
2. What is the relationship of conflict to teacher empowerment?
3. What is the relationship of age, race, and principal's sex to teacher empowerment?

The sample consisted of three hundred teachers from a southern state that were randomly selected by computer. Two mailings resulted in 194 usable responses for a response rate of 65 percent. The researchers used the Rahim Leader Power Inventory to measure the bases of power. Rahim reported an internal consistency ranging between .72 - .88 (1988, as cited by Short & Johnson, 1994). The School Participant Empowerment Scale contains the following six subscales to measure empowerment: (a) Decision Making, (b) Professional Growth, (c) Status, (d) Self-Efficacy, (e) Autonomy, and (f) Impact. Short and Rinehart reported that coefficient alpha was .94 (1992, as cited in Short & Johnson, 1994). The amount of conflict was measured by the Rahim Organizational Conflict Inventory (1983, as cited by Short & Johnson, 1994). The scale measures three independent dimensions of organizational conflict. Reliability coefficients were computed using Cronbach's alpha for each dimension: intrapersonal ($\alpha = .73$); intragroup ($\alpha = .85$); and intergroup ($\alpha = .81$).

The independent variables were demographics, the French and Raven bases of power (1989, as cited in Short & Johnson, 1994), and three conflict scales. The dependent variables were decision making, professional growth, status, self-efficacy, autonomy, and importance. The researchers used descriptive statistics, MANOVA, and multiple regression to analyze the data. Legitimate power was demonstrated most

frequently by the principals in the study. The amount of teacher empowerment correlated positively to the amount of legitimate power. This result was probably derived from the combined result of high legitimate power and low coercive and reward power. Referent power was related positively to decision-making. This finding suggested that teachers who perceive themselves as participating in school decision-making process give the principal power because of the teachers' belief in the good will of the principal. The only significant relationship between conflict and empowerment was found between interpersonal conflict and self-efficacy. Teachers who are empowered in the decision-making process may find themselves in dilemmas with home commitments versus school requirements, discipline versus instruction, etc. (Short & Johnson, 1994).

Somech (2005) examined the relative effect of a directive leadership approach compared to a participative leadership approach on school-staff teams' motivational mechanisms (empowerment and organizational commitment) and effectiveness (team in-role performance and team innovation). The random sample included 140 teams selected from 140 different elementary schools in northern Israel. Data were collected from 712 teachers, all of whom were members of the 140 teams, and their corresponding 140 immediate leaders (the heads of teams). Data were obtained through survey methodology with a response rate of 69% for team members and 100% for leaders.

The independent variable was the style of leadership, either directive or participative. The dependent variables were organizational commitment, empowerment, in-role performance, and innovation. The researcher used Structural Equation Modeling to determine the relationships among the variables. Results indicated that directive leadership aims to augment school-staff teams' in-role performance via the arousal of the

motivational mechanism of organizational commitment; participative leadership aims to facilitate innovation by promoting the motivational mechanism of teachers' empowerment (Somech, 2005). The results of this study show that each leadership style promotes a distinct but potentially complementary approach to managing school-staff teams, depending on the desired school outcome.

Tschannen-Moran (2009) explored the relationship between teacher professionalism in a school and (a) faculty perceptions of the school leaders' professional orientation, and (b) the level of faculty trust in three important constituencies: the principal, teacher colleagues, and clients. In this study, clients are considered to be students and parents. Respondents for this study were 2,355 teachers within 80 middle schools in a mid-Atlantic state. Schools were diverse in size, racial composition, and setting (urban, suburban, and rural).

The independent variable in the study was teacher professionalism. Teachers' perceptions of their colleagues' behavior were assessed using the Teacher Professionalism subscale of the School Climate Index. This scale consisted of Likert-type items and had a Cronbach's alpha of 0.94. The four dependent variables were professional orientation of principals, trust in the principal, trust in colleagues, and trust in clients. The professional orientation of principals was captured using the Enabling Structure Scale ($\alpha = 0.96$). The Faculty Trust Scale was used to determine teachers' trust in the principal, colleagues, and clients ($\alpha = 0.98, 0.87, \text{ and } 0.97$, respectively).

The researcher used hierarchical linear modeling to examine the proportion of between-group variance, which ranged from 14% to 29% and was statistically significant in all cases. The researchers conducted an exploratory factor analysis using maximum

likelihood extraction with varimax rotation of all the items in the five subscales used in the study. This revealed five factors with eigenvalues higher than 1 that explained 80% of the variance. The findings supported the hypothesis that the degree of teacher professionalism is related not only to the professional orientation of schools leaders but also to faculty trust (Tschannen-Moran, 2009). These findings support previous research promoting the positive relationship between distributed leadership and teacher professionalism.

Principal leadership style directly affects the amount of teacher empowerment that exists within schools. Too much empowerment can lead to conflict in organizations, while a shortage of empowerment can lead to bitterness. Therefore, the relationships between principals and teachers are critical to increasing teacher leadership and empowerment in schools. Moye, Henkin, and Egley (2005) explored the relationship between teachers' sense of empowerment and their interpersonal trust in their principals. The study addressed two research questions:

1. Is there a relationship between teachers' perceived level of empowerment and their level of interpersonal trust in their principals?
2. Do certain predictor variables (gender, minority status, years in teaching profession, involvement in team teaching, involvement in community/volunteer work, and union membership) moderate the relationship between perceived level of empowerment and level of interpersonal trust in the principal?

The independent variables were empowerment, gender, race, years teaching, experience with administrative responsibilities, committee work, team teaching,

volunteer work, and union membership. These were found through survey responses. The dependent variables were participant responses to survey questions addressing interpersonal trust, empowerment, meaning, competence, self-determination, and impact. Survey respondents in this study were elementary school teachers in an urban district and included all teachers in a 50 percent random sample of elementary schools ($N = 21$) in the district. Spreitzer's multidimensional measure of psychological empowerment and McAllister's measure of affect- and cognition-based trust were used in this study. Since the wording of some survey items was slightly changes, the researchers determined the reliability for this particular instrument. Reliability estimates using Cronbach's alpha for the survey constructs ranged from 0.630 to 0.972. The response rate for the survey was 54 percent (Moye, Henkin, & Egley, 2004).

Frequencies were computed for the predictor variables, and ordinary least squares (OLS) regression was used to explore the relationship between empowerment and interpersonal-level trust. Results of the study indicated that teachers who find their work important and personally meaningful, who reported significant autonomy in their work, and who perceived they had influence over their work environment reported higher levels of interpersonal trust in their principals. Additionally, those teachers who have never had administrative responsibilities, or were less involved in committee work in their schools, reported having higher interpersonal trust in their principals (Moye, Henkin, & Egley, 2004). These findings show some net positive effects from less exposure to school and district politics and contentious organizational interactions, and that some teachers were more interested in leadership in their own classrooms and increasing student learning, rather than dealing with policy. These findings suggest that teachers should be involved

in instructional leadership, rather than managerial leadership. Teachers were more concerned with policies and operations that affect the students in their classrooms. The results indicated that giving teachers a direct effect on instructional decisions increased empowerment and trust in their principals. Communication patterns were shown to influence teacher-principal trust. The study suggested that principals promoted trust by demonstrating benevolence.

Daly (2009) studied the leadership and trust in terms of No Child Left Behind (NCLB) accountability and program improvement (PI) status. PI status under NCLB was defined as failure to meet Adequately Yearly Progress (AYP) for 2 consecutive years. The exploratory study was guided by three research questions:

1. How do teachers in schools in PI status and non-PI status differ with respect to perceptions of a threat-rigid response, trust, and leadership?
2. To what extent do teachers' perceptions of trust and leadership behaviors predict lower levels of a threat-rigid response within the school building and within the district?
3. To what extent do the perceptions of principals of schools in PI status predict levels of a threat-rigid response within their school buildings and within their districts? (p. 170)

The author hypothesized that educators in schools in PI status would predict a less threat-rigid response when trust and specific leadership dimensions, including shared leadership, act as moderators. This study could be correlated to the context in Kentucky by assuming these educators mimic the same response one would see in educators in Kentucky schools in Needing Assistance status. Briefly, the author believed that

educators in PI status schools that experienced strong trust and leadership among faculty and administrators would see sanctions as less of a threat and would continue to benefit from open communication about instruction.

The mixed-method study followed a cross-sectional survey approach following the general survey development path for Phase 1, and employed qualitative methods for Phase 2. Focus groups and interviews were used to add depth to the survey findings. The author used a purposeful sample of 252 teachers in eight schools in Year 2 PI (four elementary, four middle), as drawn from four districts in southern and central California. Fifty-three administrators who work in PI settings were chosen to round out the survey phase. Demographic differences among PI and non-PI schools were not statistically significant (Daly, 2009). Three instruments adapted from previous surveys and literature reviews measured threat-rigidity, trust, and leadership. Previous researchers cited the instruments reliability and validity.

Surveys were distributed by administrators during faculty meetings to ensure a high response rate (86%). Focus groups were conducted with grade level teams, and individual interviews were conducted with principals. The researchers conducted second-order factor analysis to determine if threat-rigidity, trust, and leadership were stable independent factors. The researchers then conducted a one-way ANOVA to determine the presence of significant differences in the mean scores between PI and non-PI schools at the building and district levels. A series of multiple regression models were run to predict the total threat-rigid response. Focus group and interview data were analyzed via constant comparative analysis and by checking and rechecking emerging themes.

The authors found that PI schools perceived a more threat-rigid response than did the non PI-schools ($F = 26.532$), less trust ($F = 13.491$), and leadership ($F = 5.784$). The regression analysis showed that trust factors were significantly related to threat-rigidity, explaining 47% of the variance. Leadership also predicted threat-rigidity, explaining 48% of the variance. Data from focus groups were parallel to these results, with teachers citing lack of voice and involvement in decision-making at the building level. The interview data indicated that principals perceived they were sharing leadership, but this conflicted with focus group data from teachers. The results from this study indicated that the relationship between administrators and teachers in struggling schools is, to say the least, stressed by accountability demands. This study could be generalized to other teachers and administrators in similar situations.

Wahlstrom and Louis (2008) examined the various factors that are often present in principal-teacher interactions and teacher-teacher relationships to see how those may have an impact on teachers' classroom instructional practices. The authors were interested in "leadership patterns, trust, and teacher-teacher relationships because they were often seen as levers to promote better instruction" (p. 464). Three researcher questions were asked:

1. How are teachers' instructional practices affected by principal-teacher relations, particularly in the efforts of the principal to share leadership with teachers, and by the teachers' trust in the principals?
2. How are teachers' instructional practices affected by teacher-to-teacher relations in a professional community, including their collective sense of responsibility?

3. How is the association between leadership and teacher-teacher relations affected by the teacher's individual sense of efficacy? (p. 468)

Data for this study were responses from the *Teacher Survey*, a 6-point Likert scale attitudinal survey, developed for the Learning from Leadership research project (Wahlstrom & Louis, 2008). The instrument was field tested for reliability and validity. Survey documents were mailed to individual schools and typically completed by all teachers during faculty meetings. The article was based on surveys from 4,165 teachers in 39 districts in 138 schools. The response rate was 67%.

The authors developed three dependent variables using principal component analysis with varimax rotation. The three variables that loaded with eigenvalues of over one and explained 62% of the total variance were: (a) Standard Contemporary Practice, (b) Focused Instruction, and (c) Flexible Grouping Practices. The authors used factor analysis to identify the following independent variables: (a) principal leadership behavior, (b) teacher's professional community, (c) individual sense of efficacy/competence, and (d) other demographic characteristics.

The authors used stepwise linear regression to address the research questions. The two leadership behavior variables (Principal Trust and Shared Leadership) were entered in the first step. The four teacher professional relationship variables (Reflective Dialogue, Collective Responsibility, Deprivatized Practice, and Shared Norms) were entered in the second step. Individual characteristics (race, gender, years of teaching, and individual efficacy/competence) were entered in the last step as moderating variables. The researchers conducted nine additional regressions for each of the

elementary/middle/high school populations to see how school level affects the influence of leadership on teacher classroom practices.

The regression of Standard Contemporary Practice on the independent variables indicated that both Principal Trust and Shared Leadership were significant, but only explained about 3% of the variance ($R^2 = .031$). During the second step, which added the four variables measuring teachers' professional community, Shared Leadership continued to be significant, but Trust was not. The R^2 increased to .065 and all of the added variables were significant. The final step of adding the individual characteristics increased the R^2 to .089. The coefficient for Principal Trust continued to be not significant, while the coefficient for Shared Leadership was of modest significance. Race was the only variable that was noted as significant in the equation. In summary, the variables measuring teachers' professional community had a robust effect on Standard Contemporary Practice. Teachers' experience of Shared Leadership is significant, but seemed to be less important than professional community. Little variation existed in the results between school levels.

A much higher percent of the variance was explained in the model with Focused Instruction than Standard Contemporary Practice. The first step, adding Trust and Shared Leadership, yielded an R^2 of .138, and increased to .202 after the teacher community variables were added in the second step. The only community variable that was not significant was Deprivatized Practice. Trust and Shared Leadership remained significant in this equation. The final step increased R^2 to a robust .400, with the following variables significant: (a) Shared Leadership, (b) Collective Responsibility, (c) Shared Norms, and (d) Efficacy/Competence. These results indicated that leadership behavior has a stronger

effect on classroom strategies that are designed to keep the emphasis on pacing and learning, and that these are supported by agreement about responsibility about student achievement and consistency over basic school values. Results across school levels showed little difference except Principal Trust was significant in middle schools, but not elementary and high schools. Reflective Dialogue was significant for elementary schools only.

The first model for Flexible Grouping practices on leadership variables indicated that both Trust and Shared Leadership were significant with 4.2% of the variance explained. Adding the community variables nearly doubled the explained variance ($R^2 = .086$) but yielded insignificant leadership variables. The final model added individual characteristics and increased the R^2 to .129. Though leadership variables were still insignificant, all of the community variables and individual characteristics were significant in the final model. Few differences existed among school levels.

When considering Leadership and Instruction, this study supported the results of Marks and Printy (2003) which suggested that expanding the decision-making in schools to non-administrators was an important step that leaders could take in long-term efforts to improve instruction. The results indicated that increasing teachers' trust in the principal may have positive effects on school climate, but is less significant than shared leadership. The findings suggest that professional community adds a great deal to the explanation of the three instructional practice variables. Most significant, Reflective Dialogue, Shared Norms, and Deprivatized Practice seem to have the strongest effect on instruction. Students are more likely to benefit when teachers have opportunities to discuss

instruction, share norms about student success, and have opportunities to see others teaching.

In conclusion, Walhstrom and Louis (2008) suggested that the concept of trust plays a key role in schools. Surprising, they found that teacher trust in their principal could be significant, but was never the highest predictor of instructional practice. Their results found that trust between teachers was more significant than trust between the teacher and the principal. These results indicate a further need for research into teacher-teacher relationships in professional learning communities.

Summary

The previous section on principal leadership suggests that principals cannot lead alone and must use the expertise and leadership of their teachers to increase student outcomes. Researchers have found that distributed instructional leadership, rather than managerial, has the most potential for increasing student achievement (Marks & Printy, 2003) and teachers trust (Short & Johnson, 1994; Somech, 2005; Moye, Henkin, & Egley, 2004). Specifically, the type of teacher leadership employed in schools will determine whether decentralization is effective in increasing student learning (Murley, Keedy, & Welsh, 2008). The following section highlights the literature on teacher leadership and focuses on teacher instructional leadership.

Teacher Instructional Leadership

Every teacher leads every day in their classrooms. They exert power, make decisions, force compliance, and empower children to achieve beyond the potential the students see in themselves. Teachers that exert a high degree of leadership in the classroom have been proven to have high levels of student achievement in some

educational settings. Greenfield & Andrews (1961) identified factors that were causative or predictive of teacher success. They focused on teacher leader behavior as identified through Stogdill and Coon's 1957 Leader Behavior Questionnaire (as cited in Greenfield & Andrews, 1961), which was shown to have high reliability and validity when identifying behaviors of those in formal leadership positions. The purpose of this study was to relate the behavior of teachers as leaders to pupil growth, as measured by achievement on examinations. The researchers had two hypotheses:

1. Teacher leader behavior is positively related to pupil growth.
2. There is significant agreement among the judgments of principals, other teachers, and students about teacher leader behavior.

The authors obtained the measure of pupil achievement by using the Cooperative School and College Tests, and used observed class ability to predict class achievement through the use of regression. The sample size was fifty-one teachers of social studies or mathematics in Grade 4 and the pupils in their classes. The teacher's leader behavior was described by their principal, five other teachers, and ten of their students. The authors averaged the ratings from the five teachers and ten students. The instrument used was the Teacher Leader Behavior Description Questionnaire (TLBDQ), which was adapted from the McBeath Ohio LBDQ (as cited in Greenfield & Andrews, 1961). The teacher leadership data were obtained from three urban Alberta school systems. Pupil ability and achievement data were obtained from the Alberta Department of Education.

The findings of the study indicated a discrepancy among principals, teachers, and students in their perceptions of teacher leader behavior. Descriptive statistics indicated that principals' ratings were higher than those of the other groups. The two leadership

dimensions were associated with approximately 20% of the variance in growth or achievement. The authors concluded that there was a significant agreement among principals, teachers, and students in their descriptions of teacher leader behavior. Teachers that showed a higher degree of leadership tended to induce higher achievement in their pupils. Growth ratings by other teachers and students were more successful in predicting pupil growth than the single rating of the principal. These results had implications for teacher training and selection (Greenfield & Andrews, 1961).

The focus of this dissertation was teacher leadership among other teachers, not necessarily from teacher to student. The results from the previous study could be followed by research on teacher leader behaviors among their peers. For instances, teachers that show high degrees of leadership in professional learning communities or their teams might see a higher degree of team success, and possible student achievement.

In general, the literature on teacher leadership among their peers was sparse and was more advocacy than empirical research. Less cited in the literature was how principals enable teacher leadership, and the effects of teacher leadership on school climate and student outcomes. This section of the literature review summarizes the possible effects of teacher instructional leadership, discuss conditions that influence teacher leadership, and define informal teacher leadership in terms of professional learning communities. The focus is strictly on teacher instructional leadership, rather than managerial positions, because that is the type of leadership that is more likely to increase student achievement.

Effects of Teacher Leadership

The literature was abundant with claims of potential and desired effects of teacher leadership, but limited on empirical evidence to support those effects. To date, most research in this general area had “centered on non-instructional individual and organizational outcomes” (Marks & Louis, 1997, p. 247). Possible effects include: effects on teacher leaders, effects on colleagues, and effects on students (York-Barr & Duke, 2004).

Numerous studies link empowerment to school-based decision making, but there are also correlates of empowerment to job satisfaction that could affect student achievement. Quaglia, Marion, and McIntire (1991) investigated the difference between satisfied and dissatisfied teachers regarding their perceptions of empowerment, attitudes toward students, self-efficacy, work conditions, and teachers' status in their communities. The subjects were 477 teachers from 20 Maine communities. The researchers selected 27 items for further research from an extensive Teacher Opinion Inventory survey conducted by the College of Education of the University of Maine. Validity and reliability were not reported. Responses were given on a 5-point Likert scale. The items were designed to assess attitudes in the following five broad categories: attitudes towards students, teacher efficacy, teacher empowerment, working conditions, and community support for education. Teachers were identified as satisfied or dissatisfied based on their response to the following question on the survey, “All things considered, how satisfied are you about being a teacher?” The percentage of positive responses from the other items on the survey was compared for the two groups of teachers and 2 x 2 chi-square analyses were calculated for each item.

