

USING TEACHER PERCEPTIONS TO PREDICT FIFTH GRADE SCIENCE AND  
MATHEMATICS SCORES IN NORTH CAROLINA

by

Jason Daniel Federico

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

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## ABSTRACT

The purpose of this study was to analyze teachers' perceptions of their working conditions and to what extent the perceptions impacted 5th grade students' achievement in the areas of mathematics and science in North Carolina. The 2014 student achievement data in the areas of 5th grade End-of-Grade (EOG) scores in mathematics and science were obtained from one randomly selected school in each of the 115 school districts in North Carolina. The perceptions of teachers' working conditions were extracted from the 2014 teacher working conditions survey results from each of the same randomly selected 115 schools. This correlation study used a stepwise multiple regression model to determine which teacher working conditions indicator (Time, Facilities and Resources, Community Support, Manage Student Conduct, Teacher Leaders, School Leadership, Professional Development, and Instructional Practices) had the strongest predictive relationship to the scores on mathematics and science. Student achievement data were reported as composite scores that were calculated by adding the percentage of students who scored a 3, 4, and 5 (considered grade level) on each test. This research study will help schools determine which teacher perceptions of working conditions have the strongest predictive relationship to elementary student achievement in mathematics and science. The findings of this research study specified that the indicators in the North Carolina Teacher Working Conditions survey could predict 5th grade student test scores in science and mathematics. The indicators of Managing Student Conduct, School Leadership, and Community Support and Involvement were significantly correlated to 5th grade EOG science scores. In addition, a significant correlation was discovered between the indicator of Community Support and Involvement and 5th grade EOG mathematics scores. Overall, the strongest predictive relationship to both science and mathematics scores was from the indicator of Community Support and Involvement.

*Keywords:* Student Achievement, Teacher Satisfaction, Instructional Practice, School Resources, School Leadership, Teacher Leadership, Professional Development, Student Conduct

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## **Dedication**

First, and foremost, this study is dedicated to my wife, Shauna and to my son, Bryce. None of this would have been possible without the love, support, and understanding you have afforded me during this process. Throughout this procedure, both of you have shown me what it means to truly sacrifice your ambitions and needs to support someone else. I have a lot to make up for when this process is finally completed because of the time I took away from both of you. I look forward to the day that I can finally focus my attention on supporting both of you in whatever you desire to achieve.

Last, but not least, this study is dedicated to my parents. I have never gone without the things I needed to navigate this world, thanks to the sacrifices you both have made for our family. I have never had to question how much you love me because of your actions each and every day of my life. Thank you for believing in me and not giving up on me when I may have let you down.

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### **List of Abbreviations**

National Aeronautics and Space Administration (NASA)

National Commission on Excellence in Education (NCEE)

Science, Technology, Engineering, and Mathematics (STEM)

Next Generation Science Standards (NGSS)

North Carolina Teacher Working Conditions (NCTWC)

National Assessment of Educational Progress (NAEP)

Programme for International Student Assessment (PISA)

Organization for Economic Cooperation and Development (OECD)

Elementary and Secondary Act (ESEA)

End-of-Grade (EOG)

Teacher Time Use (TTU)

Professional Learning Communities (PLC)

Class Size Reduction (CSR)

Work Life Balance (WLB)

Appreciative Inquiry (AI)

Supplemental Educational Services (SES)

Collaborative Problem Solving (CPS)

Consistency Management & Cooperative Discipline (CMCD)

North Carolina Professional Teaching Standards Commission (NCPTSC)

Public Schools of North Carolina Accountability Services Division (PSNCASD)

Institutional Review Board (IRB)

Statistical Package for the Social Sciences (SPSS)

Emotional Intelligence (EI)

Organizational Climate (OC)

Resource Dependence Theory (RDT)

Work Adjustment Theory (WAT)

Self-Determination Theory (SDT)

Iowa Tests of Basic Skills (ITBS)

Family Involvement Project (FIP)

Check-In/Check-Out (CICO)

Professional Development School (PDS)

Texas Assessment of Knowledge and Skills (TAKS)

Scholastic Aptitude Test (SAT)

Common Core State Standards (CCSS)

## **CHAPTER ONE: INTRODUCTION**

### **Background**

On October 4, 1957, The Russians successfully launched a small basketball-sized sphere into the atmosphere that was capable of traveling the entire circumference of the world every hour and a half (Mehlinger, 1982). The United States and its citizens were shocked that another country had the knowledge and resources to build such a device. The public started to imagine the awful scenarios that could play out now that Russia had this capability. The Sputnik launch created a panic and realization in America that the United States was no longer the most technologically advanced society.

The United States no longer had the upper hand in technology and started to take a hard look at the educational quality provided to American youth. Mehlinger (1982) pointed out that the Cold War made American education a matter of national defense. In 1958, the United States Congress passed the National Defense Education Act, which focused on improving instruction in science, math, and foreign languages in schools and universities. Three years later, President Eisenhower attempted to calm the public in his State of the Union address. He discussed how the National Defense Education Act of 1958, along with the creation of the National Aeronautics and Space Administration (NASA), was helping the United States make huge leaps in the areas of science, mathematics, and technology (Eisenhower, 2009). The American public believed the United States educational structure was back in order and set to lead the country to superiority.

The United States Executive branch continued to support the advancement of education in the fields of mathematics and science. President John F. Kennedy reauthorized the programs introduced by Eisenhower when he took office. When President Lyndon B. Johnson became president, he took it a step further by authorizing the Higher Education Facilities Act of 1963.

One of the provisions of the act signed by Johnson was to "expand programs for teaching science and mathematics and foreign languages, while extending the other valuable provisions of the National Defense Education Act" (Peters & Woolley, 2015, para. 3).

Although there were similar introductions of educational legislation by subsequent presidents, the United States citizens again were shown evidence that they were not the superior nation. In 1983, National Commission on Excellence in Education (NCEE) published *A Nation at Risk: The Imperative for Educational Reform* (United States, National Commission on Excellence in Education, 1983). McIntush (2000) explained that the report educated the American public on the state of their educational system and the need for improvements, and helped them realize the United States was no longer educationally superior to other nations. The report detailed how far behind the United States was in educating young citizens in the areas of mathematics and science with some startling data. The report detailed how other industrialized nations required all students to start taking classes in higher mathematics and science by grades 6, which "based on class hours, is about three times that spent by even the most science oriented U.S. students, i.e., those who select 4 years of science and mathematics in secondary school" (United States, National Commission on Excellence in Education, 1983, p. 28). Meadows (2007) explained the 1983 NCEE report outlined how the United States was not only at risk for losing their foothold as the top nation in education but for losing their place as the leader in the worldwide economy. The report also recommended the United States hold schools accountable by using "standardized achievement tests as the way to compare students across schools" (McIntush, 2000, p. 436). This not only was another wake up call for academic improvement, but was also a call for standardized achievement testing to measure success.



After years of reauthorizations of past legislation and promises of commitment to improve education by political figures, a new report surfaced, and it did not provide good news. John Glenn, former astronaut and senator, led a commission to assess the status of education in the fields of science, technology, engineering, and mathematics (STEM). This commission was a 25-member committee labeled as the National Commission on Mathematics and Science Teaching for the 21st Century. The commission set out to tackle three specific areas: (a) to make quality improvements to math and science instruction, (b) to lure more qualified applicants into the roles of math and science teachers, and (c) to improve the teaching profession as a whole to make it more appealing (“Glenn commission calls,” 2000). John Glenn outlined the importance of the committee's work in the forward where he stated:

Mathematics and the sciences will become the products, services, standard of living, and economic and military security that will sustain us at home and around the world. From them will come the technological creativity American companies need to compete effectively in the global marketplace. (U.S. Department of Education, 2000, p. 4)

The Glenn commission's findings were another startling realization for Americans and politicians. The findings suggested that the United States education arrangement was inadequate because it was unsuccessful at enticing students to think about their surroundings in scientific or mathematical terms (U.S. Department of Education, 2000). The commission discovered U.S. performance data compared to 19 other nations in advanced mathematics and physics in the research of David Kearns and James Harvey. The data revealed, "out of the 20 nations sampled, none scored significantly lower than the United States in advanced mathematics, and only one scored lower in physics. In a phrase, our mathematics and science students are not 'world class'" (as cited in U.S. Department of Education, 2000, p. 10-11). The commission suggested three

goals should be initiated as a result of their findings. The goals were (a) to establish an ongoing system to improve the quality of mathematics and science teaching in grades K-12, (b) to increase significantly the number of mathematics and science teachers and improve the quality of their preparation, (c) and to improve the working environment and make the teaching profession more attractive for K-12 mathematics and science teachers (U.S. Department of Education, 2000). The overall message the commission wanted to stress was that American students needed to improve in the areas of mathematics and science if they were going to be successful in life and if the United States would remain competitive in a global economy (U.S. Department of Education, 2000). The commission went as far as attaching a dollar amount that would be required to implement their suggestions, but these were only words unless the U.S. government was going to take action.