Years of experience and grade level taught were similarly distributed for both satisfied and dissatisfied teachers. There were significant differences in the proportion of satisfied and dissatisfied teachers having positive assessments of students' academic performance, but little difference in their perception of students' behavior and social interests. Ninety-four percent of satisfied teachers and only 60 percent of dissatisfied teachers felt that students put a lot of energy into their work. Similarly, 92 percent of satisfied and 69 percent of dissatisfied teachers agreed that students try hard to get the best grade. There were significant differences between satisfied and dissatisfied respondents regarding teacher efficacy, work conditions, and community support for education, with satisfied teachers giving positive responses. As expected, the two groups of teachers differed more on their perceptions of empowerment than on any other construct. Satisfied teachers provided a much higher percentage of positive responses, with the differences being statistically significant for all empowerment items. Empowerment items included relationships with administrators, involvement in professional development and school policies, and freedom in selection of effective teaching methods. These findings suggest that teachers who feel empowered are more satisfied with their job.

Other studies indicate a relationship between teamwork and commitment, which strengthens the case for empowerment in the school setting. Park, Henkin, and Egley (2005) investigated the relationships between teamwork, trust, and teacher team commitment. The authors asked two research questions: (a) Will higher levels of teamwork and trust be associated with higher levels of teacher team commitment? and (b) Will the relationship between teamwork and team commitment be influenced by teacher

demographic variables (gender, age, educational level, years of teaching experience, years in the current school, and school level) and trust? Study data were derived from a survey instrument completed by 159 (57.4 percent) of the teachers employed in three elementary schools and one middle school, constituting all schools at these levels in a single district located in the southeast United States. The authors noted that the return rate was considered satisfactory for this type of self-report inquiry. Completed instruments were made available to the researchers only. Demographic data showed that a majority of the respondents were female (83.6 percent), aged 30 to 40 years (68.5 percent), had a bachelor's degree as the highest degree obtained (77.4 percent), had 11 years or more of teaching experience (46.6 percent), had worked in their current school settings for two to four years (39.6 percent), were elementary teachers (51.6 percent) and were frequently involved in teamwork activities (51.6 percent).

Rosenstein's (1994, as cited in Park, Henkin, & Egley, 2005) measure of seven teamwork components (communication, team orientation, team leadership, monitoring, feedback, backup behavior, and coordination) was used to assess the level of teamwork. McAllister's (1995, as cited in Park, Henkin, & Egley, 2005) measure of affective- and cognitive-based trust was used to assess teachers' level of interpersonal trust. McAllister suggested 11 items to assess trust. The researchers selected the four items with the highest factor-loadings; two items focused on affect-based trust and two items on cognition-based trust. Test for multicollinearity, linearity, homoscedasticity, and independence of residuals were performed before statistical computations were initiated. Principal component factoring analysis and multiple regressions were used to analyze the data. The revised teamwork measure included eight factors, and had acceptable levels of

reliability as determined by Cronbach's alpha: (a) communication (0.819), (b) team orientation (0.891), (c) team leadership (0.776), (d) feedback (0.779), (e) backup behavior (0.802), (f) coordination (0.811), (g) team commitment (0.917), and (h) trust (0.843). Team commitment was measured by slightly modifying the Organizational Commitment Questionnaire (Mowday, et al., 1979, as cited in Park, Henkin, & Egley, 2005). Researchers used the short form of the instrument that was composed of nine positively worded items. They eliminated three items that loaded on a different factor from the other six items. The reliability of the team commitment items was 0.917.

Two ordinary least squares regression equations were estimated to examine the relationship between teamwork and team commitment. The model indicated that teamwork was a significant predictor of team commitment ($p = 0.000$), and accounted for 54 percent of the variance in team commitment. Teamwork subscales of team orientation ($p = 0.011$), team leadership ($p = 0.007$), and backup behavior ($p = 0.036$) were significant predictors of team commitment. The importance of the trust variable is acknowledged as proximally high, but not statistically significant ($p = 0.063$). The influence of demographic variables were not significant with the exception of interaction effects for coordination and years in current schools ($p = 0.032$). The authors concluded that higher levels of teamwork in schools appear to support and reinforce teacher team commitment.

The literature suggested positive outcomes of various models of shared decision-making in the school context. Site Based Decision Making councils, school leadership teams, and other forms of this type of governance have potential to increase collaboration efforts among stakeholders. The literature was lacking on specific studies of this type of

shared decision-making, in terms of instructional improvement. Griffin (1995) conducted a three-year study of five teachers' understanding of how teacher participation in school decision-making has affected school and classroom activities in "redesign settings" (p. 30). The research used informal conversations with the teachers over a period of 40 months to collect data. He recorded 34 to 40 interviews with each of the five teachers. The teachers came from a variety of backgrounds and had 7 to 17 years of successful teaching experience. The school contexts of the teachers included large and small urban, with multicultural and multilingual student populations; large suburban with affluent and monolingual populations; urban with affluent students; and small rural with multicultural student groups. One broad research question was addressed: What do teachers believe are the primary classroom-level consequences of their schools' efforts to improve the workplace and redesign the role of the teacher toward greater participation in school decision making? The author admitted that as the data emerged, the original intent of the conversations was lost and began to focus on the school organization rather than the classroom organization.

The author reported limited classroom-level effects from the reform efforts. The effects were broad in terms of changes in student assessment, curriculum frameworks, use of technology, and working with students who do not conform to school norms. In contrast, teachers reported that they had little knowledge of the effects on classroom practices. The absence of the attention to changes in pedagogy seemed to be a huge gap in examining the effects of shared decision making. Griffin suggested five themes that contribute to this lack of attention to the quality of pedagogy: (a) teachers' beliefs about their own competence, (b) the persistence of the culture of isolation, (c) prevailing forms

of politesse, (d) uncertainty about excellence, and (e) information and decision-making overload. These findings indicated that shared decision-making had a school-wide focus, which could be beneficial, but suggested that there is a lack of attention paid to improvement on the classroom and student level (Griffin, 1995).

Whitaker (1995) investigated teacher leadership in restructuring of schools. The study consisted of eight schools which had principals that were one standard deviation above and one standard deviation below the group norm on the Audit of Principal Effectiveness, a nationally normed assessment of principal skills. On-site visits and interviews were conducted with the principal, and then with groups of teachers at each of the eight schools. The investigator found that the effective schools identified and used teacher leaders, whereas the less effective schools did not. These informal teacher leaders were asked opinions before the principals made decisions, presented at faculty meetings, and carried informal messages from the principal back to their colleagues. The author also stressed the importance of informal teacher leaders in the climate and culture of the school. Principals of effective schools seem to have an intrinsic ability to identify informal teacher leaders in their schools, and seek them out for opinions and professional development.

The effects of teacher leadership on the teacher leaders are more prevalent in the literature. Teacher leadership has also been identified as a predictor of learning organizations, as well as the staff feeling valued, satisfaction with leadership throughout the school, strong leadership from the principal, and having sufficient resources (Silins & Mulford, 2004). Also, staff value, leadership satisfaction, and socio-economic status (SES) have been shown to be predictors of teacher leadership, with this variable being

stronger in schools with lower SES levels. Teacher leadership empowered teachers and contributed to school improvement by the spreading of good practices and initiatives generated by teachers (Muijis & Harris, 2006), though data showing the actual amount of student achievement increases were lacking.

The outcomes of teacher leadership on colleagues can be viewed as the effects on relationships between teacher leaders and their colleagues, and in terms of the effects on practices at the classroom and school levels. Most of the reported relationship effects involve an element of distancing and conflict, such as lower levels of trust and even resentment among colleagues (York-Barr & Duke, 2004). Smylie (1992) reported that “teachers’ relationships with teacher leaders may differ substantially from their relationship with teachers who do not hold these positions” (p. 87).

Teacher leadership has been reported to have effects on teacher practices at the classroom level. Interviews conducted by Ryan (1999) with 12 teacher leaders, four nominated from each of three schools, and their respective 18 nominators and three principals revealed a high level of perceived impact on the instructional practices of colleagues. The teacher leaders in this study were department heads, and time was scheduled for leadership activities since they held formal positions. Teacher leaders “were available to their colleagues as a resource in such areas as instructional practice, assistance in dealing with difficult students, helping to plan new programs, and even offering advice on personal matters” (p. 26). These teacher leaders were viewed as extending their influence beyond their own departments and reported being satisfied with the level of influence they could exert on school policy and teacher practice through their

positions as department heads. Supportive school cultures and principal leadership were identified as key variables in the success of these teacher leaders (Ryan, 1999).

York-Barr and Duke (2004) cited little empirical evidence that supported positive effects of teacher leadership on student learning, though possibilities and assertions have been made throughout the literature. Teacher leaders have been perceived to have a positive effect on students because they influenced instructional practices of colleagues and participated in school-level decision-making (Ryan, 1999).

Marks and Louis (1997) conducted a quantitative study of teacher empowerment for instructional organization of schools, authentic pedagogy, and student academic performance. The authors asked two research questions:

1. To what extent does empowerment in diverse domains positively influence the school instructional content – specifically professional community and collective responsibility for student learning?
2. How and to what extent does empowerment enhance authentic pedagogy and student academic performance?

The sample included teachers and students from 24 public elementary, middle, and high schools (eight at each level). Selection criteria included being well along in the process of restructuring. These schools were larger than the national average, and had more minority students. Also, their National Assessment of Educational Progress (NAEP) achievement levels for math and reading were at or above the national average, except for high schools, which were below the national average. The teachers completed a questionnaire on their instructional practices, professional activities, the school culture, and personal and professional backgrounds. The subject response rate was 95% overall,

with 910 teachers responding to the questionnaire. Data collection included interview and observation of teachers, administrators, and other stakeholders. Two teachers nominated by their peers as exceptional or influential were also observed, and asked to complete performance tasks and submit samples of student work.

Analysis included three sets of measures, domains of empowerment, and an empowerment index as independent variables. Dependent variables included school organization for instruction, authentic pedagogy, and student academic performance. The between- and within- school variance was measured by hierarchy linear modeling (HLM) as a one-way analysis of variance with random effects. Results indicated that even though all schools were site-base managed, there was considerable variation among the amount of empowerment experienced by teachers. Within-school variance was smallest for influence over student experiences (60%) and greatest for classroom control (90%). While some teachers experienced large amounts of autonomy, others did not. The reliability for the empowerment index was 0.88. Teachers' influence over school operations ($ES = 0.35, p \leq .001$) was moderately consequential for their experience of professional community. The average level of professional community was significantly higher in schools where empowerment was a structural characteristic. High levels of authentic pedagogy existed in schools with high levels of empowerment, with a few exceptions. Without faculty empowerment, high levels of authentic pedagogy were very unlikely (Marks & Louis, 1997).

In summary, Marks and Louis (1997) results showed direct links between teacher empowerment and the variables of professional community and collective responsibility for students. Indirect links were revealed between empowerment and authentic pedagogy

by way of how the school was organized for instruction, specifically as a professional community with collective responsibility for student learning. Again, problems arise when examining the type of empowerment expressed by teachers in this study, as the focus was on teacher decision making rather than instructional collaboration.

Other studies show no direct effect of teacher leadership on students. Taylor and Bogotch (1994) found no significant differences in terms of student attendance, achievement, or behavior between schools with high degrees of teacher participation in decision making and schools with low participation. Four research questions were asked:

1. What dimensions of participation in decision making emerge from data collection in a restructuring district?
2. What correlations can be found between these dimensions and (a) facets of teacher job satisfaction and (b) school-level outcomes, including teacher and student attendance and student achievement and behavior?
3. Does teachers' participation in decision making result in significantly different outcomes for teachers and students?
4. Do teachers in a restructuring district perceive saturation, equilibrium, or deprivation with regard to their participation in decision making?

The study was conducted in a reform district widely known for its restructuring program. This program was implemented in the early 1980s and was aimed to professionalize teaching by enabling teachers to be active participants in decision making. The district was large and diverse, with schools ranging from intercity urban to rural and over 300,000 students in 250 schools. The schools had a high percentage of minority, ESL, and free- and reduced-lunch students. The sample for the study included

elementary and high schools pulled from two pools: (a) schools that had piloted the restructuring program, and (b) non-pilot schools that had similar demographics as the pilot schools. Thirty-three schools were selected from the two pools, including 28 elementary and five high schools.

The authors operationalized teacher participation in decision making as teachers making decisions about issues that affect their activities or job assignments. Therefore, it was not specific for instructional decisions. The authors distributed Bacharach, Bauer, and Shedd's questionnaire to measure teachers' involvement in 19 decision items (1986, as cited by Taylor & Bogotch, 1994) to 1,654 regular education teachers. The response rate was only 39%, due to the voluntary nature of the study, but was sufficient for a 95% confidence that the sample mirrors $\pm 3\%$.

School-level outcome variables on teacher and student attendance and student achievement and behavior were obtained from school profiles. The authors used principal component factor analysis with varimax rotation to identify the dimension of teacher participation in decision making. Differences between schools on school-level variables were calculated through MANOVA. The main findings that emerged from the study were: (a) several dimensions of participation in decision making existed, (b) these dimensions correlated differentially with the criterion variables, (c) teachers' participation does not produce a statistically significant effect on outcomes for teachers or students in the district, and (d) teachers in both participation groups felt deprived from decision making in all 19 items. The authors suggested that results might be different if teachers and administrators participated in professional learning, and saw direct influences on instruction with their decision making (Taylor & Bogotch, 1994).

Leithwood and Jantzi (1999a, 1999b, 2000) conducted large-scale quantitative studies on the effects of leadership on students. They reported no statistically significant relationship between teacher leadership and student engagement and a significant but weak relationship between principal leadership and student engagement. York-Barr and Duke (2004) cautioned readers about the studies due to the way the construct of teacher leadership was operationalized for measurement purposes. They noted that the absence of a valid definition was problematic in measurement and analysis.

Silins and Mulford (2004) examined organizational learning and the leadership practices and processes that foster organizational learning, and the impact of these variables on teacher leadership. The authors conducted the study through the Leadership for Organisational Learning and Student Outcomes (LOLSO) collaborative research project, funded by the Australian Research Council. The project addressed the need to further understand school restructuring and target variables that enhance student learning and outcomes, with a focus on leadership. The project included two phases. The sample from the first phase included 2,503 teachers and their principals drawn from 96 secondary schools. In the second phase of the project, survey data from 3,500 year-10 students from the project's 96 schools yielded measures of student family educational environment, student views of teachers' work in the classroom, and student outcomes such as attendance, students' self-concept, and participation in and engagement with the school. This particular study from the project employed the database provided by the surveys of the LOLSO project from high schools. The authors used data from the survey to study the relationship of teacher leadership to organizational learning and student outcomes.

The study examined the nature and strength of the interrelationship between twelve variables chosen to expand understanding of teacher leadership and organizational learning, and their impact on student participation in and engagement with the school. School context variables included socioeconomic status and school size. Eight internal school variables were used: (a) resource, (b) leader, (c) staff valued, (d) leadership satisfaction, (e) community focus, (f) teacher leadership, (g) organizational learning, and (h) teachers' work. Student outcome variables were participation and engagement. The twelve variables were included in a path model developed to examine the influence of a number of internal variables on teacher leadership and on organizational learning, and the impact of teacher leadership and organizational learning through teachers' work on students' participation in and engagement with school.

The authors tested the path model using Sellin and Keesee's procedure of latent variables partial least squares path analysis (1997, as cited in Sillins and Mulford, 2004). All measures that had a loading of at least twice their standard error and equal to or greater than 0.40 were retained. All paths were deleted where the path coefficient was less than twice its standard error or less than 0.10. The school was the unit of analysis and indicated the way in which teachers, students, and principals work in this school.

Three variables emerged as direct predictors of teacher leadership: (a) staff valued ($p = 0.37$), (b) leadership satisfaction ($p = 0.36$), and (c) socio-economic status (SES) ($p = -0.22$). The negative path value for SES indicated that there tended to be higher levels of teacher leadership in lower SES schools. Two variables had very strong indirect effects on teacher leadership: (a) resource ($i = 0.50$), and (b) leader ($i = 0.49$). A total of 57% of the variation among schools in teacher leadership was explained by these variables. Five

variables were direct predictors of organizational learning: (a) teacher leadership ($p = 0.22$), (b) staff valued ($p = 0.26$), (c) leadership satisfaction ($p = 0.22$), (d) leader ($p = 0.19$), and (e) resource ($p = 0.17$). The four variables with indirect effects were: (a) school size ($i = -0.23$), (b) SES ($i = -0.18$), (c) resource ($i = 0.59$), and (d) leader ($i = 0.43$). The proportion of organizational learning accounted for by teacher leadership was 20%. The combined effect of variables in this model explained 83% of the variance of engagement.

These results indicated that teacher leadership contributes strongly to organizational learning, and is more prevalent in smaller, lower SES schools where staff members face more challenges. Teachers' work in the classroom was the strongest predictor of student participation in and engagement with the school. The model indicated that organizational learning significantly enhanced teachers' work. However, teacher leadership was not a significant contributor to student participation in and engagement with the school, which supported the results from Leithwood and Jantzi (1999a, 1999b, 2000). Closer inspection of the survey items indicated that the teacher leadership items were not necessarily instructional in nature. In other words, the specific type of teacher leadership addressed in these studies (Sillins & Mulford, 2004; Leithwood & Jantzi, 1999a, 1999b, 2000) was not specific. These results indicate a need for further examination of the nature of teacher instructional leadership, and its impact on organizational learning and student outcomes.

Conditions that Influence Teacher Leadership

Since *A Nation at Risk* (National Commission on Excellence in Education, 1983), most national-level reform movements have recommended widespread teacher

leadership. The extent to which teacher leadership flourishes in schools depends on a number of factors, including group and professional norms, and customs of the school or district. Creating a structure that enhances the leadership capabilities of teachers is easier said than done, considering that their positions have few career advancement opportunities, little responsibility for facilitating and organizing the interdependent work of others (and little credit for doing so), scant professional growth and development opportunities, and almost no influence over the preparation and development of new teachers (Hart, 1995). In other words, the principal is still very much the “boss” in many schools. A range of conditions needs to be in place for successful teacher leadership: (a) a culture of trust and support, (b) clear, transparent structures that support teacher leadership, (c) strong leadership from the principal, and (d) engagement in innovative forms of professional development (Muijis & Harris, 2006). Supporters of teacher leadership reform assert that for any true, sustainable change to take place in schools, teachers must take ownership in the efforts (Heller & Firestone, 1995).

Teacher leaders are both teachers and leaders. The majority of the literature related to the question “Who were teacher leaders?” indicated that teacher leaders are experienced, excellent teachers that are respected by their peers (York-Barr & Duke, 2004). Multiple studies reported teacher leaders to be experts in their fields with high levels of interpersonal skills that enabled collaboration among peers (Acker-Hocevar & Touchton, 1999; Lieberman, Saxl, & Miles, 1988; Snell & Swanson, 2000).

Acker-Hocevar and Touchton (1999) investigated how teachers described current decision making structures, culture, and power and micropolitics of their work, examining how they used their agency to accomplish work and make decisions under

Florida's reform. The study was qualitative with in-depth interviews from six Florida teachers of the year. Teacher award criteria included: (a) leadership at the school, district, and/or state and national level, (b) possession of superior ability to foster excellence in education, (c) demonstrate exemplary interpersonal skills, (d) evidence of collaboration with other professionals, and (e) a strong commitment to effective teaching and learning. The years of experience for the teachers ranged from 11 to 19, with all of them having at least a master's degree. Demographics of their schools also varied.

Each teacher participated in an hour or longer phone interview. The researchers acquired trustworthiness through member checks. Teachers had a variety of opinions on their role in decision making; some felt empowered at the school, while others thought administrative control prevented teachers' voices from being heard. Some of the teachers reported a change in empowerment with the new administration and reflected on the difficulties of adapting to that change while keeping shared decision-making in place. Accountability and teacher surveillance were frustrations shared by all teachers with increased empowerment. Some teacher leaders felt isolated and limited by the school culture and declined to share their ideas with other teachers due to backlash. Some teachers reported having collective agency and a strong sense of collaboration as a norm for their school. In conclusion, teachers that had the most empowering administrators were able to more effectively exhibit teacher leadership in their schools (Acker-Hocevar & Touchton, 1999).

Snell and Swanson (2000) described a framework which captured the knowledge, skills, and dispositions of teacher leaders who demonstrated the ability to work effectively with their peers and students in their classroom and beyond. Data came from

ten in-depth case studies of recognized urban, middle school teachers. Participants came together twice for three-day conferences to facilitate reflection on their leadership experiences. The following themes emerged for identification of teacher leaders: (a) content knowledge competency, (b) pedagogical content mastery, and (c) effective classroom management skills. During the interviews, certain themes emerged regarding teacher leadership: (a) the importance of subject matter knowledge, (b) the commitment of teachers to working collaboratively, and (c) the unique challenges of teaching other teachers rather than students. Teacher leaders also reported the importance of reflection for professional growth, the sense of empowerment they shared, and their enthusiasm for innovation in the classroom. For the interview data, the authors developed a framework for teacher leadership with four themes: expertise, collaboration, reflection, and empowerment. The authors concluded that as teachers develop these characteristics throughout their careers, they emerge as leaders (Snell & Swanson, 2000).

Teachers drawn to leadership positions were viewed as achievement and learning oriented and as willing to take risks and assume responsibility (Wilson, 1993; Yarger & Lee, 1994). Wilson (1993) surveyed more than 400 teachers in all six high schools in one district to nominate teachers regarded as leaders. The reasons they listed particular colleagues as leaders included: (a) being highly involved in curricular and instructional innovation, (b) creativity in motivating students from diverse backgrounds, (c) availability to other teachers as a resource or advocate, and (d) willingness to enthusiastically sponsor extracurricular activities. The author used the reputation technique to interview 13 of the 355 teachers nominated. He found that teacher leaders seek change, challenge, and growth. They go out of their way to find innovative

programs that benefit their students, peers, and themselves. Interestingly, the teacher leaders did not see themselves as role models to their colleagues. They instead saw themselves as role models to their students. This indicated that the teacher leaders did not see modeling as a powerful form of leadership (Wilson, 1993).

Heck and Brandon (1995) investigated how purposeful reform of school decision making responsibilities affects teacher participation and leadership. The authors asked two research questions: (a) To what extent is teachers' agreement with the selection of school needs affected by their participation in decision making about: the process of making decisions about the needs; and the content of the needs? and (b) To what extent does teachers' expertise affect their participation in decision making about school needs? The authors also examined the extent in which leadership ability and experience at the school affect decisions. The study was conducted as part of a long-term evaluation of phases of a site-managed school improvement program. Subjects in the first study included 151 teachers (55 percent response rate) in nine elementary schools within one participating district. Subjects in the second study were 212 teachers (76 percent response rate) in four elementary schools which served as feeder schools to one intermediate/high school.

Questionnaires were developed to assess overall teacher participation in the reform process on a 4-point Likert scale. Items in the first study included teacher input into how decisions would be made, delegation of responsibilities, scheduling for needs assessment, and program planning. Teachers in the second study completed a similar questionnaire asking about their expertise in key areas of schooling, extent of participation in decision making, certain demographic characteristics, and their tendency

to assume leadership roles. Additionally, interviews were conducted with teachers and administrators in leadership roles. Structural equation modeling was used to test the underlying constructs and variables measured on ordinal scales. The researchers used confirmatory factor analysis to establish construct validity and determine the direct and indirect effects of the variables. Descriptive statistics were also used to compare data between the two groups.

Interviews showed that teacher leaders had more opportunities than other teachers to plan needs assessment for the school. The results addressing the first research question indicated that the largest direct effect on Agreement of school needs was through Input-into-Content (0.73), suggesting that teachers that had voice in determining the needs of the school had the strongest agreement of the school needs. The results addressing the second research question showed that teacher expertise had the strongest direct effect on teacher participation in decision making. These findings suggest that when making decisions about school improvement, teacher expertise and knowledge about their students' needs should be fully used.

Katzenmeyer and Moller (2001) suggested factors that influence a teacher's readiness to assume the role and responsibilities of a teacher leader. These factors included excellent professional teaching skills, a clear and well-developed personal philosophy of education, being at a career stage that enables one to give to others, having an interest in adult development, and being in a personal life stage that allows one time and energy to assume a position of leadership.

Silvia, Gimbert, and Nolan (2000) conducted a case study of three teacher leaders who attempted to lead from within their classrooms. This exploratory case study

employed a descriptive case study methodology as presented by Merriam (as cited in Silvia, Gimbert, & Nolan 2000). The unit of analysis was teacher leaders who worked within a progressive school district in the northeastern United States that had a reputation for offering professional growth opportunities to its teachers. The authors asked two research questions: (a) What is teacher leadership from within the classroom?; and (b) How do teachers, who predominantly lead from the classroom, experience teacher leadership?

Teacher leaders were selected using a “unique case selection” procedure, which encouraged participants to be selected based on a unique attribute inherent in the population. Three teachers selected as leaders met the following criteria: (a) 10 or more years teaching experience; (b) nominated by at least three peers within the district; (c) viewed their primary responsibility as a classroom teacher; and (d) had a history of serving the district in recognized leadership roles. Each teacher participated in a semi-structured interview that focused on the following: (a) biographical information, (b) leadership experiences within the district; and (c) comments about the possibilities for teacher leadership in the district. Interviews were tape recorded and transcribed. The authors conducted member checks to ensure reliability of the data (Silvia, Gimbert, & Nolan 2000).

The authors conducted a cross-case analysis and drew five assertions regarding the activities of teacher leaders in the classroom: (a) navigated the structure of the school; (b) nurtured relationships; (c) encouraged professional growth, (d) helped other with change, and (e) challenged the status quo by raising children’s voices (Silvia, Gimbert, &

Nolan 2000). The teacher leaders in this study possessed a certain set of leadership skills, though none of them felt that they had been able to act as effective leaders.

Overall, teacher leadership seems to stem from success in the classroom (Silvia, Gimbert, & Nolan 2000; Katzenmeyer & Moller, 2001). Teachers must first be respected by their peers for their instructional expertise before other teachers will follow their advice and suggestions. The next section of the literature review addresses barriers to teacher leadership and conditions that must exist for it to be embedded in school culture.

One of the most widespread constraints of teacher leadership is that hierarchical leadership is deeply embedded in school culture (Smith & Peterson, 1988). The main benefactors of teacher leadership should be the students, yet many of the students do not believe in, let alone practice, democracy. This suggests that leadership is a cultural phenomenon that is very difficult to change. According to Barth (2001), “The hidden curriculum trumps the overt curriculum” (p. 444).

Other studies have suggested that the principal-teacher relationship is critical when implementing teacher leadership, and can often serve as a restraint. Anderson (1994) conducted a multi-site case study of six schools in which 28 respondents shared their perspectives on the nature of teacher leadership from their respective context. Data showed that respondents’ views of teacher leadership produced a fairly distinct focus on the mutual influences of teacher leaders and principals. These influences went two ways, from the teacher leader to the principal, and vice versa (Anderson, 2004). The principal must not only have a distributed style of leadership, but must also build relationships and trust amongst both teacher leaders and their peers for teacher leadership to flourish. Without this culture of collegiality, leadership opportunities can create conflict. Another

concern is the effects of collegiality among teachers in formal leadership positions. Some researchers believe that this collegiality could create a larger power struggle in schools (Kerchner & Caufman, 1995; Little, 1990, 1995).

Even in schools that have cultures that support distributed leadership, many teachers in leadership roles have reported feeling overwhelmed between the role of classroom teacher, their responsibility to their students, and the new responsibilities as school leaders (Griffin, 1995; Smylie, 1992; Smylie & Denny, 1990; Smylie & Smart, 1990). This suggests that the teachers are not seeing direct connections from their leadership roles to classroom improvement. These types of shared decision-making seem to have impact on school-wide decisions, sometimes dealing with procedural, policy, and managerial tasks, but do little to directly impact classroom instruction. Recent advancements in research on the leadership structure of schools are moving towards this new idea of shared instructional leadership.

Defining Teacher Leadership

One reason the literature on teacher leadership is vague is a lack of a clear definition of the term. Defining teacher instructional leadership in terms of the classroom is a much less daunting task than defining teacher leadership amongst peers. Another reason teacher leadership takes many definitions in the literature is because it will look different depending on the grade levels in each school. For instance, in high schools engaged in restructuring, newly created teacher leadership roles reside outside traditional departmental structures, and their responsibilities span traditional subject boundaries. Some teacher leaders serve as heads of new organizational units intended to create more meaningful homes for students and to generate closer ties between teachers and a cohort

of students (Little, 1995). Teacher leadership at the elementary and middle level was more likely be more team centered than department centered.

The literature is rampant with definitions of formal teacher leadership roles, including mentor teachers, career ladders, lead teachers, and others (Hart, 1995). A comparative case study exploring the teacher perceptions regarding a career ladder program in two schools was conducted by Hart in 1994. Components of the career ladders program included clinical peer supervision, shared decision making, and collegial assistance, but not permanent career advancement. These teachers were involved in curriculum assistance in subject specialties, in-service training, teacher observation, consultation on instructional techniques, leadership of school programs, and communication within each school and throughout the district. Even though these tasks were a significant part of the teachers' routines, the creators of the program stressed that the teachers' top priority should remain classroom instruction.

The outcomes defined by those that created the program were: (a) improved earning potential for career teachers, (b) use of expert teachers for the overall improvement of curriculum and instruction, and (c) increased involvement by teachers in professional decisions affecting schools. Increased student outcomes were the expected result (Hart, 1994), though the researcher is lacking data to support this claim.

Hart (1994) found very different perspectives of the career ladder program in the two schools. Teachers at one school felt the program was very effective and had the potential to positively impact curriculum, instruction, and student learning. Teachers and administrators in this school acted quickly on challenges from other teachers regarding their identity as teachers; career teachers formed a committee to define their roles, and

administrators publicized their leadership activities to improve communication about the program. On the other hand, teachers in the second school expressed concern about the program causing more trouble than it is worth. Career teachers in this school continued to work in isolation, and were thus very vulnerable to attack from other teachers. There was no set of shared beliefs on which they could be judged, and the principal remained silent when problems arose. Grounded in “role theory,” this study signified the importance of defining teacher leadership roles, and then promoting them clearly throughout the faculty to increase buy-in from staff. This suggests that though many teachers might be designated with formal leadership positions, role ambiguity still exists among the teacher leaders and the faculty members they are supposed to lead.

Other studies have investigated teacher leadership models that are directly designated to increase student achievement. Hallinger and Richardson (1988) suggested a conceptual analysis seeking to empower teachers and improve student learning. They stress that this model must provide for increased interaction among teachers in curricular and instructional decision making, which supports leadership through professional learning communities. The overall goal is to increase quality of instruction, and, in turn, student learning, though these reforms were initially created to increase teacher professionalism.

The four models discussed were: (a) Principal’s Advisory Committee, (b) Instructional Support Team, (c) School Improvement Team, and (d) Leader Teacher Committee. The Principal’s Advisory Committee (PAC) is a representative group of the faculty that is involved in making decisions that improve the organizational culture of the

school. PACs are mainly involved in policy and supervisory decisions, and are less focused on instruction than other models.

The Instructional Support Team (IST) goals are to improve instruction through collaboration with administration and teachers within specified curricular and interdisciplinary domains. ISTs often involve teachers coaching and mentoring other teachers, as well as playing lead roles in curriculum development. School Improvement Teams (SIT) improve learning for students by involving teachers in setting school-wide goals and leading professional development activities. It is different from the IST due to serving as an overseeing committee rather than being directly involved with teacher-to-teacher interaction and classroom practices.

The Lead Teacher model, less prevalent in the literature, is the most radical type of reform and is increasing the utilization of the expertise of professional staff, by widening accountability within the school site beyond the principal. In terms of delegation of power, the ISTs and Lead Teacher models offer the most hope for shared instructional leadership by teachers. The authors recommended further empirical studies on the impact of these models on student achievement (Hallinger & Richardson, 1988).

Many researchers have investigated the role of department heads in distributed leadership, but few have conducted the extra step of examining the social networks that exist within the department. Lima (2008) looked at the roles of department coordinators and other teacher leaders within a system of formally distributed teacher leadership in 12 departments of two Portuguese schools. This study supported the network approach to studying distributed leadership in schools. The researcher used York-Barr and Duke's (2004) conception of distributed professional teacher leadership "as a process whereby

teachers, individually or collectively, influence their colleagues in order to improve their professional practice” (p. 287-288). This study was not designed as a study of teacher leadership, but the data collected are particularly useful for assessing how far teacher leadership was exercised and distributed within the participating institutions. Not only did Lima examine who was leading, but the mechanism into how teachers were leading and sharing instructional expertise, both formally and informally. The paper addressed two main research questions:

1. To what extent do department coordinators, to whom leadership has been formally distributed, actually exercise professional leadership in relation to their colleagues?
2. Besides department coordinators, are there other teachers within the departments who play a professional leadership role? In other words, is professional leadership distributed beyond formal role positions within departments?

The researcher used a purposeful sample in two Portuguese schools: a secondary school (School A) and a Basic Integrated School (School B). School A was comprised of 33 teaching staff, distributed among four departments. School B employed 83 teachers, organized into eight departments (Lima, 2008). A department social network questionnaire was distributed to staff members in each department. Each respondent indicated how much they felt each of their colleagues had influenced their own professional development, with 1 meaning they did not contribute at all to their development, and 5 meaning they totally contributed to their development. Each department member indicated the teachers with whom he or she exchanged teacher

materials, developed materials jointly and/or planned his/her work jointly. Respondents were asked to indicate how often they developed each of these relations with each of their colleagues. Response rates were 90.0% in School A and 88 % in School B.

The author operationalized actor centrality as an actor that was involved in more relations than the others in his or her network. This measurement could be asymmetrical, meaning an actor may choose or nominate another with regard to a specific relation, but not be nominated or chosen by the same person, or symmetrical, meaning a tie from actor A to B implies the same tie from B to A. All actors were rank-ordered based on their normalized centrality. The author also calculated centrality share, or the relative weight of each actor's centrality in the context of all centralities in his/her department. Network centralization was measured to examine the extent to which each network in each department was focused around a unique actor, and was expressed as a percentage ranging from 0 to 100. The network density was measured to indicate the proportion of relations that were actually present in the network, relative to the total of relationships that were theoretically possible in that network. Low densities indicated a lack of distributed leadership within a department (Lima, 2008).

All data were analyzed with the centrality and density routines included in the UCINET VI program. Results indicated that a variety of leadership networks existed within the various departments. Four departments had focused, formal leadership, with the department coordinator perceived as the key leader in the department. Though they were seen as a central figure in the department, involvement in collaborative relations with those colleagues and their effectiveness in making them work collaboratively were minimal. Five departments had multiple leadership, with the department coordinator

regarded as a key leader, but this position was shared with other teachers. Sometimes department coordinators and other informal leaders were also prominent actors with regard to actual collaborative activities, but their prominence in their activities was low, meaning that they were also not effective in developing a collaborative culture among their colleagues. This indicated the existence of informal teacher leadership within the networks. One department had alternative, informal leadership, where the department coordinator was not seen as being a leader, but a different colleague held the most central position. In this network, results suggested that the alternative leader was a relatively effective professional leader, but the small size of the department was cause for misinterpretation of these results. Two departments had a leadership void, with the department coordinator as one of a majority of isolated teachers in the department. Not surprisingly, teachers in these department reported low collaborative practices.

In conclusion, the multiplicity of configurations of leadership showed that systems of leadership that were formally distributed may comprise a variety of informal network patterns of leadership, many of which do not confirm the supposed virtues of leadership distribution (Lima, 2008). Results indicated even though some teachers were viewed as leaders, their effectiveness of creating professional collaboration to increase student learning was low.

Other in-depth case studies support informal teacher leadership roles (Hatch, White, & Faigenbaum, 2005). Conventional approaches to teacher leadership imply that teachers must be put in formal positions of authority to make change, but this is not always the case. Teachers can influence other teachers in informal positions and create legitimate power by relying on the expertise and credibility they develop as classroom

teachers. They can do this by fostering reflection and representation, building on and building up networks of practice, and connecting groups and crossing boundaries.

Teacher leadership can take many forms, including formal and informal positions. Cases have been cited where teachers moved into pivotal leadership positions based on their own initiative (Frost & Durrant, 2003). Muijis and Harris (2006) conducted an empirical study of teacher leadership in the United Kingdom and found that it was characterized by a variety of formal and informal groupings, often facilitated by involvement in external programs. The research had three goals: (a) identify different models of, and approaches to, teacher leadership in practice; (b) explore how teacher leadership can best be facilitated and developed; and (c) explore the possible relationship between teacher leadership, as a form of professional collaborative work, and school improvement. The authors operationalized teacher leadership as “purposeful collaboration and co-operation amongst teachers” (p. 963). The authors noted that teacher leadership need not be defined by formal positions, but instead purposeful collaboration with the purpose of improving instruction.

The authors employed a case study design for the project and collected evidence from ten schools selected through purposive sampling. The sample included five primary and five secondary schools. The researchers collected data through semi-structured interviews with a diagonal cross section of school staff, and through document mining. The authors used inductive reasoning to explore the data using a thematic analysis framework. The researchers used constant comparative analysis to interpret the data.

The researchers found five dimensions of teacher leadership as a form of professional initiative and learning: (a) shared decision-making, (b) collaboration, (c)

active participation, (d) professional learning, and (e) activism. The researchers concluded that each of the schools had strong head teachers that led their peers in collaboration and professional growth. Though certain teachers were designated with leadership titles, other teachers lead informally through collaboration. In the commentary, the authors noted the lack of evidence that supported the effects of teacher leadership on improved student outcomes, but instead stressed that literature cited professional learning communities as being evidence that lead to strong and measurable improvement in pedagogy and student learning. Muijis and Harris (2006) called for further research into the relationship between teacher leadership and professional learning communities.

Du Four (2004) described professional learning communities as groups of teachers focused on learning rather than on teaching. These teachers hold themselves accountable for results and work collaboratively with the primary goal of increasing student learning. The three big questions addressed by professional learning communities are:

1. What do we want each student to learn?
2. How will we know when each student has learned it?
3. How will we respond when a student experiences difficulty in learning?