If the report in 2000 was not enough to spur action, the National Academy of Sciences panel put out a new report in 2005 titled *Rising Above the Gathering Storm* (National Academy of Science, 2005). The panel analyzed data on the current educational situation regarding STEM fields. The investigative findings of this panel revealed that the United States went from being a global leader in the areas of science and technology to a nation struggling to remain relevant on a global level (Gobble & Gwynne, 2011). President George W. Bush reacted to this report by creating the American Competitiveness Initiative (ACI). The initiative earmarked billions of dollars for new research in the field of STEM and called for more than "\$400 million in FY 2007 for science education programs" (Dawson, 2007, p. 30). Now, the American public could rest assured that a focus on STEM education had taken hold.

If improvement was the goal, then school administrators needed a way to make sure they were making progress in the fields of mathematics and science education. The sometimes-

unpopular decision was to implement standardized achievement test for accountability.

Bauerlein (2015) noted that standardized assessments, such as the Scholastic Aptitude Test (SAT) in 1926, were originally developed to level the playing field for students from low socio-economic areas who were trying to compete with the students from high socio-economic areas. Although standardized assessments have come under intense scrutiny lately, they still have value. Heyneman (1987) recognized the cost relief of such tests and the ease of implementation as positive aspects of standardized assessment.

Another positive aspect of standardized assessments can be an increase in content coverage. In a study by Huss and Eastep (2011), over half of the middle school teachers believed that state testing and accountability had a positive effect on the curriculum. An overwhelming majority of those teachers felt they had less autonomy and the researchers attributed those opinions to the focus on content coverage. One of my colleagues at work described an experience he had in a high school United States history course. While he enjoyed the class, he stated that the teacher devoted an entire semester, out of a yearlong course, to the Civil War, because that is what the teacher enjoyed (M. Sanford, personal communication, January 29, 2015). This colleague missed a plethora of history instruction because a lack of accountability allowed the teacher to deviate from the accepted curriculum. Ellis, Lamoureux, Awender, Wessel, and Donohoo (2008) would have felt empathy for my co-worker's situation because they noted, "The function of standardized assessment practices is to make schools and teachers more accountable" (p. 31). Standardized assessments can have a positive impact for the United States educational system by requiring specific content coverage and tracking results in an effort to improve mathematics and science instruction.

The United States has made a commitment to leveling the playing field for American students. The new push is for increased knowledge in the areas of STEM. The movement has infiltrated school districts across the country by advising staff to focus on developing student proficiency and interest in the STEM fields. Teachers across the country are exposed to professional development to help them acquire the skills necessary to lead this charge. The development of the Next Generation Science Standards (NGSS) in 2013, in line with Common Core mathematics and English language arts standards, should help schools focus on this initiative. The NGSS are focused on transferring science knowledge through real world interconnectedness and engineering principles in grade K-12 (Pratt, 2013). The NGSS are aimed at taking science, technology, engineering, and mathematics education to the next level, so students are prepared for the world that awaits.

### **Problem Statement**

The problem is that not enough research exists in the area of teacher working conditions and science and mathematics achievement. Riegle-Crumb, Moore, and Ramos-Wada (2011) explained engagement is the key to producing future scientist regardless of gender. Some experts have advocated for teacher professional development and instruction as the key to increased achievement. Cotabish, Dailey, Robinson, and Hughes (2013) studied the effects of professional development on STEM achievement in elementary students and found increases in teacher content knowledge and science-processing skills can lead to increased student achievement. Other studies have pointed out that the lack of understanding of STEM education by administrators is the problem with implementation. Brown (2011) noted, "Fewer than one half of the administrators (with teachers in their building participating in a STEM focused Master's Degree) understood the concept and/or could describe it" (p. 8). Other researchers have

pointed out that teachers lack an overall understanding of science principles needed to implement STEM activities effectively. Moomaw (2012), an associate professor in early education, discussed that pre-school teachers lack knowledge of science to pull off integrated lessons, which, in turn, could lead to the misunderstanding of science concepts. These examples are rather vague for school districts that are trying to pinpoint what exactly affects student achievement in the areas of mathematics and science education. The problem is the lack of research regarding the school environment along with what is needed to spur greater achievement in the area of science and mathematics education.

### **Purpose Statement**

The purpose of this correlational study was to examine the predictive relationship between the predictor variables of work place condition indicators and the criterion variables of student achievement in the areas of mathematics and science. The eight-predictor variables were extracted from the 2014 North Carolina Teacher Working Conditions (NCTWC) survey. The two criterion variables were created by the North Carolina 5th Grade End of Grade (EOG) level exams in mathematics and science. The 2014 NCTWC survey included the following indicators: (a) Use of Time, (b) Facilities and Resources, (c) Community Support, (d) Manage Student Conduct, Teacher Leaders, (e) School Leadership, (f) Professional Development, and (g) Instructional Practices. Each indicator was compared to the 5th grade EOG mathematics and science scores, which were deemed above grade level. The previously mentioned grade level scores were the percentage of students who scored a 3, 4, and 5 on the EOG exams.

### **Significance of the Study**

This study examined the effects of the school environment on elementary student achievement in mathematics and science. The push for STEM education has reached a critical

point in the American educational system. Schools need to change how they structure the school day, and how they handle daily operations to meet the challenge of improvement in the areas of STEM education. The reported statistics on student performance in the areas of mathematics and science are clear: American students are not performing at the same level their counterparts in other countries are performing in the areas of STEM.

Since the 1960s, the United States has self-monitored educational progress with a variety of exams. The National Assessment of Educational Progress (NAEP) is one tool used to track U.S. students and their educational progress. The results have been less than promising for American students. Peterson, Lastra-Anadon, Hanushek, and Woessmann (2011) reported that just 32% of 8th grade students in the United States were at or above the NAEP proficiency standard in mathematics. Peterson et al. (2011) also noted that when they compared those NAEP scores to the Programme for International Student Assessment (PISA) results, they found students from the United States "in the Class of 2011, with a 32 percent proficiency rate, came in 32nd among the nations that participated in PISA" (p. 53). Epstein and Miller (2011) would add more agony to the United States dilemma in STEM education when they discovered that there were few students in the United States who scored "at or above the proficient level in math and science" (p. 5) on the NAEP exam.

The Class of 2015 had eight percent of their students scoring in the advanced level in NAEP mathematics (Hanushek, Peterson, & Woessmann, 2014). That number by itself seemed to be low and became even more shocking when compared to advanced proficiency levels of other countries. Hanushek et al. examined the proficiency scores for other countries in mathematics and discovered that "Korea (30%), Japan (23%), Switzerland (20%), Belgium (19%), the Netherlands (18%), Germany (17%), Poland (16%), and Canada (16%)" (p. 16) had a higher

percentage of students scoring in the advanced mathematical level than did the United States. At the time of data collection, it was apparent from the research that the United States was far behind other nations when it came to mathematics and science proficiency.

If schools in the United States are going to reduce the achievement gap between their students and other countries in the STEM subjects, then they need to know what area of the school environment has the greatest impact on achievement. The North Carolina Teacher Working Conditions Survey creates a strong data point for schools to assess their working environment. The survey is a researched-based tool that gives a school a score in a number of categories that lead to high student achievement. It also describes how satisfied teachers are with their working environment. The school environment can influence teacher perception of the work place and be a deciding factor on whether teachers continue their employment with the agency.

A great example of being able to retain highly qualified teachers was done in a study on the retention differences between charter schools and traditional public schools. In the study by Wei, Patel, and Young (2014), charter schools had a higher turnover than did traditional schools, but charter school teachers reported a “more supportive teaching environment, higher expectations of students among staff, a greater sense of responsibility for student learning, and higher levels of student engagement in learning” (p. 19). It is conceivable to think that if traditional schools improve discrepancies, then traditional school retention could be even higher. The teachers at the charter and traditional schools in the study were responding to their work environment, which is an example of the work adjustment theory (WAT). The WAT describes how an employee’s perception of his or her satisfaction with the work environment is a result of his or her ability to perform the required tasks and the reinforcements available to improve or

continue satisfactory performance (Dawis, England, & Lofquist, 1964). It makes sense that retention and job satisfaction should be one of the key goals of any school district. This study could help schools refine the practices that lead to teacher satisfaction and retention, while focusing on student success in science and mathematics.

The school environment can be an important factor in student achievement. An environment that is conducive to learning will allow students to focus on achievement. In their study, McMahon, Keys, Berardi, and Crouch (2011) hypothesized that the school environment could affect a student's sense of belonging, the most significant relationships to academic achievement. Students are a valuable and sometimes overlooked source of feedback for the school climate. Van Ryzin (2011) studied student perceptions of the school environment and how this relates to academic achievement. The researcher concluded, "The school environment . . . can be a significant source of protective factors that can both promote healthy adolescent development and enhance school performance" (p. 1577). A school's faculty is another valuable source for feedback on the school environment that is conducive to learning. B. Johnson and Stevens (2006) studied teacher perceptions of the school environment and the relationship to student achievement. Their research uncovered the following:

Schools in which teachers perceived a positive school climate, with a high degree of affiliation among teachers, an atmosphere of innovation, high involvement of teachers in the decision-making process, cooperative, friendly students, and adequate resources and facilities, had better average student achievement. (p. 118)

This study can help solidify current research on the effects of school environment and positive student achievement. In addition, this study adds to the current research by pinpointing which part of the perceived environment can predict achievement in the areas of mathematics



and science in the elementary grades. This study may help the schools and United States close the STEM achievement gap, which currently exist between American students and other countries.