Teacher learning communities are different from typical school communities because of their strong commitment to ensuring that all students learn, improving instruction, success in obtaining resources, and true collaborative work (McLaughlin & Talbert, 2006). The differences in traditional communities and learning communities are vast. Traditional communities accept differing academic abilities in students, while

learning communities believe that all students can achieve at high levels. Learning communities involve collaboration around teaching and learning, as well as mentoring.

Summary

The literature on teacher leadership is mainly descriptive in nature and lacks empirical studies investigating the effects of teacher leadership on student outcomes. Most of the literature points to a need for instructional teacher leadership and collaboration among peers to increase student outcomes (DuFour, 2004). The next section cites studies from researchers that have investigated the correlations and effects of both principal and teacher leadership on school outcomes, in particular, student achievement.

Leadership and Student Achievement

Cheng (1994) investigated how principal leadership is related to school performance in terms of multi-level indicators such as school organizational characteristics, teacher group-level and individual-level performances, and student performances. Data were taken from Cheng's ongoing research project "Education Quality in Hong Kong Primary Schools: Indicators and Organizational Determinants." This study was a cross-sectional survey, involving 190 primary schools. The sample included 678 classes of mainly grade 6 students, 21,622 students, and 3,872 teachers. The validity and reliability of all instruments were documented in the pilot study and past studies. The independent variable is the measure of principal leadership described by five measures: (a) human leadership, (b) structural leadership, (c) political leadership, (d) symbolic leadership, and (e) education leadership. Dependent measures included the following: (a) student performance, (b) teacher individual-level performance, (c) teacher

group-level performance, and (d) organizational factors. The researchers used self-reporting to obtain data for dependent measures.

The Pearson correlation analysis of the five dimensions of principal leadership was very high, ranging from 0.82 to 0.92, showing that the dimensions are correlated substantially. The principal component analysis revealed one factor that all five dimensions loaded on with an eigenvalue of 4.5 and 90.0% of the explained variance. The researchers constructed a measure of “strength of leadership” based on these findings. According to the results of the contingency table analysis and t-tests, there was no relationship between strength of principal leadership and the principal’s demographic characteristics or school demographic characteristics (Cheng, 1994).

The correlation coefficients indicated a strong relationship between strength of the principal’s leadership and organizational characteristics with statistically significant ($p < 0.001$) positive correlations for all dimensions of organizational effectiveness except formalization, which was not significant, and hierarchy of authority, which had a negative correlation. Strong leadership had a statistically significant positive correlation with all teacher group-level performance indicators except intimacy, which was still positive but not statistically significant. All teacher individual-level performance indicators had a statistically significant positive correlation to strong leadership, except for social satisfaction and feeling of job meaning, which were still positive but not significant. Two student performance measures had a statistically significant positive correlation to strong principal leadership: attitude towards school and attitude towards learning. Other measures of student performance were positive, except for the perception of homework overload and intention to drop out (Cheng, 1994).

These results indicate a strong relationship between principal leadership and teacher performance. This reinforces the need for development of strong leadership in ineffective schools. These results indicate the effect of principal's leadership on student performance may be indirect. Cheng suggests that strong principal leadership has a direct positive effect on organizational characteristics and teacher performance, which in turn may have an effect on student performance. Though the student performance variables in this study did not include achievement scores, the author suggested an indirect relationship between leadership and achievement since leadership was shown to directly affect teacher performance (Cheng, 1994).

Heck, Larsen, and Marcoulides (1990) tested a theoretical causal model concerning how elementary and secondary school principals could influence student achievement through the frequency of implementation of certain instructional leadership behaviors. The authors proposed a model showing how governance indirectly affected student achievement through school climate and instructional organization. The sample included 118 public elementary and high schools in California that had scored above or below their "comparison band" test scores at either the third- and sixth-grade levels or twelfth grade in reading and math for three consecutive years (1984-1986), as measured by the California Assessment Program. The authors used regression techniques to standardize for socioeconomic status and language background factors present in the student population. The authors used this technique to identify schools that either outperformed or underperformed for several years across grade levels, after controlling for demographic factors. The authors also imposed additional criteria including questionnaire return rate and tenure of the principal. The final sample tested included

168 teachers and 30 principals in 30 schools, or about one quarter of the schools that could have been in the study had no criteria for inclusion been imposed.

The principals and teachers responded to Larsen's Instructional Activity Questionnaire (1987, as cited in Heck, Larsen, & Marcoulides, 1990) that considered variables measuring relative frequency of implementation of 34 instructional leadership behaviors of the principal. The instrument was selected based upon acceptable validity and reliability in previous studies. The authors used a five-point, Likert-type scale with responses ranging from "*never*" to "*always*" to construct the variables. The authors used confirmatory factor analysis to identify 22 of the 34 behaviors they believed to be most strongly identified with instructional leadership. All subscales in the final version had internal consistency coefficients ranging from 0.7 to over 0.9 (Heck, Larsen, & Marcoulides, 1990).

The authors used structural equation modeling to describe how they believed student achievement was influenced both directly and indirectly by latent variables, and how these latent variables are related to the observed variables. The three independent variables were management of the school's governance structure, school instructional organization, and school climate. The dependent latent variable was school student achievement (Heck, Larsen, & Marcoulides, 1990).

Findings indicated that principals in high-achieving schools involve teachers in instructional decision making to a much greater extent than in low-achieving schools. Direct-effects of principal instructional leadership on student achievement were about equally divided between both mediating variables – school climate and instructional organization (Heck, Larsen, & Marcoulides, 1990). This supports the claim that the

principal has an indirect effect on student achievement through developing a positive school climate and organizing the school for instructional success.

Johnson, Livingston, Schwartz, and Slate (2000) reviewed research studies to identify factors considered to be determinants of an effective school. Many of these studies focused on the nature of leadership within the school. The investigation was conducted through extensive literature searches that reviewed studies published from 1975 to 2000 that identified factors considered by different stakeholders to be determinants of an effective school. Findings revealed that limited information was available from the constituents closest to the students – teachers and parents. Teachers recognized the importance of effective leadership and people-centered management. The literature suggested that principals who demonstrate support and caring for their teachers and students, who provide instructional leadership, and who involve parents and community members are more likely to have effective schools. The authors stressed that no single factor defines an effective school. The collaborative nature of the high-achieving schools reflected in this review supports the case for distributed leadership.

Hallinger and Heck (1996) reviewed the empirical research on the relationship between the principal's role and school effectiveness during the period from 1980 to 1995. Studies chosen for the review measured principal leadership as an independent variable and school performance as a dependent variable. Most of the studies were quantitative, cross-sectional, correlation design with survey as the main form of data collection; some were qualitative. The authors developed five categories of studies adapted from the Pitner model (as cited in Hallinger & Heck, 1996): (a) direct-effects, (b) direct-effects with antecedent effects, (c) mediated-effects, (d) mediated-effects with

antecedents, and (e) reciprocal-effects. Findings from direct-effect studies revealed no effects or weak effects of principal leadership on school performance. Researchers have used more sophisticated methodologies to study the context of school leadership and performance in other studies. Findings from mediated-effect studies indicated the leadership construct was theoretically linked to intervening variables and student performance. These findings correlated with the two previously mentioned empirical studies (Cheng, 1994; Heck, Larsen, & Marcoulides, 1990). The authors concluded that the impact of principal leadership was achieved through indirect means (e.g., school climate, school culture, instructional organization) and called for further research into the complex relationship of the principal and the schoolhouse.

Louis, Dretzke, and Wahlstrom (2010) investigated three different school leader behaviors that have been under the microscope in recent studies: (a) instructional leadership (which focuses on improving classroom pedagogy), (b) shared leadership (which emphasizes the engagement of leaders at many levels, and (c) trust (which focuses on the importance of emotions and emotional intelligence in motivating high performance). The authors connected them to student achievement through their impact on teachers' work. The authors' chose to focus on elementary and secondary schools. The authors asked the following research questions:

1. Do three specific attributes of leadership behavior—the sharing of leadership with teachers, the development of trust relationships among professionals, and the provision of support for instructional improvement—affect teachers' work with each other and their classroom practices?

2. Do these leadership behaviors and attributes of formal school leaders contribute to student achievement (Louis, Dretzke, and Wahlstrom, 2010)?

The authors used data from 2005 and 2008 teacher surveys developed for a US research project funded by the Wallace Foundation. The quantitative sample included 157 schools and the teachers and administrators who were members. The authors deliberately used an equal number of elementary and high schools. Measures of student achievement were derived from school-level scores on the states' tests used for measuring AYP in response to NCLB. The independent variables used in the study were confirmed by factor analysis to load on the constructs. The variables used were: (a) focused instruction, (b) teacher's professional community, (c) shared leadership, (d) instructional leadership, and (e) trust in principal. The dependent variable was student achievement and was measured by the percentage of students attaining proficiency on language and math tests.

The authors used paired-sample *t* tests to compare mean ratings on the variables to determine whether there were differences between schools, and hierarchical multiple regression to examine the moderating effects of school level on relationships in the framework. The authors used structural equation modeling to examine the direct and indirect effects of leadership on achievement. The authors only reported results for math achievement, although they cite similar results to data from the literacy state test (Louis, et al., 2010).

The results suggested that professional community and trust were the only significant predictors suggesting that relationships among adults in the school, whether principal–teacher or teacher–teacher, led to stronger focused instruction. Further

regression results suggested that while instructional practices had the most effect on achievement, this effect was increased when principal leadership was added to the model. Overall, adding leadership variables and the building level control variable more than doubled the percentage of variance in math achievement that was explained (Louis, et al., 2010). The authors assumed that instructional leadership might have a direct relationship with classroom practices, since their measures incorporate discussions of practice between teacher and principal. Shared leadership and trust, however, were assumed to have an indirect relationship with classroom instructional practice. They assumed professional community would not have a direct effect on students because students experience classrooms but not the conversations that occur among teachers. It was found to have a significant indirect effect on achievement due to its strong relationship to focused instruction (Louis, et al., 2010).

Leithwood, Patten, and Jantzi (2010) tested the new concept “The Four Paths” of how leadership influences student learning. The authors conceptualized leadership as flowing along the following four paths toward student learning: (a) Rational, (b) Emotions, (c) Organizational, and (d) Family. Each path has different variables that have different effects on learning. They hypothesized that leaders increase student learning by improving the condition or status of selected variables on the paths.

The authors collected data as part of a 5-year evaluation of a provincially sponsored project in a Canadian province aimed at improving elementary school student achievement in language and math by improving the quality of leadership in schools. The authors collected survey data from principals and a sample of their teachers regarding distributed leadership. The sample included approximately 1,200 principals and the

majority of the province's 72 schools districts. Evidence used in the study to measure the variables was provided by 1,445 teachers in 199 schools. The authors conducted a confirmatory factor analysis on all measures of variables representing each of the Four Paths and correlations between all variables. The authors used math, reading, and writing scores as well as most combinations of these scores as student achievement variables (Leithwood, Parren, & Jantzi, 2010).

The results of this study suggested that principals should focus on the variables that most highly correlate with increased student achievement. The paths overlap and correlate with one another, but the two main variables that leadership influenced that had a positive correlation with student achievement were Instructional Time and Professional Learning Community. There were two variables on the Family Path (Computer at Home and Adult Help) that correlated with student achievement. The authors suggested that principals should try to have more influence on variables on the Family Path, and described the complexities and difficulties with leadership affecting this Path. It was also noted that SES explained more variation in student achievement across schools than did any other single variable or individual Path (Leithwood, et al., 2010).

Leadership has been shown to have a direct effect on change in schools and indirect effects on student growth rates in math. Heck and Hallinger (2009) conducted a longitudinal study to investigate the impact of shared leadership on school improvement. The authors asked two research questions: (a) What is the relationship between distributed leadership and academic capacity when observed over time? and (b) How does distributed leadership impact school improvement capacity and subsequent growth in math?

The authors tested the model by collecting data from students and teachers in elementary schools in a western state in the USA over a four-year period. They gave surveys to each school's teachers on three occasions. Response rates for each survey distribution were above 73 percent. Achievement data from a student cohort were collected in years two, three, and four. The authors used multilevel, longitudinal modeling which enabled representation of initial states of variables and subsequent changes that occurred between them over time (Heck & Hallinger, 2009).

The authors stated that the findings implied the need to distribute particular types of leadership practices and create a sustained focus on strategies aimed at the improvement of teaching and learning. The results also suggested that changes in teacher perceptions of distributed leadership and academic capacity were significantly related to student perceptions of the quality of the school's socio-curricular organizations. This relationship also supported the validity of the proposed school improvement model because the evidence came from different sources. Moreover, even after adding this additional mediating variable to the model, both leadership and academic capacity effects remained significantly related to math growth rates. Also, principal stability contributed positively to teacher perceptions of changed in distributed leadership. The authors called for more systematic empirical study of school leadership and its effects. Powerful effects attributed to school leadership by policymakers have yet to be fully validated through research (Heck & Hallinger, 2009).

Supovitz, Sirinides, and May (2010) examined the effects of principal leadership and peer teacher influence on teachers' instructional practice and student learning. The study employed multilevel structural equation modeling to examine the structural

relationships between student learning and theorized dimensions of principal leadership, teacher peer influence, and change in teachers' instructional practice. The authors used teacher survey and student achievement data from a mid-sized urban southeastern school district in the United States in 2006-2007. The district had 52 schools, 30 elementary schools, 10 middle schools, 8 high schools, and 4 specialty schools. The authors achieved an 81 percent response rate for the survey.

The authors asked the following five research questions:

1. Is principal leadership associated with teacher change in instruction?
2. Is principal leadership associated with teacher peer influence?
3. What is the relative magnitude of the association of principal leadership and peer influence with teacher change in instruction?
4. Is there a relationship between teacher change in instruction and increases in student learning in mathematics and/or ELA?
5. In light of findings from the above questions, what are the indirect relationships among principal leadership, peer influence, change in instruction, and student learning?

The authors used a multilevel structural model with latent variables specified to investigate principal and peer influences on change in teacher instruction as it relates to student learning. The results demonstrated a positive association for both principal and peer influence with teachers' change in instructional practice in both ELA and mathematics. The structural path from principal leadership to peer influence was also shown to be significant in both subjects. Finally, the direct relationship between teachers' change in instructional practice and whole-class change in student learning was

demonstrated for ELA but not mathematics. The authors found empirical evidence that principal leadership influences student learning indirectly through teachers' instructional practices (Supovitz, et al., 2010).

The New Teacher Center (2011) conducted a large scale survey study that described a direct correlation from leadership to student achievement. The TELL Kentucky survey (described in detail in Chapter 3) was given to all Kentucky educators in the state across all grade levels. The survey asked questions about teacher perceptions of working conditions in their school. Two of the working conditions were School Leadership and Teacher Leadership. The report analyzed the relationship between survey responses aggregated to the school level and school performance on the 2011 KCCT for both math and reading for each of the 1,286 schools in the state of Kentucky with a sufficient response rate.

The NTC used multiple regression to determine which of the eight working conditions were significant predictors of student achievement when considering math and reading at certain grade levels. Not all grade levels were included in the analysis. At the middle school level, both School Leadership and Teacher Leadership were significant predictors of student achievement. The authors reported simple correlations using two-tailed tests. Teacher Leadership was significant at the .01 alpha level ($p=.302$), and School Leadership was significant at the .01 alpha level ($p=.249$). In social science, .3 is considered a strong correlation, so it is surprising that Teacher Leadership showed a stronger correlation than School Leadership based on previous research. Also, Teacher Leadership was only above the .3 level for middle school, and not for elementary and high school. Neither Teacher Leadership nor School Leadership were found to have

significant correlations to math and reading achievement in elementary and high schools, though the correlations were positive (NTC, 2011).

The authors used multiple regression and controlled for various environmental factors to better determine whether there is a direct relationship between particular teaching conditions and achievement. The models presented isolate and examine the connection between achievement and teaching conditions to determine its predicted impact. While these models did not allow for a direct, causal link between teaching conditions and student achievement to be established, they ensured that documented relationships were due to perceptions reported on the TELL Kentucky Survey and were not due to poverty, school size, etc., as could be the case with correlation coefficients (NTC, 2011).

For the purpose of continuity in reporting, regression analyses were presented using agreement rates. As a secondary measure for verifying accuracy, regression models were also calculated using factor means. Both methods were found to be within one percent of each other in explaining the variability in the data set that is accounted for by the statistical model. Standardized coefficients were compared to understand the relative influence of teaching conditions controlling for other variables (NTC, 2011).

The model for middle school performance was robust and explained 65 percent of the variance in students scoring proficient or above. Teaching conditions accounted for approximately 11% of the total variance explained. The results for leadership were surprising. School Leadership related negatively to school level performance. For every percent increase in agreement on questions in the School Leaders area, aggregate student performance declined .165 percentage points and was significant at the .05 alpha level.

This was also true for high school, as aggregate student performance declined .11 percentage points, but was not considered statistically significant ($p = .065$). This is perplexing. The authors suggested a few explanations for this result. One explanation for this finding may relate to the immediate outcome of instituting new school leadership. Often, new leadership brings initial questioning as educators slowly adapt to new changes in culture, process, etc. even when these may be viewed as positive changes outside the schools. Getting educators “on board” with new ways of working together and seeing an impact on school performance may not be realized until long after the intervention occurs (NTC, 2011).

Both School and Teacher Leadership had positive correlations with estimated teacher retention rates ($p=.424$ and $.423$, respectively). Also, the authors found poverty to have significant negative correlation of $.421$ significant at the $.000$ alpha level (NTC, 2011). These results call for more investigation of the TELL Kentucky Survey data to further investigate the relationship between teachers’ perceptions of leadership and student achievement.

Summary

The previous studies link principal leadership to indirect effects on student achievement, and suggested a need for distributed leadership through teacher leaders. In general, findings indicated that the principal does make a difference in student learning, but closer examination of the condition under which this effect is achieved is needed. Current research indicated that the effect of the principal on student learning is indirect. This does not discount the importance of the principal in improving student outcomes,

but instead suggests a need for distributed leadership using the instructional strengths of teachers.

Researchers have gone as far as stating that it is difficult for one to arrive at a coherent understanding of how leadership influences student learning given that the empirical evidence is relatively confusing (Leithwood, et al., 2010). Much of the research can be left up to interpretation and speculation. This solidifies the challenge given to school leaders to determine which variables have the most significant correlation to student achievement, and how principals can make all the changes necessary to create an organizational structure in the school that is conducive to teacher leadership. Determining which of these variables is most important needs to be investigated more in depth in the literature.

In conclusion, the benefits of both teacher leadership and professional learning communities are vast for both school culture and student achievement. Teacher learning communities are uncommon in U.S. schools (McLaughlin & Talbert, 2006); therefore, strong leadership is required to begin implementation of this type of reform. Principals must distribute leadership among teachers to use the teachers' expertise with instruction and gain buy-in with the entire faculty. The TELL Kentucky survey provides a valid and reliable method to gather teachers' perceptions of both Teacher and School Leadership. The following section states research questions used in this study.

Research Questions

The following research questions were used in this study to examine the quantitative relationships between leadership and student achievement:

1. Is there a significant canonical correlation between the leadership construct variable set (Teacher Leadership and School Leadership) and the student achievement variable set (Achievement, Gap, and Growth)?
2. Is there a significant interaction effect of Teacher Leadership and School Leadership on Achievement, Gap, and Growth scores?
3. Is there a significant main effect of Teacher Leadership on Achievement, Gap, and Growth scores?
4. Is there a significant main effect of School Leadership on Achievement, Gap, and Growth scores?

CHAPTER III

METHODOLOGY

The purpose of this study was to examine the relationship between teacher perceptions of leadership constructs (Teacher Leadership and School Leadership) and student achievement on the Kentucky K-PREP assessment (Achievement, Gap, and Growth). Specifically, is there a significant relationship between teacher perceptions of leadership constructs and student achievement? Furthermore, is there a significant difference in student achievement when comparing schools with high, medium, and low teacher perceptions of leadership? This chapter explains the study design, instrumentation, data collection, and statistical analysis used to answer the research questions.

Research Questions

The following research questions addressed the relationship of leadership constructs to student achievement:

1. Is there a significant canonical correlation between the leadership construct variable set (Teacher Leadership and School Leadership) and the student achievement variable set (Achievement, Gap, and Growth)?
2. Is there a significant interaction effect of Teacher Leadership and School Leadership on Achievement, Gap, and Growth scores?

3. Is there a significant main effect of Teacher Leadership on Achievement, Gap, and Growth scores?
4. Is there a significant main effect of School Leadership on Achievement, Gap, and Growth scores?

Research Design

The author used a non-experimental correlational design using a nonrandom sample of existing data. This study was considered non-experimental because no variable in the data set was manipulated. The sample was not considered random because no students or teachers were randomly assigned groups for experimental purposes. This study employed two quantitative research designs. First, pre-existing data were gathered from a cross-sectional survey study. Second, explanatory correlational research was used to allow for the examination of the extent to which perceptions of leadership and student achievement co-vary – that is, where changes in one variable reflect a change in the other. Specifically, canonical correlation and 3 x 3 factorial MANOVA were used to identify relationships between the leadership variables and student achievement variables. The sample included a population of Kentucky teachers and students. Pre-existing data were obtained from the 2013 administration of the Kentucky Teaching, Empowering, Leading, and Learning (TELL) Survey for leadership perceptions, and from the 2013 Kentucky Core Content Test (KCCT) for student achievement data.

Instrumentation

Two instruments were used for secondary data. The 2013 Teaching, Empowering, Leading, and Learning (TELL) Kentucky survey provided data on teacher

beliefs about working conditions in schools. For the purpose of this study, the leadership constructs within the data were the focus. The 2013 Kentucky Core Content Test provided data regarding student achievement.

TELL Kentucky Survey. Teachers need supportive school environments that maximize their opportunity to be effective to do their best work with students. With the leadership of Governor Steve Beshear and Commissioner Holliday, the Kentucky Department of Education (KDE) and a coalition of education stakeholders working within the New Teacher Center (NTC), administered the second iteration of the Kentucky Teaching, Empowering, Leading and Learning Survey. The TELL Kentucky Survey assessed whether educators across the state report having the resources and supports necessary to facilitate effective teaching. Findings from this initiative informed school improvement planning (New Teacher Center [NTC], 2013a).

The TELL survey originates from extensive work by the North Carolina Professional Teaching Standards Commission (NCPTSC) beginning in 2001 and is given in nine states. The NCPTSC conducted a literature review and analyses of state and national survey data from the National Center for Education Statistics' School and Staffing Survey to better understand the factors that contribute to teacher satisfaction and employment trajectories. Based on these efforts, the NCPTSC identified the following areas: (a) time, (b) empowerment, (c) leadership, (d) decision making, and (e) facilities and resources as related to future employment plans (NTC, 2013b).

The TELL Survey incorporates these constructs and includes others logically and empirically linked to outcomes of interest, teacher retention and student learning. These constructs include: student behavior support, community support, and instructional

practices and support. Based on the NCPTSC-identified areas and an external validation study, the TELL Survey currently includes the following eight constructs:

- time,
- facilities and resources,
- community support and involvement,
- managing student conduct,
- teacher leadership,
- school leadership,
- professional development, and
- instructional practices and support (NTC, 2013b).

The survey also includes questions for novice teachers to assess induction support and for principals to assess district-level supports (NTC, 2013b). The author focused on two constructs for this study: Teacher Leadership and Principal Leadership.

Reliability and validity analysis. This section describes the methods used by external and internal analysts to verify that the structure and items included in the TELL Survey result were in meaningful and useful information. This work was part of the MET Project supported through the Bill and Melinda Gates Foundation (Swanlund, 2011). The Swanlund analyzed data from 286,835 educators from 11 states across the U.S. The external survey review examined both validity and reliability. These analyses identified patterns in the data that provide a clear structure for the survey and confidence for interpreting the results (NTC, 2013b).

Reliability testing ensures the survey instrument produces the same results across repeated measures either within the same population or with a similar population

(Dillman, 2000). The external review analyzed reliability using both the Rasch model person separation reliability and Cronbach's alpha. The Swanlund (2011) study concluded the survey was capable of producing consistent results across participant groups. In summary, the external analyses confirmed the TELL Survey offers a robust and statistically sound approach for measuring teaching and learning conditions, including leadership.

The term validity generally refers to the process of ensuring the survey accurately measures what it is intended to measure (Dillman, 2000). The internal validity testing conducted for the TELL Survey assesses the structure of the response scale and the alignment between survey items and broader survey constructs. The review used the Rasch Rating Scale Model to examine the item-measure correlations, item fit, rating scale functioning, unidimensionality, and generalizability of the instrument. This analysis prompted several edits including a four-point Likert scale rather than a six-point Likert scale. Some survey constructs were broken into multiple constructs, and one construct was added resulting in a final total of eight constructs. Also, there were some items that overlapped in the leadership constructs and will be reviewed separately for analysis (NTC, 2013b).

In addition to the external analyses, NTC conducted internal analyses of validity and reliability to verify the stability of the instrument across survey populations as promoted by industry standards found in the Standards for Educational and Psychological Testing (American Research Association, American Psychological Association, and National Council on Measurement in Education, 1999). The internal reliability testing

for TELL Kentucky include generating internal consistency estimates and test of validity include conducting factor analyses (NTC, 2013b).

The data for these analyses include 43,761 respondents out of a reported 50,500 school-based licensed educators in Kentucky, yielding a response rate of 87 percent. Respondents include several categories of educators: 88% are teachers, 5% are administrators, and 7% are other licensed educators, such as librarians and school psychologists (NTC, 2013a).

The internal validity analyses assessed the degree to which the 2013 TELL Kentucky Survey measured the eight theoretical constructs it is intended to capture. The NTC conducted a factor analyses to group variables with similar characteristics together. The NTC performed confirmatory factor analysis and varimax rotation procedures to verify the actual structure of the data reflected the expected structure of the previous validity studies. The researchers specified an eight factor confirmatory factor analysis. All eight factors had eigenvalues greater than one. The eight factors contributed at least ten percent of the variance and together explained 64% of the variance (NTC, 2013b). The internal validity testing for TELL Kentucky confirms that the survey is generalizable and will produce similar results with similar populations.

The reliability analyses for TELL Kentucky produced Cronbach's alpha coefficients ranging from .86 to .95. Alphas normally range between 0.00 and 1.00. The closer the Cronbach's alpha coefficient is to 1.00 the greater the internal consistency of the items in the scale. Alpha coefficients above .70 are considered acceptable (Dillman, 2000). All eight alpha coefficients are high and above .70 confirming internal consistency of the TELL Kentucky Survey constructs. The Cronbach's alpha coefficient

for teacher leadership and principal leadership were .93 and .95, respectively (NTC, 2013b).

Unbridled Learning. Student achievement in Kentucky was measured by the Next-Generation Learners accountability model. This model is anchored in college and career readiness for all students. Like previous accountability models, it continued annual public reporting of disaggregated student outcome measures in math, reading and science to assess school performance. However, this more robust next-generation model also includes student achievement growth measures, emphasis on college and career readiness, high school graduation rates, student achievement in writing and social studies, and increased focus on the lowest-performing schools. Additionally, the new accountability holds all schools and districts accountable for improving student performance and creates four performance classifications that determine consequences and guide interventions and supports. Schools and district classifications were based on the following measures: (a) Achievement (Content Areas were reading, mathematics, science, social studies and writing.); (b) Gap (percentage of proficient and distinguished) for the Non-Duplicated Gap Group for all five content areas; (c) Growth in reading and mathematics (percentage of students at typical or higher levels of growth); (d) College Readiness as measured by the percentage of students meeting benchmarks in three content areas on Explore at middle school; (e) College/Career-Readiness Rate as measured by ACT benchmarks, college placement tests and career measures, and (f) Graduation Rate (KDE, 2013b).

The construction of the test forms for K-PREP was a coordinated effort between KDE and the testing contractor, adhering to guidelines that promote fair and ethical

testing practices. However, the process of constructing test forms begins with the development of the content, writing and reviewing items that assess the content appropriately. Using the content developed for testing, specialists worked together to assess the appropriateness of the content including, when obtained, using data to determine the statistical quality of the content (KDE, 2013b).

Reliability. Reliability is the consistency of the results obtained from a measurement. In terms of student achievement, when a score is reported for a student, there is an expectation that if the student had instead taken a different but equivalent version of the test, a similar score would have been achieved. A test has little or no value is the test does not measure student ability and knowledge consistently. Furthermore, the ability to measure consistently is a prerequisite to making appropriate interpretations of scores on the measure; that is, showing evidence of valid use of the results (Dillman, 2000).

Test-retest reliability estimation is not used on the Kentucky assessment because students never take the same test twice under any circumstance. Also, test-retest would use a long interval between testing sessions due to Kentucky's assessment windows, and would likely result in student growth in knowledge of the subject matter. Alternate forms reliability estimation was not appropriate because students do not take more than one form of the test (KDE, 2013b).

Internal consistency methods use a single administration to estimate test score reliability. For state assessments where student testing time is at a premium, internal consistency procedures have a practical advantage over reliability estimation procedures requiring multiple tests. Probably the most frequently used internal consistency

reliability estimate is the coefficient alpha, which is based on the assumption that the inter-item covariance constitutes true-score variance and the fact that the average true score variance of items is greater than or equal to the average inter-item covariance. Coefficient alpha estimates for each overall test and by item type are provided for each grade and subject on the K-PREP assessment (KDE, 2013b).

Scores are provided for each performance indicator, in addition to the total score for the content areas. Reliability at the domain level, though, will generally be lower than total score reliability because reliability is influenced by the number of items, as well as their covariance. In some cases, the number of score points associated with a domain score was small. Results involving domain scores must be interpreted carefully, as in some cases these measures have low reliability due to the limited number of points attached to the score. The test creators also used the standard error of measurement to express score inconsistency. This was reported for total scores and domain scores for the overall testing population, gender, ethnicity, and other student breakout groups. The conditional standard errors of scale scores are provided in the raw and scale score conversion tables (KDE, 2013b).

Scoring reliability for open-ended items included the between-reader agreement observed in the required second reading of all On-Demand Writing test responses and a percentage of students' short-answer and extended-response item responses for Reading, Mathematics, Science, and Social Studies. These data were monitored on a daily basis by Kentucky's testing contractor during the scoring process. Reader agreement data showed the percentage perfect agreement of each reader against all other readers (KDE, 2013b).

Validity. Validity is the process of collecting evidence to support inferences from assessment results. A prime consideration in validating a test is determining if the test measures what it is intended to measure (Dillman, 2000). The test makers used validity argument, which is an explicit scientific justification of the degree to which accumulated evidence and theory support the proposed interpretations of the test scores. For the Kentucky assessment, the stages of scoring, generalization, extrapolation and implication were used. Scoring validity included the scoring of performance items, and model fit and scaling. Scree plots for the principal component analyses for each subject and grade were given in the Yearbook. These results provided evidence that Kentucky assessment measures a single dimension. Item-total correlation was calculated between the item and the total test score (KDE, 2013b).

The tests of the Kentucky assessment system are based on content standards and benchmarks along with extensive content limits that help define what is to be assessed. Committees of educators collaborate with item-development experts, assessment experts and Kentucky Department of Education staff annually to review new and field-tested items so that tests adequately sample the relevant domain of material the tests are intended to cover. These committees participated in the process to further advance test content validity for each test. Subject matter experts from the field of education were recruited to develop test content for K-PREP. Item writers were trained on the Common Core, which was essential to address interpretations of the standards so that all K-PREP assessment content was developed to the same guidelines. The Kentucky Department of Education reviewed the assessment content and aligned to Common Core for appropriateness. Content specialists review each piece of assessment content and recommend

modifications to Common Core alignments. KDE also held item review workshops where participants review each piece of assessment content for its Common Core alignment, in addition to reviews for content appropriateness. Committees also examined items for ethnic or cultural bias, and were trained on how to avoid economic, regional, cultural and ethnic biases when writing items (KDE, 2013b).

Throughout the item development process, quality control was instituted in a variety of ways. Multiple staff persons from the testing contractor worked with and consulted over the items. They also used universal design review by providing checks on bias and sensitivity issues on the item, artwork, and stimuli. Scoring rubrics were reviewed for what could lead to errors or other issues in hand scoring (KDE, 2013b).

In summary, the empirical validity evidence for the scoring and the generalizability validity arguments for Kentucky assessment is quite strong. Reliability indices, model fit and dimensionality studies provided consistent results, indicating the Kentucky assessment is properly scored and scores can be generalized across settings.

Sample Size

The sample for this study included 1033 Kentucky elementary, middle, and high schools. Some schools were eliminated based on certain criteria. The sample included schools with a 60% or higher response rate. Only schools with K-PREP data were included in the sample; this excluded alternative schools, day treatment facilities, preschools, etc. Also, schools with two or more sets of achievement data and only one set of TELL data were excluded from the sample. For example, some K – 12 schools have three sets of achievement data (elementary, middle, and high), but only one set of TELL responses. Since the author could not separate responses by grade level, those schools

had to be excluded from the sample. The final sample of 1033 schools included 72% of Kentucky schools. The final response rate of the schools used in the sample was 88.5% and included responses from 43,759 educators in Kentucky.

Procedures

The data used in the study were considered secondary data. Once approval was secured for the study from the university institutional review board, data analysis began. Open data banks from various websites provided data for the TELL survey and K-PREP student achievement. K-PREP data was found on the KDE website (KDE, 2014). Data from the TELL Kentucky Survey was also found on the internet, but did not provide specific demographic information or individual teacher responses to conduct validity and reliability analysis. The author completed a data request form from the New Teacher Center ensuring participant anonymity and ethical use of data. The New Teacher Center honored the request, and provided individual teacher responses with demographic data and a code file for the entire TELL Kentucky data set. The Statistical Package for the Social Sciences (SPSS) version 18 was used to conduct all statistical procedures.

The data bank from the Kentucky State Report Card (KDE, 2014) provided test score summary information and school demographics. These reports provided information for educators and administrators to compare student achievement at various levels. The state summary report provided a summary of test performance for all students within a school for a particular subject and grade, along with summary information at the district and state level for comparison. This report provided the percentage of students in each performance level along with percentages at the district and state levels. The mean scores by domain (“reporting category”) are also presented

for the school, in addition to the mean scores at the district and state levels. The school summary report also provided percentages of the school's students that fall above and below the mean scores from the school, district, and state levels. For achievement comparisons at the national level, this report provided the percentage of students in each percentile rank quarter at the school, district, and state level.

Variables

Student achievement variables. One set of variables for the study were student achievement variables provided by Kentucky School Report Cards from an online data base (KDE, 2013). They were gathered from the Next-Generation Learners (NxGL) component of Kentucky's accountability system. The component included multiple measures of student performance on tests and student accomplishments of graduation and readiness for college or career. Reporting was organized into five categories: (a) Achievement, (b) Gap, (c) Growth, (d) College/Career Readiness, and (e) Graduation Rate. Graduation Rate and College/Career Readiness were not included in the analysis because they are not available for all grade levels. Accountability was based on students enrolled 100 days, or a full academic year (KDE, 2011b).

Achievement. Achievement reported student performance in the five content areas of reading, mathematics, science, social studies, and writing (on-demand and language editing and mechanics). Points were awarded based on a formula for student performance levels of Novice, Apprentice, Proficient, and Distinguished (KDE, 2011b).

Gap. Gap creates a single student gap group that includes students with membership in the following groups as required by federal guidelines: (a) African-American, (b) Hispanic, (c) Native American, (d) students with disabilities, (e) poverty

(qualified for free or reduced price lunch), and (f) limited English proficient. The student performance levels of novice, apprentice, proficient, and distinguished were reported for this non-duplicate group, meaning students may qualify for more than one Gap group but were only counted once (KDE, 2011b).

Growth. A statistical program generates a Student Growth Percentile by comparing an individual student's score to the student's score to the student's academic peers using two years of test scores. Growth is reported for reading and mathematics in grades four through eight and at grade eleven (KDE, 2011b).

Leadership variables. The independent variables for the study were the leadership constructs for the TELL Survey. The author wanted to explore the correlations between student achievement, and Teacher Leadership and School Leadership.

Teacher leadership. The TELL Survey consists of sixteen items regarding teacher leadership. After the factor analysis conducted by NTC, eight of those items loaded on the teacher leadership construct. Those eleven items were used for data analysis in this study and are displayed in Appendix A.

School leadership. The TELL Survey consists of twenty items regarding school leadership, with five of those items dealing with SBDM. After the factor analyses conducted by NTC, eleven of those items loaded on the school leadership construct and were used in this study. They are displayed in Appendix A.

Statistical Analysis

Validity and reliability analysis. The New Teacher Center (2013b) conducted internal and external validity and reliability analyses. These were repeated in this study

to ensure accuracy. First, the confirmatory factor analysis, using principal components analysis and varimax rotation procedures was repeated for the current study to ensure validity. The entire data bank and all responses were used for validity analysis. The reliability analysis was repeated to obtain Cronbach's alpha coefficients to ensure that the survey was generalizable and would produce similar results with similar populations. Only responses for this particular study were used in the reliability analysis; therefore, results may differ slightly from those of the New Teacher Center (2013b). Cronbach's alphas of .70 and higher were kept as part of the leadership constructs.

Descriptive statistics. The author computed descriptive statistics to identify basic summary information about the variables, including means for student achievement data and percentage of student in poverty reported by percent of free and reduced lunch students. This data for the sample was compared to data from the entire state of Kentucky to determine if the sample was generalizable.

Canonical correlation. The author used canonical correlation to address the first research question: What are the relationships between the leadership factors on the TELL Survey and student achievement? According to Stevens (2002), canonical correlation analysis "is appropriate if the wish is to parsimoniously describe the number and nature of mutually independent relationships existing between the two sets" (p. 471). Canonical correlation is appropriately used for studying the degree of relationships between two variable sets when each set consists of at least two variables (Thompson, 2000). Specifically, canonical correlations allows for the examination of maximum linear combinations of Pearson correlation between the leadership and achievement variable sets. Canonical correlation analysis reduces the likelihood of Type I error.

Scholars refer to the independent and dependent variables as canonical covariates that are correlated to produce canonical roots. The canonical roots are analogous to principal components in factor analysis, except they seek to maximize the between-group variance. In canonical correlation, the canonical roots are also called canonical variables.