### **Research Questions**

The research questions for this study follow:

**RQ1:** How accurately can grade level scores on *North Carolina Science End of Grade (EOG) standardized assessment* be predicted from a linear combination of Teacher Working Conditions factors for grade 5 North Carolina elementary students?

**RQ2:** How accurately can grade level scores on *North Carolina Mathematics End of Grade (EOG) standardized assessment* be predicted from a linear combination of Teacher Working Conditions factors for grade 5 North Carolina elementary students?

### **Null Hypotheses**

The null hypotheses for this study follow:

**H<sub>0</sub>1:** There will be no significant predictive relationship between the criterion variable (Science EOG) and the linear combination of predictor variables (Time, Facilities & Resources, Community Support, Manage Student Conduct, Teacher Leaders, School Leadership, Professional Development, and Instructional Practices) for grade 5 North Carolina elementary students.

**H<sub>0</sub>2:** There will be no significant predictive relationship between the criterion variable (Math EOG) and the linear combination of predictor variables (Time, Facilities & Resources, Community Support, Manage Student Conduct, Teacher Leaders, School Leadership, Professional Development, and Instructional Practices) for grades 5 North Carolina elementary students.

## Definitions

The subsequent terms were defined to help provide lucidity of the vocabulary that is referenced throughout this study.

1. *Community Support and Involvement* - Tschannen-Moran and Tschannen-Moran (2011) defined community engagement and support as “the degree to which the school can count on involvement and support from parents and community members and the extent to which the school provides the community with information about its accomplishments” (p. 440).
2. *Teacher Leadership* - “Teacher leadership, in its truest sense, involves those informal aspects of leadership, where a teacher sees a need or identifies a problem and takes the reins to address it within his or her means” (Helterbran, 2010, p. 365).
3. *School Leadership* - Lumpkin (2008) described a strong school leader as someone who will “establish a school’s culture based on integrity and values, enhance the competences of each teacher, and create alignment with a shared focus on student learning through teamwork” (p. 25)
4. *Time Use* - McEwan (2012) summed up teacher time use by explaining the activities that monopolize it at school. The author stated, “Time that could be used for planning or grading may actually be consumed by committee responsibilities and duty assignments, meetings with departments and cross-disciplinary groups, as well as meeting and corresponding with parents” (p. 83).
5. *Facilities and Resources* - Arsen and Yongmei (2012) sighted examples of school expenditures as “regular classroom instruction, special needs instruction, instructional support, administration, or operations and maintenance” (p. 3).

6. *Management of Student Conduct* - Schimmel (2003) summarized some of the keys to ensure an orderly school environment, which focused on producing quality students and citizens, as it was historically intended to be. The suggestions were to create an environment “that encourages student participation and responds to their interests and concerns—through both the formal and hidden curriculum—students are more likely to become the active citizens and responsible supporters of our constitutional democracy” (p. 34).
7. *Professional Development* - Zollman, Tahernezehadi, and Billman (2012) described strong professional development as: “[a] a strong focus on developing teacher knowledge of and ability to teach the subject matter; [b] a solid relevancy to the teacher’s classroom situation; and [c] an intensive, sustained duration for professional development” (p. 107-108).
8. *Instructional Practice* - Rosenholtz and Simpson (1990) described the ideal environment that will maximize teacher instructional effectiveness. The authors explained that the environment that “sets clear-cut, narrow boundaries around the task, protecting the job from non-instructional duties, decisions, or interruptions, and that allows teachers the greatest autonomy and professional support for performing the core instructional tasks defined within those boundaries” (p. 254).

## **CHAPTER TWO: LITERATURE REVIEW**

### **Introduction**

The focus on mathematics and science has been a growing trend in education. The phrase STEM education has evolved from this focus in mathematics and science in the United States. In 2009, President Obama launched his Educate to Innovate campaign ("President Obama launches," 2009). President Obama wanted schools to increase student achievement in the areas of mathematics and science. In fact, President Obama hosted a science fair at the White House during his presidency to promote STEM education. In 2009, Americans were led to believe that the United States was on the right track when it came to improving education in the fields of mathematics and science, but that was short lived.

In 2012, the Organization for Economic Cooperation and Development (OECD) reported the PISA results, and they were disappointing for the United States. The OECD compared the scores on the PISA test for 34 OECD member countries (as cited in Kelly et al., 2013). The organization dissects data and reports on things such as the percentage of students who score at the highest level of proficiency (level 5) and the percentage of students who score at the basic understanding level (level 2). In 2012, the OECD reported that the United States' 15-year-old population had a lower percentage of students at level 5 and a higher percentage at level 2 in both mathematics and science than did more than 50% of the participating countries (Kelly et al., 2013). Not only was the United States below more than half of the OECD countries, but the United States had remained stagnant in mathematics and science when comparing the 2006, 2009, and 2012 average scores on the PISA test (Kelly et al., 2013). Miller, Warren, and the National Center for Education Statistics (2011) compared different university statistics in highly industrialized, G-8 countries, which are Canada, France, Germany, Italy, Japan, United

Kingdom, and the United States. The shocking revelation was that the United States had the lowest ratio of university degrees awarded in the STEM fields to university degrees awarded in arts and humanities. The United States educational configuration has determined a direction for its academic failure in the areas of STEM, but now it needs to reach a conclusion on how it will arrive at its destination.

Elementary education is important because it lays the foundation for a child's future. McCarthy and Quinn (n.d.) discussed the emphasis that is placed on elementary education in the 21st Century and how "leaders, teachers, and parents seek ways to make the first step in the American education system educative, meaningful, and positive" (para. 4). The authors were trying to explain that a strong education in the early years would spur the on-going desire to learn. Bracey (1996) looked back at 75 years of elementary education and proposed that the 1965 Elementary and Secondary Act (ESEA) was responsible for a shift in the thinking toward primary education as the foundation and not just as the beginning of school attendance. The importance of early childhood education goes much further back than 1965. Finkelstein (1991) discussed how "early republican statesmen like George Washington, Benjamin Rush, and Noah Webster identified the fate of children and the fate of a young nation as utterly intertwined" (p. 465). Dr. Alan H. Schoenfeld (2009), the chair of education at University of California at Berkley, explained it best when he noted, "What and how we teach not only affects how students see themselves, but it also affects their trajectories through life" (p. 28). Laying the foundation for the future starts with the experiences that children are subjected to at an early age. Maldonado-Carreño and Votruba-Drzal (2011) studied the effects of student-teacher relationships on academic achievement and behavior problems in grades K-5. The results showed that the quality of student-teacher relationships reported by the elementary teacher was associated with the levels of academic

achievement and behavior for students as they move from kindergarten through fifth grade. A focus on elementary education will help lay the foundation for building stronger mathematics and science students in the United States.

A concentration on mathematics and science in elementary grades in the United States would require a system in place to track progress. The answer could be the use of standardized assessments. Phelps (2005) defended standardized testing by explaining that these types of tests offer “improved diagnosis (of student's strengths and weaknesses); improved prediction and selection (for college, scholarships, or employment) and; most controversial, improved achievement” (p. xv). These types of tests can ensure that schools are meeting the call for improvement in science and mathematics. Teachers at a Title I school who adopted a new improvement program in 2009, with increased testing, praised the practice because it “provided them with an extra reminder to hit standards, ‘even if it’s something I don’t really like teaching”” (Snow-Gerono & Gregory, 2009, p. 38). A prime example favoring the use of standardized assessments is in North Carolina. The North Carolina education system uses EOG testing in their school districts to ensure their students are meeting the standards. North Carolina uses two separate EOG tests in grade 5 to test achievement in mathematics and science. North Carolina is able to determine if they are meeting the call for improved achievement in these two areas in the elementary grades.

Mathematics and science in the elementary grades are a great place to start in the pursuit of improved achievement in the STEM areas, but the next step is to look at what will have the greatest impression on this realization. North Carolina employs an outstanding tool that can be used to look for relationships between practice and student achievement. Since 2002, North Carolina has tracked responses from teachers to evaluate how well the schools are supported to

allow them to deliver quality instruction (“North Carolina teacher working conditions,” 2014). The categories are Community Support and Involvement, Teacher Leadership, School Leadership, Managing Student Conduct, Use of Time, Professional Development, Facilities and Resources, Instructional Practices and Support, and New Teacher Support (“North Carolina . . . about,” 2014). A composite score is calculated from the responses to each question in the categories. This gives the school a score on each category that they can use to improve conditions that have been researched and discovered to improve teacher working conditions. These scores can be cross-referenced against North Carolina EOG scores in 5th grade mathematics and science to see which category has the greatest influence on student achievement in these content areas.