Canonical correlation has advantages over other multivariate techniques. Unlike multiple regression analysis, which can predict the value of a single continuous dependent variable from a linear function of a set of independent variables, canonical correlation facilitates the study of interrelationship among sets of multiple variables. A researcher can look at relationships between sets and within sets of variables using canonical correlation. This technique also places the fewest restrictions on the types of data on which it operates, and is the most appropriate and powerful multivariate technique when multiple variables in sets need to be studied (Hair, Anderson, Tatham, & Black, 1998). For this study, examining the within set correlations was important to see the relationships between the leadership constructs.

The results of canonical correlation analyses yield multiple canonical functions that maximize the correlation between the linear composites, also known as canonical variates. Unlike other multivariate techniques, the classification of variables as independent or dependent is of little importance for the statistical estimation of the canonical functions, because canonical correlation analysis weights both variates to maximize the correlation and places no particular emphasis on either canonical variate. These functions are sets of standardized coefficients (from the two linear equations) that indicate the relationships between the variable sets. In addition, canonical correlation of an analysis is the Pearson r relationship between the two canonical variates on a given

canonical function. The canonical correlation represents the bivariate correlation between the two canonical variates, and thus indicates the strength of the overall relationship between the variates. Canonical correlation reduces the likelihood of experiment-wise Type I error, acknowledges that the sets of variables are related, and might simultaneously co-exist (Zientek & Thompson, 2009).

Examining how the leadership constructs (Teacher Leadership and Principal Leadership) relate to the student achievement variables (Achievement, Gap, and Growth) provided insight into the variable sets shared variance. In canonical correlation, multiple variables are defined as two sets of measures. The relationship between these sets of variables is broken down by forming orthogonal functions of the two sets of variables that are uncorrelated to each other to maximize the relationships between the variable sets (Zientek & Thompson, 2009). These uncorrelated pairs are used to obtain additive partitioning of the total association between the sets of measures (Stevens, 2002; Zientek & Thompson, 2009). The correlations between the pairs of linear combinations – the unobserved latent variables, also known as canonical variates, are the canonical correlations. The canonical variates maximize the relationship between the two variable sets that they represent by weighting each person's or school's data, and summing the weighted scores within each variable set (Thompson, 2000). The square of the canonical correlations, the multivariate squared canonical coefficients (Rc^2), are an estimate of the proportion of variance shared linearly by the two canonical variates derived from the two variable sets (Thompson, 2000).

As described, canonical correlation finds the linear combination of the two sets of measures by differentially weighting them to obtain the maximum possible correlation

between the two variable sets (Pedhauzer, 1997). Once this is achieved, the procedure then locates another pair of linear combinations that maximizes the possible correlation, which is uncorrelated to the first root. Canonical correlation works on the assumption of uncorrelated means including: (a) the correlation coefficient between any two variables is based on a linear relationship, and (b) canonical variates are uncorrelated across sets and linear (Stevens, 2002). Canonical correlation can accommodate any continuous variable without the strict assumption of normality, but it is highly recommended because multivariate normality is required for the statistical inference test of significance of each canonical function. Homoscedasticity and multicollinearity should also be remedied to make interpretation reliable (Hair, et al., 1998).

The maximum number of canonical correlations obtainable in the data for this study was two, as it relates to the number of variables in the smaller set of variables which are the two leadership constructs (Zientek & Thompson, 2009). In canonical correlation, the first few canonical variates account for most of the association between the sets of measures. Successive pairs of canonical variates are based on residual variance, and their respective canonical correlations become smaller as each additional function is extracted. Each of the pairs of variates is orthogonal and independent of all other variates derived from the same set of data. The strength of the relationship between pairs of variates is reflected by the canonical correlation. The canonical correlation squared represents the amount of variance in one canonical variate accounted for by the other canonical variates. Squared canonical correlations are called canonical roots or eigenvalues (Hair, et al., 1998).

To determine how many possible canonical correlations indicate statistically significant relationships between the variable sets, tests of statistical significance were conducted that relied on an approximation similar to the χ^2 distribution (Stevens, 2002). Interpretation of the canonical variates in a significant function is based on the premise that variables in each set that contribute heavily to shared variances for these functions are considered to be related to each other. Hair, et. al. (1998) recommend three criteria be used in conjunction with one another to decide which canonical functions should be interpreted. The three criteria were: (a) level of statistical significance of the function, (b) magnitude of the canonical correlation, and (c) redundancy measure for the percentage of variance accounted for from the two data sets. Additionally, standardized canonical coefficients (shows relative contribution of each variable to its variate) and canonical structure coefficients (shows correlation between original variable and its variate) will be examined for interpretation. The level of significance used for this study was .05, and is considered the minimum acceptable for interpretation. Regardless of the results of these tests, it was deemed important to examine the canonical functions to determine the extent to which particular variables contributed to the identified multivariate relationship.

3 x 3 factorial MANOVA. The author used multivariate analysis of variance (MANOVA) to answer the Research Questions 2 – 3 which generally ask: Do differences exist between Teacher Leadership and Principal Leadership on student achievement? According to Stevens (2002), MANOVA has the potential to lead to more powerful tests by reducing within cell variance and allows the examination of effects of independent variables on dependent variables. MANOVA is used to examine the main and interaction effects of categorical variables on multiple dependent interval variables.

MANOVA uses one or more categorical independent variables as predictors, like ANOVA, but unlike ANOVA, there is more than one dependent variable. Where ANOVA tests the differences in means of the interval dependent for various categories of independent variables, MANOVA tests the differences in the centroid of means of the multiple interval dependent variables, for various categories of the independent variables. Post hoc comparisons can be performed to see which values of a factor contribute more to the variance of the dependent variables (Garson, 2012b).

The independent variables used for the MANOVA were teacher perceptions of teacher leadership and school leadership. Three groups were created for both Teacher Leadership and School Leadership by dividing the data set into percentiles using the 33rd, 66th, and 99th percentile. This ensured equal cell size for the data analysis. The dependent variables were the 2013 student achievement data set: (a) Achievement scores, (b) Gap scores, and (c) Growth scores.

Wilks' lambda multivariate F statistic identified the overall significance of the model. Statistically significant multivariate F s were followed by univariate analysis of variance (ANOVA) for each dependent variable. Furthermore, statistically significant differences found in ANOVAs were followed by Tukey or Tamhane T2 post hoc tests to determine where difference in means occurs. Additionally, partial eta square (η_p^2) was used to report the percentage of variance in each dependent variable accounted for by the independent variables. Specifically, MANOVA analysis tested the following null hypotheses: There is no significant difference in the leadership group means on the student achievement variables.

Both main effects and interactions effects were interpreted for the data. The interaction effects are interpreted when one is looking for differences among the results of each set of single factor experiments. There is no interaction when the outcomes of the different teacher leadership variables are equal at each level of the of the school leadership variables. When the outcomes of the components differ, an interaction effect is present. The main effects of an independent variable refer to the average of the component single factor experiments making up the factorial design. The main effects examined one level of the independent variables on each dependent variable accounting for the covariates. For instance, one main effect will be the examination of schools in the group categorized by “high teacher leadership” on 2013 Achievement, Growth, and Gap. The main effects are most appropriately interpreted when interaction is absent (Keppel & Wickens, 2004).

CHAPTER IV

RESULTS

The purpose of this study was to examine the relationship between teacher perceptions of leadership constructs (Teacher Leadership and School Leadership) and student achievement on the Kentucky K-PREP assessment (Achievement, Gap, and Growth). Specifically, is there a significant relationship between teacher perceptions of leadership constructs and student achievement? Additionally, differences in student achievement among schools with high, medium, and low teacher perceptions of leadership as evidenced by TELL Kentucky Survey results was examined.

The following research questions addressed the relationship of leadership constructs to student achievement:

1. Is there a significant canonical correlation between the leadership construct variable set (Teacher Leadership and School Leadership) and the student achievement variable set (Achievement, Gap, and Growth)?
2. Is there a significant interaction effect of Teacher Leadership and School Leadership on Achievement, Gap, and Growth scores?
3. Is there a significant main effect of Teacher Leadership on Achievement, Gap, and Growth scores?
4. Is there a significant main effect of School Leadership on Achievement, Gap, and Growth scores?

This chapter reports the statistical results of the factorial multivariate analysis of variance (MANOVA) and canonical correlation, as well as preliminary validity and reliability testing, and descriptive statistics.

Validity and Reliability Analysis

The same factor analysis procedures used by the New Teacher Center (2013b) were repeated to measure the eight theoretical constructs from the TELL Kentucky Survey. The procedure included performing a confirmatory factor analysis, using principal components analysis and varimax rotation procedures. This was repeated to ensure that the data actually reflected what was found in previous validity studies. Data reflected the exact same results as the New Teacher Center (2013b). Specifically, this study focused on Component 6 (Teacher Leadership) and Component 7 (School Leadership). The eigenvalues of Teacher Leadership and School Leadership were 1.63 and 1.56, respectively. This met the Kaiser criterion that suggests only including factor with eigenvalues greater than one (Stevens, 2009). The cumulative percent of variance found explained by the eight factors was 64.02% and was the same as the percentage reported by the New Teacher Center (2013b).

Cronbach's alphas were computed to measure the internal consistency reliability of the scores generated from the measures on the TELL survey leadership items; specifically, internal consistency reliability coefficients greater than or equal to .70 were deemed acceptable (DeVellis, 2012). Responses used in this study were included in the data, not the entire data set provided by the New Teacher Center. Table 1 shows the resulting coefficient alpha estimates, compared against those reported in the literature by the New Teacher Center (2013b). The coefficients observed were of similar magnitude,

and they indicated that teacher responses were fairly consistent across items. The slight difference in correlations was more than likely due to data reduction for the current study.

Table 1

Comparison of Reliability Coefficients

Variable	Number of Items	Coefficient Alpha	
		Current Study	Literature
Teacher Leadership	8	.92	.93
School Leadership	11	.94	.95

Descriptive Statistics

A total of 1033 schools were included in the analysis. Elementary schools accounted for more than half of the sample, with 60.50% of schools including students in grades kindergarten through 5th grade. A total of 21.00% of schools were middle schools with grades six through eight, and 18.50% of schools were high schools with grade nine through 12. The percent of students living in poverty were equal among schools. Table 2 displays descriptive statistics for the sample.

Table 2

Descriptive Statistics for TELL Schools

Level	Achievement	Gap	Growth	% Free/Reduced Lunch
Elementary School				
Mean	21.40	13.34	24.42	54.98%
<i>N</i>	626	626	626	
<i>SD</i>	3.64	3.15	3.15	
% of Total <i>N</i>	60.50%	60.50%	60.50%	
Middle School				
Mean	19.57	11.45	16.62	54.09%
<i>N</i>	217	217	217	
<i>SD</i>	2.91	2.37	1.84	
% of Total <i>N</i>	21.00%	21.00%	21.00%	
High School				
Mean	11.93	6.79	11.24	53.88%
<i>N</i>	191	191	191	
<i>SD</i>	1.97	1.40	1.43	
% of Total <i>N</i>	18.50%	18.50%	18.50%	

A comparison of the sample descriptive statistics to the state descriptive statistics showed that the sample for similar to the entire state. The elementary schools used in the sample had a lower poverty rate, with a free and reduced lunch total of 54.98%. Elementary schools across the state of Kentucky average 65.00% poverty. Student achievement scores were very similar. A comparison of the schools used in this study with the state is shown in Table 3.

Table 3

Sample and State Comparison

Level	Achievement	Gap	Growth	% Free/Reduced Lunch
Elementary School				
Sample Mean	21.40	13.34	24.42	54.98%
State Mean	21.00	12.60	24.00	64.81%
Middle School				
Sample Mean	19.57	11.45	16.62	54.09%
State Mean	19.30	11.20	16.80	56.05%
High School				
Sample Mean	11.93	6.79	11.24	53.88%
State Mean	12.10	6.70	11.40	54.44%

Canonical Correlation

Canonical correlation was used to analyze the relationship between sets of leadership and student academic variables. Canonical correlation is another means of breaking down the association for two sets of variables, and is appropriate if the goal is to parsimoniously describe the number and nature of mutually independent relationships existing between the two sets (Steven, 2009). This analysis identifies the first few linear combinations, or canonical variates, that generally account for most of the between-association. Canonical correlation is useful for analyzing the relation of a set of covariates to a set of continuous dependent variables. The author used the aggregate mean for TELL responses by school. The leadership variables were the aggregate responses from the TELL Kentucky Survey for the Teacher Leadership items and the School Leadership items. The student achievement variables were Achievement, GAP, and Growth scores for each school included in the results that had achievement data and

over a 60% response rate for the TELL survey. Appendix B includes a diagram that visualizes the variables and the examined relationship through canonical correlation.

Canonical correlation is a multivariate statistical model that allows for the examination of maximum linear combinations of Pearson correlations (r_{ulvl}) between the leadership and student achievement variable sets. Using SPSS terminology, the leadership variables were designated as covariates and the student achievement variables were designated as the dependent variable set.

The number of canonical functions is equal to the number of variables in the TELL Survey (Thompson, 1987); therefore, the canonical correlations were restricted to producing only two possible canonical functions (Function 1 and Function 2) in this study. According to Thompson (1978), canonical analysis produces synthetic scores for each participant, similar to the synthetic factor scores used in factor analysis and the predicted dependent variable scores in regression- such scores are the focus of canonical analysis. The statistical significance of the canonical correlations for the two canonical functions as well as multivariate significance was tested.

Canonical correlation assumptions. Stevens (2009) recommends having a very large (1000 or more) number of subjects, or a large subject to variable ratio. Specifically, there should be approximately 20 times the number of subjects than variables in the study if the intent is to examine one canonical root only as in the current study. This study included 1033 subjects, and a subject to variable ratio of approximately 207/1, which met this assumption. Data must be interval level in canonical correlation, and both the student achievement and leadership data set were recorded at interval level.

The tests of significance of the canonical correlations are based on the assumption that the distributions of the variables in the population (from which the sample was drawn) are multivariate normal. Little is known about the effects of violations of the multivariate normality assumption (Garson, 2012a). However, with a sufficiently large sample size the results from canonical correlation analysis are usually quite robust.

Canonical correlation results. Wilks's Lambda, which tests if the canonical correlations are zero, indicated that there was a multivariate significance of the canonical correlations for the two functions generated (Wilks's $\Lambda = .87$, $F = 25.14$, $p = .000$). Further dimension reduction analysis indicated that the first canonical function (Wilks's $\Lambda = .87$, $p = .000$) was statistically significant, but not the second function (Wilks's $\Lambda = .99$, $p = .104$).

The first function accounted for approximately 13% of the explained variance, and the second function added somewhat more than 0.4% to that. The canonical correlation for the first function was .36 and the canonical correlation for the second function was .07. Table 4 presents major information from the canonical correlation analysis and shows information from Function 1 only since the first function was statistically significant and Function 2 was not significant. As shown in Table 4, the standardized canonical coefficients (canonical weights) were .83 for Teacher Leadership, .17 for School Leadership, .57 for Achievement, .49 for Gap, and -.05 for Growth. Teacher Leadership had the largest coefficient, indicating that a one unit increase in Teacher Leadership would increase the canonical variate by .84.

Table 4

Canonical Correlation for Teacher Leadership Function

Variable	Function 1	
	Canonical Loadings	Canonical Weights
Leadership		
Teacher	.99	.84
School	.97	.17
Student Achievement		
Achievement	.98	.57
GAP	.98	.49
Growth	.77	-.05
Redundancy Coefficient		
Leadership by Achievement		.12
Achievement by Leadership		.11
Canonical Correlation Coefficient		.36
Squared Correlation Coefficient		.13

The correlations between the two variable sets and the canonical function (canonical loadings) showed that four of the variables (Teacher Leadership, School Leadership, Achievement, and Gap) had loadings that were larger than .90. Teacher Leadership had a large correlation coefficient of .99 with the leadership variate, and School Leadership had a correlation coefficient of .97 with the leadership variate. Achievement had the largest correlation coefficient of .984 with the student achievement variate, followed by the correlation of .982 between Gap variable and the student achievement variate. These canonical weights and loadings mostly reflected Teacher Leadership.

The redundancy coefficient indicated that the first canonical variate from the student achievement variables explained approximately 12% of the variance in the leadership variables. The redundancy coefficient of .11 was obtained, which indicated that approximately 11% of the variance in the student achievement variables was explained by the canonical variate from the leadership variables.

The findings from the canonical correlation analysis suggested that there was a significant relationship between leadership variables and student achievement variables. The direction of the correlation was positive and large in magnitude for both Teacher Leadership and School leadership for the dependent variables. This means that schools with higher perceptions of teacher leadership and school leadership have higher student achievement outcomes. This finding was extremely significant for the study. Subsequent factorial MANOVA was conducted to further examine the relationship between the two sets of variables.

MANOVA Analysis

The author used 3 x 3 factorial MANOVA technique to address Research Questions 2, 3, and 4:

2. Is there a significant interaction effect of Teacher Leadership and School Leadership on Achievement, Gap, and Growth scores?
3. Is there a significant main effect of Teacher Leadership on Achievement, Gap, and Growth scores?
4. Is there a significant main effect of School Leadership on Achievement, Gap, and Growth scores?

According to Stevens (2009), MANOVA has the potential to result in a more powerful test by reducing within-cell variance, and it allows for examination of joint effects of multiple independent variables (Teacher Leadership and School Leadership) on dependent variables (Achievement, GAP, and Growth). MANOVA calls for categorical independent variables; therefore, schools were placed in groups based on their Teacher Leadership and School Leadership scores from the Kentucky TELL Survey. Three groups using the 33rd, 66th, and 99th percentiles were created for equal cell size. Schools were identified as having high, medium, and low leadership scores.

MANOVA assumptions. Three multivariate assumptions must be met prior to calculating or interpreting factorial MANOVA results:

1. The observations on the dependent variables follow a multivariate normal distribution in each group.
2. The population covariance matrices for the dependent variables in each group are equal.
3. The observations are independent (Stevens, 2009).

First, normality indicates that “sampling distribution means of the various dependent variables in each cell and linear combinations of them are normally distributed” (Tabachnick & Fidell, 2001, p. 329). Stevens (2009) suggested that checking the univariate normality for each dependent variable is adequate for checking multivariate normality. In order to test the univariate normal distribution of each dependent variable, the Kolmogory-Smirnov Test was conducted, which yielded significance for all three dependent variables ($p < .05$), as shown in Table 5. This statistical significance suggested that none of the dependent variables were normally

distributed. However, it has been pointed out by several scholars (Fields, 2005; Stevens, 2009) that the Kolmogorv-Smirnov Test tends to yield significant results with large samples. Fields (2005) and Stevens (2009) suggest that plot of score distributions be obtained as well. As shown in Appendix C, all the distributions appear to be quite normal. Garson (2012b) also indicated that MANOVA tends to be robust in the face of most violations of this assumption if sample size is large. Based on these results, it was concluded that Achievement, Gap, and Growth scores are likely to be normally distributed in the population.

Table 5

Kolmogorov-Smirnov Test of Normality

Dependent Variable	Teacher Leadership Group	Statistic	<i>Df</i>	Sig.
Achievement	1	.09	344	.000
	2	.09	345	.000
	3	.09	344	.000
Gap	1	.07	344	.001
	2	.05	345	.074
	3	.05	344	.029
Growth	1	.09	344	.000
	2	.11	345	.000
	3	.12	344	.000

Second, the data set must meet the homogeneity of covariance matrices assumption. This means that the dependent variable variance and covariance matrices are equal across the levels of the independent variables. Also, for each of the groups formed by the independent variables, the covariance between any two dependent variables must be the same. When sample sizes are unequal, tests of group differences (i.e. Wilks, Hotelling) are not robust when this assumption is violated (Stevens, 2009).