### **Theoretical/Conceptual Framework**

If a teacher’s perception of his or her working conditions is favorable, it is logical to conceive he or she will be more enthusiastic and engaged at work. This then could lead to increased engagement and higher academic achievement for the students. Gujarati (2012) discussed the need for schools to improve their practices for new teachers to give them time to develop the skills necessary to meet the needs of the students successfully, which will lead to increased satisfaction and retention. The practices schools use to assist new teachers fall in line with the resource dependency theory (RDT), which involves the way “organizations respond to and manage their resource dependencies, how those decisions shape organizational structure/behavior, and the subsequent power dynamics that emerge” (Neely, 2015, p. 5). The study of RDT in schools by Smith and Meier (1994) discovered schools in the United States were managing a lack of resources by adding additional administrative tasks to teacher workloads. Smith and Meier found that pushing the normal tasks of an administrator off on

teachers actually hurt student performance. The way that schools respond to their resource dependency can have a detrimental effect on school success. This research can aid schools in resource allocation that will improve, not decrease, student achievement.

A teacher's decision to stay or leave can be the product of his or her work environment. Herzberg (1974) detailed the factors of work satisfaction in his motivation-hygiene theory. The motivational aspect involves the content of the job, and the hygiene feature involves how employees are treated at work. The motivational factors create job satisfaction if present, and the hygiene aspects determine dissatisfaction if they are not present (Islam & Ali, 2013). This theory relates to education because as a teacher's tenure increases, then so do the opportunities for development of sound teaching practices. A school must be focused on improvement for a teacher's skill and practices to evolve. Cerni, Curtis, and Colmar (2014) studied transformation leadership and concluded that a consistent push toward excellence "may translate into increased job satisfaction among staff and consequently improve student learning outcomes" (p. 302). As teachers move on, by voluntary transfer or a career change, so does the expertise in teaching practices and relationships with the stakeholders. This can have a devastating effect on student achievement, especially in high-minority, low-performing districts. Watlington, Shockley, Guglielmino, and Felsher (2010) researched teacher attrition in high-minority, low performing districts and concluded that teacher turnover jeopardizes student achievement with these types of populations. Because of the present study, school administrators will be able to determine what needs to be changed with the job content and employee treatment to increase student achievement.

The perception teachers have of their working conditions has a domino effect on school effectiveness. Deci and Ryan (2008) worked on the self-determination theory (SDT), which



details the intrinsic and extrinsic motivation of employees in the work place. The SDT is almost a guide for employers on how they can create an environment that promotes self-evaluation of performance for satisfaction (intrinsic) or an environment that promotes fear of reprimand to complete job responsibilities. The researchers cautioned employers to avoid creating environments that promote the fear of reprimand because they have discovered the greatest gains in job performance with autonomous (intrinsic) motivation (Deci & Ryan, 2008; Stone, Deci, & Ryan, 2009). This theory is helpful for administrators who are attempting to create a sound working environment that leads to academic success for students. This research study can help administrators determine what areas of the school environment are in need of attention to improve intrinsic, rather than extrinsic, motivation for their teachers. An environment that fosters optimal conditions for teacher effectiveness could lead to greater teacher satisfaction and retention, which, in turn, could lead to higher academic achievement for students in the areas of mathematics and science.

### **Use of Time**

Teachers require time to accomplish the plethora of responsibilities that are assigned to them by the district. The use of time can mean a variety of things, but it can be narrowed down to organizing the teachers' day in a way that allows them to meet their responsibilities. The NCTWC includes two additional areas of emphasis in this category of time. The NCTWC includes appropriate class sizes and class interruptions in addition to time allotted for instructional and non-instructional responsibilities (North Carolina Teacher Working Conditions Survey, 2014).

The expenditure of time allotted to a teacher by a school can influence a teacher's satisfaction with his or her working conditions. The duties that teachers are held accountable for

can be overwhelming and can take a toll on their state of mind. Nagar (2012) proposed that the result of high demands and a lack of time could lead to a “deterioration of their relationship with students which in turn leads to a reduced sense of satisfaction with various aspects of their job” (p. 55). Few alternatives seem to be available for schools to reduce teacher dissatisfaction with their job when it comes to the use of time issue. Kühnel and Sonnentag (2011) researched the benefits of vacation on teacher burnout. These researchers realized that all the positive effects of vacation were eliminated when the teacher returned to work and dealt with the time pressure of the job. The time pressure issue can be relieved with the support of colleagues helping teachers cope with the high demands on their time. The results of time pressure and lack of peer support can lead to a teacher’s dissatisfaction with his or her work environment. Wei et al. (2014) discovered that charter schoolteacher retention could improve if they were allocated more time for collaboration among colleagues. Teacher time use is one of the most difficult issues for schools to deal with and can be detrimental to schools beyond teacher perceptions.

The use of time in a school can have an effect on academic success for students. Students need instructional time to learn. Sometimes, the additional responsibilities that teachers face cut into learning time. A report on teacher time use (TTU) found that the obstacles preventing teachers from increasing instructional time were “extra responsibilities, lack of time for paperwork completion, the amount of paperwork, ability groups in class arrangements, and standardized testing calendars” (Vannest, Soares, Harrison, Brown, & Parker, 2010, p. 96). Instructional time can be a crucial factor in the achievement of students.

Student achievement can be improved by focusing on improving the length and quality of instruction. Blank (2013) analyzed the decline of science instructional time in elementary classrooms and discovered “classes with the highest amount of class time per week (4 hours) had

average NAEP achievement scores 12 points higher than students in the classes with the lowest amount of class time” (p. 842). Vitale and Romance (2012) suggested changes to how science is taught in the elementary grades. The researchers suggested science instruction should be combined with literacy instruction. They used the Iowa Tests of Basic Skills (ITBS) to measure the outcomes of the study. The results of their experiment showed “the effects of the Treatment/Intervention were statistically significant in favor of the grade 1- 2 experimental Science IDEAS classrooms for both ITBS Science and Reading” (p. 465). Increased instructional time seems to be an obvious choice to increase student achievement, but it is not the only factor.

The time set aside for peer-to-peer support can have a positive effect on student achievement as well as teacher satisfaction. Whether the peer-to-peer interaction is called professional learning communities (PLC) or collaboration time, it has the same positive affect on achievement. A large urban school in Texas used the PLC platform to turn around their poor performance on the Texas Assessment of Knowledge and Skills (TAKS) standardized assessments. D. Williams (2012) studied Texas schools’ achievement during the PLC initiative and found, “Significant increases in the reading mean percentage passing on the TAKS occurred during district-wide implementation of PLCs” (p. 37). The benefit of peer-to-peer support seems to extend to the area of special education as well. A study involving schools that experienced high achievement by their special education population “indicated that, for inclusion to work, general and special education teachers need to collaborate” (Huberman, Navo, & Parrish, 2012, p. 70). The time to meet with colleagues seems to be a critical component of time management for schools.

If the additional teacher responsibilities must be in place, then a solution could be to reduce the class sizes. In their study on the effects of vacation for teachers, Kühnel and Sonnentag (2011) encouraged reduced class size, but realized “that this recommendation is not very realistic because of the current economic situation” (p. 140). California decided to test the theory of reducing class sizes to improve academic achievement. Jepsen and Rivkin (2009) reported in their study of California’s Class Size Reduction (CSR) initiative that, “Overall, the findings suggest that CSR increased achievement in the early grades for all demographic groups” (p. 247). The schools that give teachers time to complete all of the responsibilities, whether it is instructional or non-instructional, could experience positive outcomes.

### **Facilities and Resources**

For teachers successfully to implement all of the responsibilities that are required, they need functional facilities and sufficient resources. This category involves the systems in place that allow a teacher to navigate the academic day smoothly and efficiently. The NCTWC survey includes categories such as availability of instructional materials, access to relevant and functional instructional technology, availability of support personnel, and maintenance and space available in the physical environment (NCTWC, 2014). The condition of the facility and availability of resources provided can lead to the optimal environment for teachers to meet their responsibilities.

Facilities and resources can affect a teacher’s perception of his or her working environment. Teachers and other professionals struggle with the demands of life outside of work and their career. Padma and Reddy (2014) investigated schools that provide their employees with work life balance (WLB) facilities and discovered teachers in those types of schools had greater job satisfaction. Many schools across the country face the reality of deteriorating

facilities. Many difficult decisions must be made when deciding if upgrades should be done to a school. The first question that has to be asked is, “Will it make a difference?” That question was answered by researchers looking into how facilities play a part in school climate. Uline, Wolsey, Tschannen-Moran, and Lin (2010) discovered, “The aesthetic aspects of the physical learning environment play a prominent role in creating and sustaining a productive learning climate within schools” (p. 628). The physical environment seems to play a part in how a teacher feels about their school environment.

Aside from facilities, available resources play a part in teacher perception of their school’s learning environment. Every department member in a school needs and wants the resources to be successful at his or her job. Some of the largest needs come from technology support and special education. In the 21st century, students are products of a technological world and can navigate it fairly well. For schools to have a technology rich environment, resources must be spent on the technology infrastructure and support for teachers to help integrate it into their classrooms. Lin (2011) studied an art teacher’s journey with integrating technology into the classroom and revealed how the teacher’s motivation and satisfaction were affected by the school’s commitment to technology support.

The area of special education is as challenging as technology support because of the exceptional needs of some students. Berry and Gravelle (2013) interviewed special education teachers in a rural environment and found that “budget, time, scheduling, responsibilities, and role confusion” (para. 53) were the major obstacles identified by these teachers. Berry and Gravelle proposed that schools could increase work satisfaction for special education teachers if attention was directed toward improving those conditions. Research shows there are additional benefits for schools that focus on teacher attitudes toward the school environment.