The results from Box's Test of Equality of Covariance Matrices showed a statistical significance ($p = .000$) suggesting that this assumption was not met. This was not surprising as Garson (2012b) noted that Box's Test is extremely sensitive to violations of this assumption of normality, making the Box Test less useful than might otherwise appear. Visual inspections of variances and covariances of the dependent variables for each group indicated that those values did not differ much in magnitude. Thus, it was concluded that the significance of Box's Test for likely due to the significance of the normality tests.

Third, independence of observations implies that "the score for any particular subject is independent of the scores of all other subjects" (Shalvenson, 1996, p. 378). In the current study, independence was addressed prior to data collection because the survey design facilitated teachers to complete the survey independently and only once.

Finally, Bartlett's Test of Sphericity was examined, which showed a significance ($\chi^2 = 3175.55, p = .000$). This suggested that the correlation matrix in the population was not an identity matrix, indicating that there was a sufficient amount of correlations among the three dependent variables to justify the use of multivariate statistics in this study.

MANOVA results. A 3 x 3 factorial MANOVA (Teacher Leadership at three levels [high, medium and low] and School Leadership at three levels [high, medium, and low]) analysis addressed the second, third, and fourth research question. Teacher Leadership and School Leadership served as independent variables, while Achievement, Gap and Growth served as the dependent variables. According to Field (2005), main effects can be misleading without the interpretation of interaction effects; thus, Research Question 2 is discussed first.

Research Question 2 addressed the following null hypothesis: There is not a significant interaction effect of Teacher Leadership and School Leadership on Achievement, Gap, and Growth. According to MANOVA results (Table 6), the null hypothesis is retained. There was no significant multivariate interaction effect between Teacher Leadership and School Leadership on Achievement, Gap, and Growth (Wilks's $\Lambda = .99$, $F(6, 2048) = 2.10$, $p > .05$). The lack of significant interaction effect indicates that the effect of perceived teacher leadership on the dependent variables is similar for perceived school leadership. It is noted that the actual p value of the interaction effect was .051 and was extremely close to being significant. The eta square statistic ($\eta^2 = .006$) is considered a very small effect size (Cohen, 1988); specifically, only 0.6% of the variance in the dependent variables is accounted for by the interaction effect of Teacher Leadership on School Leadership.

Following the nonsignificant Teacher Leadership by School Leadership interaction effect, the main effect of Teacher Leadership on the three student achievement outcomes was explored. Addressing the hypothesis, there was a significant main effect of Teacher Leadership on Achievement, Gap, and Growth. MANOVA results indicated a

significant multivariate effect of teacher leadership (Wilks's $\Lambda = .99$, $F(6, 2048) = 2.51$, $p < .05$). The effect of Teacher Leadership on the three dependent variables is different among schools with high, medium, and low perceptions of teacher leadership, rejecting the null hypothesis. Additionally, the eta square statistic ($\eta^2 = .007$) is considered a small effect size (Cohen, 1988); specifically 0.7% of the variance in the dependent variables is accounted for by Teacher Leadership.

Following the nonsignificant interaction (Teacher Leadership x School Leadership) effect and significant Teacher Leadership effect, the author examined the main effect of School Leadership on Achievement, Gap, and Growth scores. MANOVA results revealed that the effect of school leadership on the dependent variables was not significant (Wilks's $\Lambda = .99$, $F(6, 2048) = 2.07$, $p > .05$). The null hypothesis was accepted. This results again in a small effect size with a partial eta square value of .006. Furthermore, follow-up analyses on the individual dependent variables revealed significant univariate main effects of perceived teacher leadership on Achievement ($F(2, 117) = 5.86$, $p < .001$), Gap ($F(2, 57) = 4.86$, $p < .001$), and Growth ($F(2, 233) = 7.22$, $p < .001$). Partial eta square statistics for the univariate main effect for Achievement ($\eta^2 = .011$), Gap ($\eta^2 = .009$) and Growth ($\eta^2 = .014$) were considered very small in size because they were less than .10 (Cohen, 1988). Less than 1% of the variance in the dependent variables was accounted for by the differences in teacher leadership perceptions. Though these effects are considered very small, they were still statistically significant, likely due to the large sample size. Though the results for School Leadership were not statistically significant, it was important to note practical significance. The means for the three School Leadership groups are shown in Table 6. The researcher conducted a univariate

analysis of variance (ANOVA) for each dependent variable to locate significant differences in Teacher Leadership group (high perception, medium perception, and low perception) among the dependent variables.

Table 6

Factorial MANOVA Summary

Source	Wilks' Lambda	<i>F</i>	Hypothesis <i>df</i>	Error <i>df</i>	Sig.	Partial Eta Squared
Teacher Leadership	.99	2.51	6	2048	.020	.007
School Leadership	.99	2.07	6	2048	.054	.006
Teacher Leadership x School Leadership	.99	2.10	6	2048	.051	.006

ANOVA post hoc analysis. Results of the univariate analysis indicate that Achievement, Gap, and Growth student scores differ based on the teacher perception of teacher leadership results from the Kentucky TELL Survey. Given that schools were grouped based on three levels of Teacher Leadership (high, medium, and low), post hoc analyses were conducted to identify the between-group differences on each dependent variable.

Tukey and Tamhane's T2 post hoc analyses were performed on each dependent variable. The type of post hoc analysis was chosen based on homoscedasticity violations. The author performed Tukey post hoc analysis on Gap scores since this dependent variable did not violate the homoscedasticity assumption of MANOVA ($p > .05$ for Levene's Test). Tamhane's T2 post hoc analysis was used on Achievement and Growth since homoscedasticity was violated for these two dependent variables and the population

covariance matrices were unequal for the dependent variables in each group ($p < .05$). Results are displayed in Table 7.

Teacher leadership and achievement outcomes. Results from the Tamhane's T2 post hoc analysis revealed statistically significant differences among all groups of teacher leadership perception ($p < .01$). Schools with teachers who reported high results on Teacher Leadership from the TELL Survey versus school with teachers who reported medium results scored almost two points higher on Achievement ($MD = 1.98, SD = 0.34$). The difference between schools with high Teacher Leadership scores and low Teacher Leadership scores was even larger ($MD = 4.05, SD = 0.35$). The difference between schools with medium scores and low scores on the Teacher Leadership TELL Survey items was also significant on Achievement ($MD = 2.07, SD = 0.35$).

Teacher leadership and gap outcomes. Results from the Tukey post hoc analysis revealed statistically significant differences among all groups of teacher leadership perception ($p < .01$). Results from the Gap analysis were similar to the Achievement analysis. Schools with high Teacher Leadership scores on the TELL Survey had higher Gap scores on the K-PREP compared to schools with medium scores ($MD = 1.56, SD = 0.26$) and schools with low Teacher Leadership scores ($MD = 3.09, SD = 0.26$). The difference between schools with medium scores and low scores was also significant ($MD = 1.56, SD = 0.26$).

Teacher leadership and growth outcomes. Results from the Tamhane's T2 post hoc analysis revealed statistically significant differences among all groups of Teacher Leadership perception on student growth ($p < .01$). Schools with teachers who reported high results on Teacher Leadership from the TELL Survey versus school who reported

medium results scored over two points higher on Growth ($MD = 2.09$, $SD = 0.42$). The gap between schools with high Teacher Leadership scores and low Teacher Leadership scores was even larger on Growth ($MD = 4.19$, $SD = 0.44$). The spread between schools with medium scores and low scores on the Teacher Leadership TELL Survey items was also significant on Growth ($MD = 2.10$, $SD = 0.44$).

Table 7

Mean and Standard Deviation for Teacher Leadership and School Leadership Groups

Leadership Group	Achievement		Gap		Growth	
	Mean	SD	Mean	SD	Mean	SD
Teacher Leadership						
Low	17.22*	4.64	10.19*	3.49	18.25*	6.00
Medium	19.30*	4.43	11.72*	3.28	20.35*	5.52
High	21.27*	4.53	13.28*	3.64	22.43*	5.56
School Leadership						
Low	17.40	4.61	10.30	3.45	18.59	5.99
Medium	19.00	4.62	11.52	3.46	19.97	5.84
High	21.39	4.37	13.38	3.51	22.47	5.34

*Difference in means significant at the $p < .05$ level.

Summary of Results

Descriptive statistics, reliability analysis, canonical correlation, and 3 x 3 factorial MANOVA were used to examine the relationship between both teacher perceptions of teacher leadership and school leadership based on aggregate scores from the Kentucky TELL Survey and student achievement outcomes from Unbridled Learning.

Descriptive statistics indicated that the means from the sample population were similar to those found statewide in Kentucky. The largest discrepancy was shown when

comparing the percentage of students receiving free or reduced lunch in elementary school. Schools in the sample had approximately 54.98% of students receiving free or reduced lunches. In Kentucky, approximately 64.81% of students received free or reduced lunch. Other than this finding, data from the sample proved to be compatible with that in the state. This finding indicated that the sample was a good example of schools across the state of Kentucky.

The reliability analysis corresponded with data from the New Teacher Center (2013b), and found eight factors that loaded on Teacher Leadership, and eleven factors that loaded on School Leadership. Canonical correlation analysis was conducted using the aggregate mean of these items to produce two factors – Teacher Leadership and School Leadership. Results indicated that there was a significant canonical correlation between both School Leadership and Teacher Leadership and student achievement. It should be emphasized that the canonical correlation was in a positive direction, meaning that as scores with the canonical variates (Teacher Leadership and School Leadership) increased, so did the student achievement variables. This positive correlation was large in magnitude across all dependent variables in the student achievement set, including Achievement, Gap, and Growth.

Results from the MANOVA indicated a statistically significant difference between schools with high, medium, and low Teacher Leadership and all student achievement variables ($p = .020$). Though the results did not indicate a statistically significance difference among schools grouped by School Leadership ($p = .054$), it is noted that there was practical significance among the findings. The MANOVA did not indicate a significant interaction effect between Teacher Leadership and School

Leadership ($p = .051$). Results indicated that schools that reported high perceptions of teacher leadership scored higher on Achievement, Gap and Growth than schools with medium and low perceptions of teacher leadership. This pattern followed for School Leadership results, as well. Post hoc testing revealed that the difference between Teacher Leadership group means was significant across all three groups.

CHAPTER V

DISCUSSION

The purpose of this study was to examine the relationship between teacher perceptions of leadership constructs (Teacher Leadership and School Leadership) from the 2013 TELL Kentucky Survey and student achievement on the 2013 Kentucky accountability assessment K-PREP (Achievement, Gap, & Growth). Specifically, is there a significant relationship between teacher perceptions of leadership constructs and student achievement? Furthermore, the study determined if there was a significant difference in student achievement when comparing schools with high, medium, and low teacher perceptions of leadership.

Non-experimental correlational design was used with an existing data bank for all variables. This study employed two quantitative research designs. First, pre-existing data were gathered from a cross-sectional survey study. Second, explanatory correlational research was conducted to allow for the examination of correlations between leadership and student achievement. Specifically, the author used canonical correlation and 3 x 3 factorial MANOVA to identify relationships between the leadership variables and student achievement variables. The sample included a population of Kentucky teachers and students. Results were reported at the school level ($N = 1033$). Data was obtained from the 2013 administration of the TELL Kentucky Survey for

leadership perceptions, and from the 2013 K-PREP for student achievement data. Four research questions were asked:

1. Is there a significant canonical correlation between the leadership construct variable set (Teacher Leadership and School Leadership) and the student achievement variable set (Achievement, Gap, and Growth)?
2. Is there a significant interaction effect of Teacher Leadership and School Leadership on Achievement, Gap, and Growth scores?
3. Is there a significant main effect of Teacher Leadership on Achievement, Gap, and Growth scores?
4. Is there a significant main effect of School Leadership on Achievement, Gap, and Growth scores?

Descriptive statistics, reliability and validity analyses, canonical correlation, and 3 x 3 factorial MANOVA were used to examine the relationship between both teacher perceptions of teacher leadership and school leadership based on aggregate scores from the TELL Kentucky Survey and student achievement outcomes from K-PREP.

Descriptive statistics indicated that the means from the sample population were similar to those found statewide in Kentucky. The largest discrepancy was shown when comparing the percentage of students receiving free or reduced lunch in elementary schools. Other than this finding, data from the sample were compatible with that in the state. This finding indicated increased generalizability of the study.

The reliability and validity analyses corresponded with data from the New Teacher Center (2013b), and found eight factors that loaded on Teacher Leadership, and eleven factors that loaded on School Leadership. Canonical correlation analysis was

conducted using the aggregate means of these items to produce two factors – Teacher Leadership and School Leadership. Results indicated that there was a significant canonical correlation between both School Leadership and Teacher Leadership, and student achievement. The significant canonical correlation suggested that the leadership variables, especially teacher leadership, were significantly related to achievement variables. This positive canonical correlation was large in magnitude across all dependent variables in the student achievement set, including Achievement, Gap, and Growth.

Results from the MANOVA indicated a statistically significant difference between schools with high, medium, and low Teacher Leadership on all student achievement variables ($p = .020$). Results did not indicate a statistically significance difference among schools grouped by School Leadership ($p = .054$), but it should be noted that as perceptions of school leadership increased, student achievement increased on all dependent variables; School Leadership followed the same pattern as Teacher Leadership. The MANOVA did not indicate a significant interaction effect between Teacher Leadership and School Leadership ($p = .051$). Post hoc testing revealed that differences between Teacher Leadership group means were significant across all three groups.

This study is significant for three reasons: (a) principals and teachers need more information about strategies to increase instructional capacity and student achievement; (b) graduate-level educational leadership and teacher education programs can benefit from the information; and (c) the results can help inform state, district, and school planning for professional development opportunities for principals and teachers.

Following is a discussion of the results which revealed some novel findings about the correlations between leadership and student achievement. Also included in the discussion are study implications for practitioners, limitations, and recommendations for further empirical research linking leadership to student achievement.

Leadership and student achievement. Canonical correlation was used to examine the relationships between the leadership factors and student achievement variables. Wilks's Lambda, which tests if the canonical correlations are zero, indicated that there was a multivariate significance of the canonical correlations for the two functions generated (Wilks's $\Lambda = .87$, $F = 25.14$, $p = .000$). Further dimension reduction analysis indicated that the first canonical function (Wilks's $\Lambda = .87$, $p = .000$) was statistically significant, but not the second function (Wilks's $\Lambda = .99$, $p = .104$).

The first function accounted for approximately 13% of the explained variance, and the second function added approximately 0.4% to that. The canonical correlation for the first function was .36 and the canonical correlation for the second function was .07. The standardized canonical coefficients (canonical weights) were .83 for Teacher Leadership, .17 for School Leadership, .57 for Achievement, .49 for Gap, and -.05 for Growth. Teacher leadership had the largest coefficient, indicating that a one unit increase in Teacher Leadership would increase the canonical variate by .84.

The canonical loadings showed that four of the variables (Teacher Leadership, School Leadership, Achievement, and Gap) had loadings that were larger than .90. Teacher Leadership had a large correlation coefficient of .99 with the leadership variate, and School Leadership had a correlation coefficient of .97 with the leadership variate. Achievement had the largest correlation coefficient of .98 with the student achievement

variate, followed by the correlation of .98 between Gap variable and the student achievement variate. These canonical loadings mostly reflected Teacher Leadership.

The redundancy coefficient indicated that the first canonical variate from the student achievement variables explained approximately 12% of the variance in the leadership variables. The redundancy coefficient of .11 was obtained, which indicated that approximately 11% of the variance in the student achievement variables was explained by the canonical variate from the leadership variables.

The findings from the canonical correlation analysis suggested that there was a significant relationship between leadership variables and student achievement variables. The direction of the correlation was positive and large in magnitude for both Teacher Leadership and School leadership for the dependent variables, but was statistically significant for Teacher Leadership only. This is a significant finding and suggests teacher perceptions of the amount of leadership they exhibit and their influence on school decision making may have a larger impact on student achievement than their perceptions of leadership from administrators. This is not surprising, considering much of the literature on principal leadership that indicates that it has an indirect effect on student achievement (Cheng, 1994; Heck, et al., 1990; Hallinger & Heck, 1996; Johnson, et al., 2000; Louis, et al., 2010; Leithwood, et al., 2010; Heck & Hallinger, 2009; and Supovitz, et al., 2010). Examination of all of the bivariate correlations in this study indicated that Teacher Leadership had the largest correlation with the other variables. It had the highest correlation with the leadership canonical variate, indicating that most of the influence on student achievement was due to perceptions of Teacher Leadership. This significant correlation was followed by a relatively small redundancy coefficient, suggesting that

only 13% of the variance in student achievement variables was explained by the leadership variables. This could be due to the researcher using an aggregate mean to represent leadership factors.

Results from the current study showed that schools with teachers that have higher perceptions of teacher leadership have higher student achievement outcomes. This was an important finding and addition to the literature. There have been few empirical studies linking teacher leadership to student achievement (Leithwood, et al., 2010). Most research indicates an indirect effect of school leadership to student achievement, and suggests that principal that build capacity within their teachers have better student learning results (Leithwood, et al., 2004). The findings from this study provided empirical evidence that perceptions of teacher leadership have stronger correlations to student achievement than perceptions of school leadership.

Canonical correlation allowed for simultaneous examination of teacher and school leadership on student achievement, and created latent variables that are unable to be used in other techniques such as multiple regression. Use of this “many-to-many” relationship (Garson, 2012a) allowed for examination of different dimensions of the variables. Though the variance explained by the latent leadership variables was only 13%, the canonical loadings were large and positive, suggesting that schools with high perceptions of teacher and school leadership will have better student learning outcomes. This technique was unique among current leadership and achievement studies, and could explain why other studies did not find significance in their results.

Teacher leadership and school leadership. The second research question addressed the interaction effect between School Leadership and Teacher Leadership. The

interaction effects are interpreted when looking for differences among the results of each set of single factor experiments. There was no interaction when the outcomes of the different Teacher Leadership groups are equal at each level of the of the School Leadership variables. When the outcomes of the components differ, an interaction effect was present.

According to MANOVA results (Table 7), the null hypothesis was retained. There was no significant multivariate interaction effect between Teacher Leadership and School Leadership on Achievement, Gap, and Growth (Wilks's $\Lambda = .99$, $F(6, 2048) = 2.10$, $p > .05$). The lack of significant interaction effect indicates that the effect of perceived teacher leadership on the dependent variables is similar to perceived school leadership. It is noted that the actual p value of the interaction effect was .051 and was close to being significant. The eta square statistic ($\eta^2 = .006$) is considered a small effect size (Cohen, 1988); specifically, only 0.6% of the variance in the dependent variables is accounted for by the interaction effect of Teacher Leadership on School Leadership. This result is surprising, considering most literature links indirect effects of principal leadership on achievement, but very few study link teacher leadership to student achievement. This is more than likely due to a lack of quantitative empirical studies regarding the interaction between teacher and principal leadership.