The conditions created by proper facilities and resources can affect student achievement. It is difficult to decide where the bulk of a school's budget should be allocated to produce results. Schools can start with the facilities to help improve student outcomes. Jimenez-Castallanos (2010) discovered a link between the age of facilities and student achievement. The newer school designs tended to be geared more toward pedagogical pursuits. As a result, student achievement increases as the age of the facility decreases. With the upgrade to facilities, schools must provide the resources to fill it. Technology appears to have a positive effect on achievement, as it did for teacher perceptions of their environment. In a study of technology immersion by Shapley, Sheehan, Maloney, and Caranikas-Walker (2011), schools that implemented immersion were more successful than schools that did not. The study pointed out that while achievement differences in mathematics and reading scores were positive, they were not statistically significant. The immersion schools study did reveal less classroom behavior issues for these schools, which could lead to more time for teachers to focus on engaging lessons.

Many areas for resource allocation seem to affect student performance positively. Chien and Mistry (2013) investigated the effects of school resources on students in different demographics. From their findings, the researchers suggested poor students attend schools that are inadequately supplied with resources, and school resources had a greater effect on student academic achievement for poor students than for students with a higher socio-economic status. School resources can have an effect on a student's desire to learn or participate in class. Rutten, Boen, and Seghers (2012) investigated students' desire to participate in physical education class. Rutten et al. set out to find out if student autonomy in physical education class would be improved if the physical education teachers focused on allowing students to choose activities. Their results determined a link between students' desire to participate and autonomy, but also

discovered that the status of resources and facilities related to student autonomy. Another group of researchers made a discovery that may shock school and public officials. James et al. (2011) investigated school expenditures on student achievement. These researchers found teacher salaries and benefits had the greatest impact on student achievement. It is evident that resources play a part in conditions and performance for school districts.

### **Community Support and Involvement**

The support and involvement of the community can ease the difficulties faced by teachers as they try to meet the needs of their students. This category, in the simplest terms, is the level of interaction the school has with the community. The level of interaction between these entities can contribute to the teacher's ability to meet the needs of all stakeholders. The NCTWC survey contains items such as systems in place to encourage parent/community involvement, contributions from parents, community involvement in decision-making, and parent/guardian understanding of school programs and processes (NCTWC, 2014). All of these indicators can lead to the prime conditions for school and teacher success.

Community involvement and support can affect a teacher's opinion of his or her working environment. Trust is an important aspect for any relationship to develop into a meaningful partnership. A small, rural district set out to improve its community relationships to help improve working conditions. Tschannen-Moran and Tschannen-Moran (2011) studied a school that used a technique called Appreciative Inquiry (AI), which helps spur positive change in schools by developing opportunities for community outreach. Tschannen-Moran and Tschannen-Moran discovered that teachers in the elementary school, not district wide, experienced a greater sense of community engagement and increased trust with the parents and students because of these efforts. While the previous study focused on increased engagement of

the community and the success, it can also have a detrimental effect if there is too much involvement. Landeros (2011) studied the relationship between teachers and mothers who were overly involved in their children's school. The teachers overwhelmingly agreed that too much involvement could produce an atmosphere that prohibits their abilities to teach successfully. Although the delicate balance between enough and too much community involvement can influence a teacher's perception of the school environment, it still is an important factor in academic attainment.

LaRocque, Kleiman, and Darling (2011) reported, "Schools, even well-intentioned ones, cannot educate every child on their own. They need the active support of community and family" (p. 115). The research supports the beginning statement on the importance of a strong community relationship with its school. Lam and Ducreux (2013) would agree with the statement on strong community relationship. However, through their study, they realized "parental influence is often low at many schools" (p. 588). Schools need to find ways to engage parents and create a sense of shared responsibility in educating students.

Quezada (2014) emphasized the need for support from families with the realization that schools with strong perceptions of parent association experienced higher math proficiency for their students. Parent involvement just does not occur without some type of catalyst to get it started. Donnell and Kirkner (2014) studied a family-to-school immersion program for families where Spanish was the predominate means of communication for the families. The YMCA Family Involvement Project (FIP) provided training to parents and teachers to help create a strong community to help students achieve. After two years in the program, "FIP participation was positively and significantly predictive of effort, social skills and work habit grades, as well as standardized English Language Arts test scores, and somewhat predictive of achievement



grades” (Donnell & Kirkner, 2014, p. 227). This study did highlight the advantages of creating a community atmosphere to help students.

When the relationship with the community is present in a school there can be positive outcomes, and not just in academics. Kanters et al. (2014) investigated how sharing school facilities with community organizations would affect student physical activity. The study cross-referenced the number of shared use opportunities that were being offered and student participation in afterschool programs. The researchers discovered an increase in female participation as the amount of use increased, but the male population only showed significant changes at the highest use levels. This type of partnership creates a sense of shared responsibility between the school and community. This partnership could lead to community support for other issues that arise in the school district.

An overwhelming element in almost every study on community engagement and student success involves communication. Rapp and Duncan (2012) claimed that communication was the single most important component of creating a collaborative atmosphere between the school and community. Schools have shown academic success when they shift to a focus of communication and collaboration with the community. This is evident in the research performed by McCoach et al. (2010) on schools with low Supplemental Educational Services (SES). McCoach et al. found “communication and collaboration among parents, teachers, and staff appear to be critical factors predicting the success of low-SES schools” (p. 453).

An often-overlooked communication piece in a school community is the school board. School board members are elected to their positions by the school community members. They are the voice of the people in the community when it comes to decisions made in the school district. P. Johnson (2013) studied the practices of school boards of high achieving districts.

This researcher discovered that school boards in low-socio economic areas with high achievement perceived themselves “as engaging in effective board leadership practices to a greater extent than board members from low-wealth, high-poverty, lower-achieving school districts” (P. Johnson, 2013, p. 480-481). Again, the aspect of community involvement and support appears to produce beneficial results for schools.

### **Managing Student Conduct**

Managing student conduct can be the difference between a positive or negative school experience for the students and teachers. This indicator involves the ability of the administration and instructional personnel to affect student conduct in a positive manner. A strong understanding and commitment in this category can lead to more time on academic pursuits. The NCTWC survey contains items such as student understanding and compliance of rules, administration and faculty understanding and enforcement of rules, administrator support of teachers, and a safe environment (NCTWC, 2014). A successful experience for teachers and students can be the result of proper management of student conduct.

A teacher’s outlook on his or her working environment can be swayed by how well student conduct is managed in the building. Youngs, Hyun-Seung, and Pogodzinski (2015) studied how novice teachers perceived their work environment and performance when they have a principal who held students accountable for behavior. All of the teachers reported they were satisfied with the working conditions and their performance because of their principal’s consistency to support teachers with instruction and adherence to student behavior policies. All of the teachers stated they intended to continue employment with the school because of the support of their principal. The management of student conduct can have a positive effect on teachers who are dealing with the stress of the teaching profession.

Holding teachers accountable for students' results requires the teachers to follow standards and meet the needs of their students. The teachers are then evaluated, formally or informally, because of student academic success. This creates stress on teachers to provide sound instruction and engage their students at all times. The teacher who must constantly disrupt instruction to deal with discipline can feel overwhelmed by the need to address the disruption and meet those accountability measures. Schaubman, Stetson, and Plog (2011) studied the impact of implementing Collaborative Problem Solving (CPS) in a school district and the effect it would have on teacher stress. CPS is a collaborative, or school-wide, effort to create a supportive environment for students and reduce behavior issues. The self-report by teachers after the implementation showed a reduction in teacher stress, which the authors hypothesized would lead to relationships that are more positive. The issue of teacher stress is an important factor to include in any effort for school improvement.

Richards (2012) studied teacher stress across the country and realized that teachers are highly stressed, with California leading the way in this category. Richards ended the study by emphasizing that reducing stress for teachers is a critical component to consider when embarking on any achievement improvement plan. Teachers' point of view on working conditions can be improved by a collaborative approach to the management of student conduct, which permits them to focus on educating students.

The key to managing student conduct could be hidden in the quality of instructional practices used in the classroom. In 2011, Schumacher, Grigsby, and Vesey conducted a study to determine the qualities that principals should look for in prospective teaching candidates. Through their research, Schumacher et al. found high academic achievement was the byproduct of teaching practices that curbed student conduct issues. The successful teachers in their study

concentrated on “determining expected behaviors and consequences, preparing for instruction, implementing instruction, and monitoring students’ progress and potential are key to student success” (Schumacher et al., 2011, p. 6). The management of students’ conduct has been found to influence behavior and academics even in the most extreme environments.

Swoszowski, Jolivette, and Fredrick (2013) studied the effect of the implementation of a Check-In/Check-Out (CICO) intervention program in a residential school for students with extreme emotional and behavior disorders. The program had the students to check-in every morning to establish the expectations and the rewards for positive behavior, then the students had to check out to discuss if their goals were met. An additional component included home visits to include parents in the process. The results showed a reduction in behavior incidents and improvement in academic performance in all subject areas. In addition, the staff perceived the program as having a positive effect on the students. Managing student conduct is important for the success of students in a variety of settings.

It is difficult to standardize the meaning of the words *high achievement* because different areas set that bar at different levels. Freiberg, Huzinec, and Templeton (2009) applied a statistical measure to the term high achievement. In their research, they analyzed data from a school that implemented a Consistency Management and Cooperative Discipline (CMCD) program for teachers. By the second year of implementation, the teachers reportedly saved “an average of 45 minutes per day, equaling 27 school days (5.4 school weeks) of time saved per year” (Freiberg et al., 2009, p. 77). With the increase in classroom instructional time “students’ mean mathematics test scores improved from the 50th percentile before CMCD to the 75th percentile after CMCD program participation” (Freiberg et al., 2009, p. 75). The focus on the management of student conduct can have positive effects on student achievement. This is why it

is important to support teachers in the development of management practices and to implement overall school initiatives on this subject. Richards (2012) summed it up best, “It is true that ‘children are our future,’ but teachers lead the way” (p. 312).

### **Teacher Leadership**

The value of peer-to-peer interaction can be more beneficial to teacher development and success than the direction given from a superior or outside entity. This peer interaction can take many forms and can be called by many different names. Regardless of the name given to the opportunity, it can positively affect a teacher, both professionally and personally. The NCTWC survey covers categories such as teacher autonomy, recognition as experts, inclusion in the decision-making process, and leadership opportunities (NCTWC, 2014). The positive reaction from teachers, which occurs because of being encouraged to lead and be led by other teachers, can benefit the school in a variety of ways.

A teacher’s analysis of his or her working conditions can be influenced by the teacher leadership experience and leadership opportunities. This kind of initiative can be difficult for schools to implement and sustain. It requires a school to cultivate an environment that invites teachers to identify and rectify situations that are in need of improvement. Helterbran (2010) discussed how teacher leadership is sometimes construed as an extra duty that a smooth talking principal can push off on an unsuspecting teacher. Helterbran strongly recommended that teacher leadership evolve from within the teaching ranks to benefit the school and students. Sometimes teachers prefer to learn from someone within their own organization. They desire to learn from someone who is familiar with their situation and has proven to be an exemplary teacher. In a study on technology integration by Schrum and Levin (2013), all eight locations surveyed indicated they found informal, peer-to-peer professional development as the most

helpful. The peer-to-peer relationship gives novice, or insecure teachers, someone to turn to for advice and guidance.

In a review of an Alabama Teacher Mentor Program, Kent, Green, and Feldman (2012) hypothesized that mentorship from strong teacher leaders would help new teachers “remain committed to providing consistent, quality education and instruction on a long-term basis” (p. 10). Teachers who feel supported by their peers are likely to remain confident in their abilities and be content with their work environment. That support can also be in the form of teacher autonomy. Sacks (2013) reported on the progress that a school was making with a teacher-led initiative with middle students and homework. The teachers developed a process where students could receive assistance on assignments during the school day instead of being assigned after-school detention because of a missed assignment. A student would be assigned to a teacher’s office hours if the student was falling behind. The student would be released once he or she was caught up on homework. The principal allowed the teachers to take the lead on an issue that was plaguing their work environment. The new, non-punitive homework system immediately improved student grades, student homework habits, and teacher satisfaction with the work environment. The teachers felt the change would not have been possible without the opportunity and permission of their administrator to come up with a viable solution. This type of opportunity allows teacher to take ownership of programs and could help sustain the change.

Teacher leadership can be the cornerstone of a commitment to school improvement. To create that cornerstone of school improvement, a school should focus on professional development. The important aspect of this type of school improvement is opportunity. The teachers need to be allowed to commit themselves fully to the professional development to see any change and to create teacher leaders. Carpenter and Sherretz (2012) studied the effects of

Professional Development School (PDS) partnerships, and the affect it has on fostering teacher leaders. The teachers were provided the opportunity to collaborate with a local university on research projects that would help students in certain areas. The teacher participants were involved in every step of the process from planning, implementation, data collection, and analysis. The teachers would then provide professional development to other staff members on the results of the programs. The researchers found this type of activity actually increased the likelihood of teachers becoming leaders in their school. In addition, Carpenter and Sherretz (2012) believed this type of program would create better teachers, produce higher student achievement, and provide an overall higher quality of school. Schools that provide these types of opportunities for teachers could see an increase in teacher leadership.

Because of professional development for improvement, teachers can gain confidence and knowledge to help lead that change. Slavit, Nelson, and Kennedy (2010) studied a project initiated in one school to develop teacher leaders for PLCs. The development of the teacher leading PLC in this school was found to contribute to a near 20% increase in student achievement on standardized assessment in science. Slavit et al.'s study is another example of teachers being led by teachers and producing positive results for the school. Some of the most important and influential leadership can come from the teacher leaders.

### **School Leadership**

The strengths and weaknesses of school leadership can play a role in how successful the school environment can be for teachers and students. Leadership is one category with a link to every other indicator. Kruse (2013) defined leadership as "a process of social influence, which maximizes the efforts of others, towards the achievement of a goal" (p. 3). In a way, school leadership is the heart of the school, and the functionality of every other part depends on its

strength. The NCTWC survey consists of classifications, such as shared vision and mission, an atmosphere of respect, teacher evaluation and feedback, data driven decision making, and the performance in every other indicator (NCTWC Survey, 2014). All of these individual elements, when working in unison and effectively, can result in positive teacher opinions of their environment and improved student achievement.

The optimal conditions that promote a teacher's sense of a successful work environment can be the result of successful school leadership. From their study of principal characteristics and teacher job satisfaction, Shaw and Newton (2014) explained how the amount of resources directed toward training and improvement directives would be wasted if schools do not have a leader who can create a supportive environment that promotes teacher retention. An educational leader's sensitivity toward others, or emotional intelligence, can affect the climate of the work environment. Goleman (2004) claimed that emotional intelligence at work involved a leader's self-awareness, self-regulation, motivation, empathy, and social skill. These types of leadership characteristics foster positive relationships, which influence a teacher's outlook on his or her environment. Momeni (2009) studied the association between a leader's emotional intelligence (EI) and the organizational climate (OC) he or she creates. The study used an EI self-assessment survey and an organizational climate survey completed by employees and supervisors. "These results show the higher a manager's EI, the better that manager's OC" (Momeni, 2009, p. 45). The constituents may be more inclined to push that extra mile for a leader who they believe to be competent.

The quality of the school leadership can create an atmosphere fit for learning. E. Williams (2009) studied the relationship between 4th grade teachers' perceptions of school leadership and a number of variables, which included school climate. The researcher discovered



a strong relationship existed between teacher perceptions and school climate. Although there was a weak relationship between climate and student achievement, there was a strong relationship between amount of discipline incidents and student achievement. Overall, this study did lend itself to the other research on how leadership can make a difference in a teacher's perception of his or her working environment. A school's staff members may take more pride in their work place and work harder to achieve their goals if there is a pleasant work climate that results from a school leader's direction.

The aspect of educational leadership that seems to be inconsistently researched is character. Kouzes and Posner (2012) developed the top four characteristics people want in their leaders. During their studies, the top choices were (a) honesty, (b) forward-looking, (c) competent, and (b) inspirational. A person's character is more a natural occurrence from a person's experiences, rather than a set of skills, which are learned through schooling or professional development. Successful leaders have an innate sense of commitment to their staff that goes far beyond a simple salutation. Sergiovanni (2005) noted, "Effective school communities depend upon the virtue of piety to provide a floor of shared values and ideas that tie everyone together, provide security and support, and give the school a special identity that communicates its character and purposes" (p. 121). That *identity* will make a school leader's job a little easier, especially when it comes to reaching a compromise that will make everyone comfortable.

Pepper (2010) declared that successful districts gather input from the people who work directly with the students every day. The researcher stressed that the additional step of inclusion in decision-making and strong managerial skills were the keys to running a smooth and effective working environment. Those managerial skills included fostering teacher leadership in a school.

Administrators should create a shared leadership model as a way to develop a collaborative culture that promotes student academic success. Louis, Leithwood, Wahlstrom, and Anderson (2010) discussed how the collective leadership model leads to student achievement because of its effect on teacher interest and work place environment. The actions and characteristics of a school leader can affect student academic success in addition to a positive working atmosphere.

The abilities and character of a school's leadership can propel a school to academic success. The literature supported the idea that the beliefs, character, and practices of a school leader seem to be the most influential components in student achievement. Soehner and Ryan (2011) defined the five core leadership capacities that promote an atmosphere conducive to learning as (a) setting goals, (b) aligning resources with priorities, (c) promoting collaborative learning cultures, (d) using data, and (e) engaging in courageous conversations. Educational leaders set their schools up for success by establishing their vision or goals for a district. For the vision or goal to be accepted, it has to be modeled from the top down, which starts with the superintendent who expects the best of their students (Wright & Harris, 2010). An example of a direct way to convey school goals was discussed by Louis et al. (2010) who explained, "Leaders in higher-performing settings not only worked to establish and communicate clear expectations for curriculum and instruction; they developed and applied mechanisms for monitoring the implementation of district expectations through supervision systems and school-improvement plans" (p. 209). For a leader's vision to take hold in a school, a school administrator should use data to mold actions that will positively affect a district. Fairbanks-Schutz (2010) concluded the district was able to improve test performance for marginalized students because their superintendent believed that data were an integral part of the decision making process and the

key to a successful student academic performance. Consistent data analysis can be a strong and beneficial force in the decision making process to help drive higher student achievement.