Teacher leadership and student achievement. The third research question addressed the main effect of Teacher Leadership on the student achievement variables – Achievement, Gap, and Growth. Addressing the hypothesis, there was a significant main effect of Teacher Leadership on Achievement, Gap, and Growth. MANOVA results indicated a significant multivariate effect of teacher leadership (Wilks's $\Lambda = .99$, $F(6,$

2048) = 2.51, $p < .05$). The effect of Teacher Leadership on the three dependent variables was different among schools with high, medium, and low perceptions of teacher leadership, rejecting the null hypothesis. Additionally, the obtained eta square statistic ($\eta^2 = .007$) was considered a small effect size (Cohen, 1988); specifically 0.7% of the variance in the achievement variables was accounted for by Teacher Leadership.

The percent of variance explained in student achievement accounted for by Teacher Leadership was small, but it was still positive and statistically significant, probably due to the large sample size. This finding verified what many researchers have hypothesized – teacher learning through strong teacher leaders in an effective way to build instructional capacity and increase student learning (Anderson, 2004; DuFour, 2004; Frost & Durrant, 2008; Griffin 1995; Heck & Hallinger, 2009; Leithwood, et al., 2004; Leithwood, et al., 2010; Louis, et al., 2010; Murley, et al., 2008; Robinson, et al., 2008; Silins & Mulford, 2004; and York-Barr & Duke, 2004).

School leadership and student achievement. The final research question evaluated the main effect of School Leadership on the student achievement variables. MANOVA results revealed that the effect of school leadership on the dependent variables was not significant (Wilks's $\Lambda = .99$, $F(6, 2048) = 2.07$, $p > .05$). The null hypothesis was accepted. This resulted again in a small effect size with a partial eta square value of .006. Results aligned with the significant Teacher Leadership effect, and the perceptions of effective school and principal leadership increased with student achievement scores across all three dependent variables. This effect was not significant and smaller than Teacher Leadership, and partially supports previous research stating that principal leadership has an indirect effect on student achievement (Cheng, 1994; Heck, et al., 1990;

Hallinger & Heck, 1996; Johnson, et al., 2000; Louis, et al., 2010; Leithwood, et al., 2010; Heck & Hallinger, 2009; and Supovitz, et al., 2010).

Limitations

Several limitations exist with the study. First, the study used school-level data rather than student- and teacher-level data due to the nature of the TELL Kentucky Survey. While this provided anonymity to the teachers taking the survey and probably aided in increasing the response rate, statistical analysis was somewhat limited. For example, using advanced methods like hierarchical linear modeling would not be appropriate unless teacher-level data was linked to student results. Teacher-level data was obtained from the New Teacher Center, but only used to confirm previous reliability and validity testing (NTC, 2013b).

The study contained data from a cross-sectional survey design; therefore, teachers were surveyed at a particular point in time. Perceptions may change over time and throughout the school year. Additionally, as in all survey research, self-selection is a bias limitation (Dillman, 2000). It is possible that those teachers who did not respond differ in some way from respondents in their perceptions of leadership. The high response rate (87 percent), however, seems to compensate for some of this limitation. Also, cross-sectional survey can be biased against new principals because it takes time for school leadership to take effect (Fullan, 2001). Also, the TELL Kentucky Survey contains strictly perception data; therefore, the results might not be indicative of what is actually happening in schools. Some quantitative researchers might argue that the study is therefore not strictly empirical. Though this is a limitation of the data, teacher perception is extremely important when studying leadership. Even if principals are collaborating with teachers

and providing opportunities for leadership, if teachers do not perceive that they have a voice in school decisions, this indicates that leadership practices of the principal need to be re-evaluated.

Another limitation stems from the data grouping during the MANOVA analysis. Schools were group based on three percentiles. It is possible that scores would vary across percentiles in other states, decreasing the generalizability of the study. Also, there was a loss of power because the scores were separated into three different categories for each leadership variable. The small effect size also limits the results. This could be explained by one of two ways – the large sample size or the aggregate means. The researcher concludes that this is probably due to using the aggregate means for the leadership constructs. This finding could be further examined using exploratory factor analysis and structural equation modeling.

Some limitations were also discovered when checking for MANOVA assumptions. The statistical test for normality was significant, but visual examination of the plot diagrams showed that the data did in fact follow a normal distribution. Also, Box's Test was violated for two of the dependent variables – Achievement and Growth. This was compensated for during post-hoc analysis by using Tamhane T2 to determine significant differences among group means.

Finally, the survey questions developed by the New Teacher Center addressed various types of leadership under one construct. For example, there are questions that address both instructional and managerial elements under the broader construct of Teacher Leadership. The literature is also lacking of a clear definition of Teacher

Leadership, and there is still debate about which variables under principal leadership are most important (Leithwood, et al., 2010).

Despite the limitations of the research, this study has significant implications for educational leadership, as previously discussed. The TELL Kentucky Survey appears to be a valid and reliable instrument to gain insight into teachers' perceptions of leadership in schools. Before the publication of this dissertation, there have been few empirical studies conducted with this data bank other than the report published by the New Teacher Center in 2011 and 2013, and the Houchens, et. al. study in 2013 examining the impact of Positive Behavior Interventions and Supports (PBIS) on perceptions of working conditions. The New Teacher Center report on the data from the 2013 survey included only descriptive statistics and compared Kentucky teachers' responses to other states, which increases the generalizability of this study. The findings from the current study suggest that much can be done with the TELL Survey data, both in Kentucky and other states.

Implications and Recommendations

This study extends earlier research on leadership and school improvement in two ways. First, despite calls for studies that examine policy prescriptions for shared leadership against empirical evidence, most studies regarding teacher leadership are descriptive and theoretical in nature (Heck & Hallinger, 2005; Leithwood, et al., 2009; Pounder, Ogawa, & Adams, 1995). This study examined perceptions of both teacher and school leadership as an organizational quality against empirical evidence for student learning. Although progress has been made at identifying and specifying the nature of principal leadership effects (Bell et al., 2003; Hallinger & Heck, 1996, 1998; Leithwood

et al., 2008; Witziers, et al., 2003), it is also true that the powerful effects attributed to school leadership by policy makers have yet to be fully validated through empirical research (Heck & Hallinger, 2005). Literature has linked teachers' sense of efficacy and collective responsibility to their teaching effectiveness and improved student achievement (Goddard, R., Hoy, W., & Hoy, A., 2000), but research is lacking in description on exactly how teachers lead and which specific mechanisms are effective to increase student achievement. This study contributes to the needed research to create a sense of urgency for school administrators to distribute leadership among teachers.

Qualitative and mixed-methodology research is needed to fully grasp the role of teacher leadership on student achievement. The current study investigated teacher perceptions, which are probably indicators of teacher influence and principal effectiveness in schools, but there are currently no empirical studies providing additional evidence for this. More quantitative data collection followed by case studies could link teacher perceptions to the actual mechanisms of distributed leadership in schools. This would provide more reliable evidence for educators and would increase buy-in for teacher leadership. Also, case study design could gain information into the informal roles of teacher leaders within their classroom and the school community.

Another recommendation for further research involves growth modeling. This current study employs a cross-sectional design. To fully grasp leadership within a school, researchers need to examine change within a school over a period of time, and there has been a focus on this type of research (Leithwood, et al., 2004; Luyten, Visscher, & Witziers, 2005; Reynolds, Teddlie, Hopkins, & Stringfield, 2000; Slegers, Geijsel, & Van de Berg, 2002). It is difficult to grasp leadership effects by examining one year of

perception data. This is most relevant for schools with new leaders, as systematic change takes place over a period of years and does not happen instantaneously (Fullan, 2001). Hallinger and Heck (2009) conducted a longitudinal non-experimental study with structural equation modeling and found support for the hypothesis that school leadership and capacity building are mutually reinforcing in their effects on each other over time. They also found changes in these mutually-reinforcing constructs were also positively associated with school growth rates in math. Similar studies could be conducted with TELL Survey constructs in other states, and soon in Kentucky. Longitudinal data could not be used for the current study because Kentucky changed testing systems between the 2011 and 2013 TELL Survey distribution. Change over time could be studied once researchers can obtain multiple data points with the same assessment model.

The TELL Survey is conducted in many states and provides data for perceptions of various working conditions in schools (NTC, 2013a). Few studies have examined this data closely using advanced statistical methods. There is opportunity to analyze variables such as perceptions of student conduct, community involvement, and professional development, as well as leadership. This data bank provides powerful insight into schools, and could be analyzed to find correlations among many working conditions to student achievement, teacher retention, and other school outcome variables.

This study has many implications for use with teacher, principals, district administrators, and universities. Teacher leadership is a critical component of effective teaching and school success. Accomplished teachers have the most intimate knowledge of both the content their students must master and the context of the community they serve. Providing opportunities for teachers to serve as instructional leaders within their

schools allows them to bring their unique knowledge in meeting student needs, and can be particularly helpful in tailoring and streamlining services to students and families in high-needs schools as well as developing policies that can sustain them over time. To increase buy-in of this work, teachers need to understand that their leadership is important and significant. This study is the beginning of providing evidence for teachers to increase a sense of urgency in leading their peers in instructional excellence.

Transformational school and district leaders who seek out and support the partnership of teacher leaders lay the groundwork for their joint success (Berry, 2010). Research, such as the current study, give insight into teacher perceptions of the amount of input they have in instructional decision making, and link those perceptions to student achievement. School and district administrators can use this knowledge to develop roles for teacher leaders to increase instructional capacity in their schools. This is important when planning professional development. Though this study suggests that teacher leadership could be one mechanism for increasing instructional capacity, more research is needed into exactly how teacher need to lead and which roles are most important in increasing student learning. This information would be beneficial to principals, district administrators, and school boards for planning professional development and allocating resources.

More research needs to be conducted into teacher leadership and how it can be cultivated under different contexts and demands. Future research can reveal more detailed information about which teachers might be most interested in particular leadership opportunities. Such data might help schools and districts strategically match

teachers best suited for particular roles with the schools that most need such assistance, or to design roles as effective retention incentives for their most accomplished teachers.

Research regarding teacher leadership is also extremely important to institutions of higher education. In Kentucky in 2008, all colleges of education were required to incorporate teacher leadership into their master's program (National Commission on Teaching and America's Future, n.d.). Recruiting teachers to enroll in these programs has been a difficult task due to a lack of a true definition of teacher leadership. More research needs to be conducted to help define teacher leadership in terms of which aspects are increase student learning effectively and efficiently. Also, teachers need to know how leading will help their career progression. Few studies have touched on this topic (Smylie & Smart, 1990), and it is not addressed adequately in current literature. Teachers need knowledge on how gaining leadership experience can benefit the students in their classroom, as well as enable them to meet their career aspirations and goals.

Conclusion

The focus on distributed teacher leadership and school leadership is of theoretical interest and practical significance. Until recently, the literature on distributed leadership has emphasized conceptual development (Gronn, 2002) and description of distributed leadership practices (Leithwood, et al., 2009; Spillane, 2006). The major findings in this study suggested that there is a link between increased perceptions of leadership and increased student learning. Specifically, the results indicate that teacher leadership may have a stronger correlation to increased student achievement than principal leadership. The findings from this study represented an important contribution to the emerging empirical knowledge base on the correlations between teacher leadership, school

leadership, and student achievement (e.g., Marks & Printy, 2003; Mulford & Silins, 2003; Pounder, et al., 1995). This study highlighted teacher perceptions of their own role in leadership, as well as the leadership from their administration, and explicitly links perceptions of teacher and school leadership to increased student achievement.

The findings imply the need to distribute leadership practices among teachers. Unfortunately, given limitations in measurement of the TELL Kentucky Survey items and the leadership constructs, the results offer little direct insight into which leadership practices should be distributed or how they should be distributed among different staff roles. Further qualitative research and case studies would shed light into the idiosyncrasies of leadership among teachers and principals.

The results add to the incremental process of knowledge building in the domain of school and teacher leadership effects. Validation of these findings will require researchers to follow schools for longer periods of time and conduct analyses that link changes in leadership and school organization with changes in teacher practices and student learning. More research with advanced statistical techniques is needed to examine the effect size of leadership on achievement, as well as identifying which leadership behavior are most directly linked to increased student learning. Nevertheless, the author of this study concludes that these empirical results strongly support the continuation of inquiry into school and teacher leadership effects on student learning and other school outcome variables.

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APPENDIX A

TELL Kentucky Leadership Constructs and Items

Construct	Number of Items	Items
Teacher Leadership	8	<p>Teachers are effective leaders in this school.</p> <p>Teachers are recognized as educational experts.</p> <p>The faculty has an effective process for making group decisions to solve problems.</p> <p>Teachers have an appropriate level of influence on decision making in this school.</p> <p>In this school we take steps to solve problems.</p> <p>Teachers are encouraged to participate in school leadership roles.</p> <p>Teachers are trusted to make sound professional decisions about instruction.</p> <p>The procedures for teacher evaluation are consistent.</p>
School leadership	11	<p>Teachers receive feedback that can help them improve teaching.</p> <p>Teachers are held to high professional standards for delivering instruction.</p> <p>Teachers feel comfortable raising issues and concerns that are important to them.</p> <p>The faculty are recognized for accomplishments.</p> <p>The faculty and leadership have a shared vision.</p> <p>The school improvement team provides effective leadership at this school.</p> <p>Teacher performance is assessed objectively.</p> <p>The school leadership consistently supports teachers.</p> <p>There is an atmosphere of trust and mutual respect.</p> <p>The school leadership facilitates using data to improve student learning.</p> <p>Professional learning opportunities are aligned with the school's improvement plan.</p>

APPENDIX B
Canonical Correlation

APPENDIX C

Histograms for Normality Testing

Figure 1: Frequency distribution of Achievement by Teacher Leadership Group, generated using SPSS

Figure 2: Frequency distribution of Gap by Teacher Leadership Group, generated using SPSS

Figure 3: Frequency distribution of Growth by Teacher Leadership Group, generated using SPSS

Figure 4: Frequency distribution of Achievement by School Leadership Group, generated using SPSS

Figure 5: Frequency distribution of Gap by School Leadership Group, generated using SPSS

Figure 6: Frequency distribution of Growth by School Leadership Group, generated using SPSS

CURRICULUM VITAE

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Education

University of Louisville Ph.D., May 2014

Graduate Program, Department of Leadership, Foundations, and Human Resource Education, Doctorate of Philosophy in Educational Leadership and Organization Development with emphasis in P-12 Administration. Dissertation Topic: Examining Teacher Perceptions of Leadership and Student Achievement in Kentucky Schools. Awards and Honors: Dean's Citation.

Bellarmino University Master of Arts, December 2006

Graduate Program, Frazier Thornton School of Education
M.A. in Instructional Leadership and School Administration

University of Louisville Rank I, December 2004

Graduate Program, Department of Teaching and Learning
M.A.T. for Alternative Certification in Middle School Science Education

University of Louisville School of Medicine June 2000 to October 2001

Graduate Program, Department of Anatomical Sciences and Neurobiology
Awards: University of Louisville School of Medicine Graduate Fellowship

Campbellsville University Bachelor of Science, July 2000

Double Major in Biology and Mathematics with Minor in Chemistry
Awards and Activities: Academic Excellence Scholarship, Valedictorian Scholarship, Dean's List, Who's Who Among Student in American Universities and Colleges, Student Government Association, Sigma Zeta (Science Honor Society) Officer, Concert and Marching Band Member, Orchestra Member.

Campbellsville High School Advanced Diploma, May 1996

Awards and Activities: Valedictorian, Eagle Excellence Award in Fine Arts and Social Studies, Rotary Club Award, Principal's Leadership Award, Journalism Award, U.S. History Award, Girls State Delegate, National Honor Society Officer, DECA (Parliamentarian and President), Class President, Marching Band Field Commander.

Professional Certificates

Professional Certificate for Instructional Leadership – Principal, All Grades

Professional Certificate for Middle Grades Science, Grades 5-9

Professional Certificate for Middle Grades Mathematics, Grades 5-9

Professional Certificate for Biological Science, Grades 8-12

Professional Certificate for Chemistry, Grades 8-12

Employment History

Assistant Principal Grade 6 – Westport Middle School January 2011 to May 2014

Instructional Leader for 6th Grade, Science, and Visual and Performing Arts Departments. 6th Grade Discipline, Support/Evaluation of Food Services Staff, Public Relations, Marketing, and Recruitment. Facilitates transition to 6th Grade and Comprehensive School Survey. STEAM Coordinator, Marketing Committee Chair, Parent Outreach and, PTSA Board Representative, Teacher Recognition, Parent-Teacher Conferences, Transportation, and Gifted & Talented Coordinator.

Teacher – North Oldham Middle School July 2003 to January 2011

6th Grade Collaborative Math & Math Pathways, 7th – 8th Grade Algebra IA & IB, 6th – 8th Grade Math ESS, 6th – 8th Grade Accelerated Science, 7th – 8th Grade Integrated Science, 8th Grade Team Leader, SBDM Council Member, Communication Committee Chair, Budget Committee Member, and Teacher Based Guidance Committee. New Teacher Mentor/ KTIP Mentor, Portfolio Scoring Team, Dell Intelligent Classroom Trainer, Schools to Watch Application Writing Team, STEM Team Sponsor (MATHCOUNTS, Future City, Science Olympiad, DOE Science Bowl, Louisville Regional Science Fair), and Student Council Sponsor

Teacher – Washington County High School June 2002 to June 2003

7th Grade Integrated Science, 8th Grade Integrated Science, 9th Grade Earth & Space Science, Summer School Math and Science

Substitute Teacher – Campbellsville Independent Schools February 2002 to May 2002

Experience with elementary, middle, and high school grade levels and all subject areas.

Graduate Research Assistant – UofL School of Medicine June 2000 to October 2001

Medical-Graduate Doctoral Degree Program in Anatomical Science and Neurobiology

Marching Band Instructor – Campbellsville High School Fall 1997 and Summer 2000

Woodwind sectionals, full band, and field instruction.

Research Assistant – Oak Ridge National Laboratory June 1999 to August 1999

Energy Research Undergraduate Laboratory Fellowship Program

Professional Affiliations

National Middle School Association
Association for Supervision and Curriculum Development
National Science Teachers Association
Kappa Delta Phi

Workshops, Seminars, Conferences

UL/UK/UC Spring Research Conference April 2014
Presentation: *Examining Teacher Perspectives of Leadership and Student Achievement in Kentucky Schools*

Schools to Watch Committee Member June 2009 – May 2010

Kentucky Association of School Administrators Conference June 2009

Kentucky Middle School Association Conference September 2008
Presentation: *111 Gifted Students and One Gifted Coordinator....Oh My!*

Oldham County Curriculum Development and Academy of Excellence 2005-2006

KY Association of Elementary School Principals Workshop March 2006

National Science Teachers Association Regional Conference October 2002
Presentation: *Our Favorite Inquiry Activities* with Dr. Andrew Kemp, University of Louisville

Experimental Biology National Conference April 2001

Kentucky Spinal Cord Injury Symposium June 2000

UofL School of Medicine Spinal Cord Injury Seminars June 2000
Presentation: *Transplantation of Human Olfactory Epithelial Stem Cells into Demyelinated Rat Spinal Cord*

Kentucky Academy of Science October 1999
Presentation: *Photoacoustic Measurements of Biological Tissue and Fluids*

ERULF August 1999
Energy Research Undergraduate Laboratory Fellowship – Oak Ridge National Laboratory
Presentation: *Photoacoustic Measurements of Biological Tissues and Fluids*