It is one thing for a leader to say all of the right things to encourage a school to succeed, but modeling those values and beliefs is equally important. Siegrist, Weeks, Pate, and Monetti (2009) investigated the variables involved in student success on the Georgia High School Graduation Test (GHS GT) and discovered an additional indirect approach to goal setting. Principals in Georgia reported "modeling the way" (p. 176) was the leadership practice that was most often exercised. Leaders must model the behavior for others to follow if the concept of teamwork is to take hold. It was acknowledged by Fairbanks-Schutz (2010) that, "The superintendent's practices of continual learning and looking forward have prompted programs and initiatives that positively support the achievement of traditionally marginalized students in the district" (p. 77). Creating a change in any organization can be a difficult, sometimes arduous task for any leader. Kouzes and Posner (2012) discovered in their investigation of leaders that managing the day-to-day operation was no longer a passive experience. The leaders must concentrate on actively identifying needs and using that information to consequential change. Constant exposure to the proper values, which are modeled and expected from school leadership, can be contagious to a school staff.

An educational leader's emotional intelligence (EI) can also help spur improved student performance. In the study by Nash (2011), it was discovered that charismatic leaders often use integrity and honest communication to create a shared vision, which focuses on high student achievement and school success. As the literature points out, sensitive leaders can affect positive change in the work place. Louis et al. (2010) found, "The emotional side of principal behavior—which we have assessed by reference to teachers' trust in the principals as ethical, caring, and

competent—has on its own been shown to have a strong relationship to student outcomes" (p. 51). Along with strong moral character, a positive attitude can also be a character trait that improves student achievement. A study in Georgia found a connection between a principal's confidence in his or her abilities to stimulate academic achievement and tangible results of his or her student population in achievement tests (Siegrist et al., 2009). Successful school leadership can seem like a daunting task, but the deployment of integrity and moral efficacy can lead a school in the right direction.

### **Professional Development**

Almost every profession requires some sort of continual development for the organization to succeed. The teaching profession offers regular professional development to help teachers gain confidence in their abilities and improve practice. Professional development can focus on practice, accountability, and non-instructional duties. The NCTWC Survey includes collections, such as data driven needs, content specific training, reflections of impact, and continual support after training (NCTWC Survey, 2014). Professional development for teachers can help to solidify practices, which could raise teacher interpretation of their working conditions and overall student achievement.

The confidence gained from professional development can make a difference in how teachers feel about their workplace. Wagner and French (2010) conducted a study on teachers' motivation for professional growth, and reported the most influential stimuli for a positive environment was "interactions between the individual teacher, the context of the professional development activity itself, and the teacher's work environment" (p. 169). A teacher's dedication to a professional development opportunity can be the difference between achievement and student success. Shaha (2013) conducted an experiment involving an online professional

development program for teachers. The teachers could participate in the professional development at any time. The study focused on the difference between teachers who actively participated and partook consistently in the professional development to teachers who passively watched the training videos with less frequency. The active participants saw tremendous gains in mathematics from the previous year. The researchers hypothesized that the success experienced by the teachers who actively participated in professional development could lead them to be more satisfied with their job and possibly continue their employment. Aside from the academic gains of the students, professional development can create the perception of a more satisfying work environment.

The positive outcomes of professional development can go beyond improvement of practice. Shernoff et al. (2011) discussed the added affects that professional development can have in their research on the feasibility of implementing a multi-component training model in an urban district. Their focus group data led them to believe that professional development “helped novices become more socially integrated into the school milieu and informed about existing school-wide practices” (Shernoff et al., 2011, p. 481). It is akin to new students who embark on their first day of school in a new environment; they may initially not like the experience because everything is new, and they have not quite figured out where they belong in this new setting. This can be the same for new, or novice teachers, in a school. Once they can develop that congeniality with their colleagues, they start to feel comfortable with their surroundings. Marston (2010) revealed that providing teachers and college professors with professional development that encourages collegial collaboration and interaction could lead to increased job satisfaction. The collegial aspect of professional development is an important variable in teacher satisfaction.

Teachers also need to experience success to gain a favorable outlook on their environment. Berry, Petrin, Gravelle, and Farmer (2011) studied the recruitment and retention of rural special education teachers. The teachers were feeling inadequate and frustrated with the abilities to meet the needs of their exceptional population. The researchers discovered that a more content specific training for these teachers could lead to the increased satisfaction and retention. The offering of strong professional development may only be the beginning of the solution to teacher satisfaction. Boyd (2013) conducted a qualitative study on teachers' perceptions about their work satisfaction and the factors that lead to that enhancement. The researcher interviewed more than 30 early childhood educators, and less than half of them admitted they intended to continue their employment. The participants expressed frustration because of the cost of their time and money to enhance their teaching skills with no recognition or monetary compensation.

Professional development can help improve a teacher's perception of the work environment and expand the actual learning environment. Ferreira, Gruber, and Yarema (2012) researched how professional development could open up a completely new area that can be considered a teacher's working environment. The researchers asked science teachers to reflect on professional development from a local university that explained how the outdoors could be used as part of their working environment. The environmental science teachers who participated in the professional development "felt better prepared to facilitate problem solving among their students, help their students make connections within and between science topics, make connections from science to real-world situations, and engage their students in hands-on/project based activities" (Ferreira et al., 2012, p. 54). The participants were able to break free from the normal confines of their working environment. They said they felt more comfortable in their

ability to deliver rigorous content in environmental science. This type of professional development helped teachers expand their normal working environment. Professional development can be the key to a successful school environment in the eyes of the teachers.

Professional development can be an essential component to any school's academic improvement goal. The type of professional development seems to be split into two categories: (a) a focus on how students learn and (b) a focus on content specific practices. Gregory, Allen, Mikami, Hafen, and Pianta (2014) looked at how teachers engage students and the level of student-teacher interaction. The researchers found that middle and high school teachers were disengaged from their students during class time, which could inhibit student academic growth. The control group of middle and high school teachers agreed to work with a personalized coach who offered consistent feedback to improve student-teacher interactions. The control group "had somewhat higher observed engagement at the end of the school year, relative to the beginning of the school year" (Gregory et al., 2014, p. 160). This type of continued professional development for teachers can improve student-teacher interactions and possibly lead to improved academic performance for students.

A study of professional development for mathematics teachers (Telese, 2012) compared the effects of content specific pedagogy and students' acquisition of knowledge. The results showed that professional development on student acquisition of knowledge could actually hurt student achievement, while content specific pedagogy training had a positive impact on achievement. No *magic bullet* exists when it comes to professional development; it must be a continual process to develop strong teaching practices. It also is not something that should be done in isolation. Liu, Lee, and Linn (2010) conducted a study of inquiry-based science units and the effects on student attainment. The results illuminated the fact that the greatest gains

were because of professional development that allowed for peer-to-peer interaction and sharing with an emphasis on supporting such a practice for science teachers.

Professional development, which offers continual support, tends to produce more positive results. Sailors and Price (2010) reported on the results of a study in Texas on the achievement gains for students when using a one-time workshop versus training that used the one-time workshop with additional classroom support. The reading achievement of the hybrid professional development students scored almost 12 points higher on post training assessment. The word *continual* applies to year-to-year and not just one specific school year. The development of sound teaching practices is not going to occur overnight. This is evident by the results of a 5-year study by C. Johnson, Fargo, and Kahle (2010) on a complete science reform initiative. The middle school results were compared to a school that matched the school demographically and did not use the same science reform professional development model. After a 3-year period, the students in the experimental group significantly outperformed the control group on standardized science achievement test. On-going and content specific professional development could keep teachers satisfied with their environment and provide a platform for increased student achievement.

### **Instructional Practices and Support**

If school leadership is the heart of a school, then instructional practices and support are the backbone. Instructional practices must be constantly updated because of the changes that are present in how we understand the world and how we function within it. Schools are in charge of preparing students to navigate the ever-changing world, which is why practices are continually updated, and support is provided to ensure practices change. The NCTWC survey includes groups, such as use of data, to drive practice, alignment to nationwide standards, PLCs to



improve practice, distinct supports provided, and teacher autonomy (NCTWC Survey, 2014). A teacher's vision and effectiveness can be a result of strong instructional practices and the support of those practices.

Effective instructional practices and the continual support of those practices can make a difference in a teacher's perception of the school environment. Teachers endure many hours of pre-service instructional education and sometimes even more in professional development hours. Teachers have worked hard to solidify their craft and need to feel vindicated for all of their sacrifices. One of the greatest compliments for teachers is to be trusted to apply that knowledge and make important decisions in their classroom. The study by Renzulli, Macpherson Parrot, and Beattie (2011) on the satisfaction differences between traditional and charter schoolteachers discovered that charter schoolteachers were more satisfied with their jobs, in part, because of the autonomy they experienced. The satisfaction with the work environment, created by teacher autonomy, can have a domino effect in other areas. The study on how a teacher's work environment affects motivation, conducted by Wagner and French (2010), demonstrated that satisfaction with choices in work environment led to higher levels of intrinsic motivation toward professional development. The respect shown by school districts toward teacher autonomy and decision-making can create a positive attitude toward the working environment.

Student achievement can be affected in an encouraging manner when there is a focus on instructional practice and support in schools. The way that teachers put their professional knowledge into practice can make a difference for their students. If teachers prefer autonomy, then it would make sense that the students would feel the same way. Alivernini and Lucidi (2011) learned that as the level of autonomy that the teacher afforded the students decreased, then so did the students confidence and independence. The opportunity to make choices can

have a positive impact on teacher satisfaction and students learning. The study on student intrinsic and extrinsic motivation by Gillet, Vallerand, and Lafrenière (2012) highlighted the fact that student autonomy was the most important indicator toward student motivation. This kind of instructional practice does not come without continued support from administration and colleagues. The collegial supportive environment can drive student achievement in the right direction. The results of a study (Moller, Mickelson, Stearns, Banerjee, & Bottia, 2013) on professional community, as it related to student achievement, were encouraging to say the least. The researchers reported the decrease in the achievement gap for different races and improvement in some White students because of teacher continued collaboration on data analysis and instructional practices. Teacher collaboration can be an effective tool in the battle for increased student attainment.

The importance of data to drive decisions for improvement cannot be ignored. A school in California, labeled as challenging because it was not meeting achievement goals, decided their data could no longer be ignored. Bernhardt (2009) reported that once the processes on proper data use were in place and continually used, the school showed improved achievement in every area and with every group for 2 years straight. Students with special needs is another area that consistently uses data to make important decision. Luckner and Bowen (2010) conducted a study on teachers' perceptions of progress monitoring for students who had an auditory impairment. The teachers stated that the formal and informal assessments were an important part of their decision-making in terms of instruction. They also stated it was an integral part in determining if students were on track to meet their academic goals and to adjust instruction in a timely manner to get them back on track. Data analysis seems to be an important component of successful instructional practice.

This kind of change in instructional practices probably would not have been as effective without support. That support needs to start with the principal in charge of the school. Goddard, Neumerski, Goddard, Salloum, and Berebitsky (2010) looked into principal instructional support and the use of differentiation in a teacher's classroom. From the realization of their hypothesis, Goddard et al. felt that the principal's support was significant in a teacher's willingness to deviate from customary teaching practices and meeting the needs of all students. Instructional practice and support play a major part in the achievement that is attained by schools.

It is clear from the research, that schools focusing on community support and involvement, teacher leadership, school leadership, managing student conduct, use of time, professional development, facilities and resources, and instructional practices and support can achieve success. Teachers retain a positive view of their working conditions when there is a focus on the aforementioned indicators. In addition, the results of a focus on the same indicators can improve student achievement. With so many factors affecting the success of a school, it is hard to pinpoint which area will have the greatest impression on student achievement. With the revelation that the United States is still lagging in the areas of STEM education, this research can help districts create a plan that will lead them to success in the areas of mathematics and science. In the court of public opinion, a district that does not produce results quickly will be found guilty of failure to educate children. With the pressure of producing results quickly, schools need to know what initiative will have the greatest impact immediately. This study will assist school administrators with the task of determining which indicator has the greatest correlation to student achievement in the areas of mathematics and science for elementary students in the state of North Carolina. The most influential component can be implemented first in the school improvement plan. Once that component has been established, schools can continue with the

other indicators that have been proven to create positive results. This will allow schools to complete a successful and comprehensive change in student achievement.

## CHAPTER THREE: METHODS

### Design

The quantitative method for this study utilized a correlational design. According to Warner (2013), a correlational design can provide “information about the degree to which scores on X and Y are linearly related, or the degree to which Y is predicable from X” (p. 303). This study is categorized as non-experimental research. The predictor variables for this study were the teacher working conditions survey indicators (Time, Facilities and Resources, Community Support, Manage Student Conduct, Teacher Leaders, School Leadership, Professional Development, and Instructional Practices). The NCTWC described the variable of Time as appropriate class sizes and class interruptions in addition to time allotted for instructional and non-instructional responsibilities (NCTWC Survey, 2014). The variable of Facilities and Resources was delineated by the NCTWC as the availability of instructional materials, access to relevant and functional instructional technology, availability of support personnel, and maintenance and space available in the physical environment (NCTWC Survey, 2014). The NCTWC defined Community Support as systems in place to encourage parent/community involvement, contributions from parents, community involvement in decision-making, and parent/guardian understanding of school programs and processes (NCTWC Survey, 2014). The variable Manage Student Conduct was outlined as student understanding and compliance of rules, administration and faculty understanding and enforcement of rules, administrator support of teachers, and a safe environment (NCTWC Survey, 2014). The NCTWC explained the variable of Teacher Leaders as teacher autonomy, recognition as experts, inclusion in the decision-making process, and leadership opportunities (NCTWC Survey, 2014). School Leadership included a shared vision and mission, an atmosphere of respect, teacher evaluation

and feedback, data driven decision making, and the performance in every other indicator (NCTWC Survey, 2014). The NCTWC expressed the Professional Development variable as data driven needs, content specific training, reflections of impact, and continual support after training (NCTWC Survey, 2014). The last predictive variable of Instructional Practice included groups such as use of data to drive practice, alignment to nationwide standards, PLCs to improve practice, distinct supports provided, and teacher autonomy (NCTWC Survey, 2014).

The criterion variables were the EOG test scores for 5th grade in mathematics and science in North Carolina. The 5th grade mathematics EOG was designed to show the level of understanding a student had on certain concepts in the North Carolina 5th grade mathematics curriculum. The 5th grade mathematics EOG tests students on their understanding of the following concepts:

- a. numerical expressions;
- b. patterns and relationships;
- c. place value system;
- d. operations with multi-digit whole numbers and decimals to hundredths;
- e. add, subtract, multiply, and divide fractions;
- f. measurement units;
- g. represent and interpret data;
- h. graph points on the coordinate plane;
- i. real-world and mathematical problems;
- j. volume and relating volume to multiplication and addition (NCDPI/North Carolina Testing Program, 2014b, pp. 6-7).

The 5th grade science EOG was designed to show the level of understanding a student has on certain concepts in the North Carolina 5th grade science curriculum. The 5th grade science EOG tests students on their understanding of the following concepts:

- a. force, motion, and the relationship between them;
- b. interactions of matter and energy and the changes that occur;
- c. how the properties of some materials change as a result of heating and cooling;
- d. weather patterns and phenomena;
- e. how structures and systems of organisms (including the human body) perform functions necessary for life;
- f. the interdependence of plants and animals within their ecosystem;
- g. differences or similarities of organisms to their parents based on the characteristics of the organism (NCDPI/North Carolina Testing Program, 2014b, p. 3).

These descriptions of the variables are supported by the literature with citations provided.

### **Research Questions**

The research questions for this study follow:

**RQ1:** How accurately can grade level scores on *North Carolina Science End of Grade (EOG) standardized assessment* be predicted from a linear combination of Teacher Working Conditions factors (Time, Facilities & Resources, Community Support, Manage Student Conduct, Teacher Leaders, School Leadership, Professional Development, and Instructional Practices) for *grade 5 North Carolina elementary* students?

**RQ2:** How accurately can grade level scores on *North Carolina Mathematics End of Grade (EOG) standardized assessment* be predicted from a linear combination of Teacher Working Conditions factors (Time, Facilities & Resources, Community Support, Manage

Student Conduct, Teacher Leaders, School Leadership, Professional Development, and Instructional Practices) for *grade 5 North Carolina elementary* students?

### **Null Hypotheses**

The null hypotheses for this study follow:

**H<sub>0</sub>1:** There will be no significant predictive relationship between the criterion variable (Science EOG) and the linear combination of predictor variables (Time, Facilities & Resources, Community Support, Manage Student Conduct, Teacher Leaders, School Leadership, Professional Development, and Instructional Practices) for grade 5 North Carolina elementary students.

**H<sub>0</sub>2:** There will be no significant predictive relationship between the criterion variable (Math EOG) and the linear combination of predictor variables (Time, Facilities & Resources, Community Support, Manage Student Conduct, Teacher Leaders, School Leadership, Professional Development, and Instructional Practices) for grades 5 North Carolina elementary students.

### **Participants and Setting**

For this study, teacher perceptions of eight indicators of working conditions in North Carolina elementary schools (Time, Facilities and Resources, Community Support, Manage Student Conduct, Teacher Leaders, School Leadership, Professional Development, and Instructional Practices) were compared to student achievement on 5th grade mathematics and science EOG exams in elementary schools across the state of North Carolina. The population consisted of 1,393 schools in 115 county school districts, with 105,136 teachers. One school from each district in North Carolina was randomly selected for this study. Non-public schools and schools that had pre-requisites, other than geographic location, were not included in this study.



Gall et al. (2007) suggested the use of a large sample in quantitative study so “the research participants' scores on the measured variables will be representative of population scores” (p. 176). One school was randomly selected from each of the 115 school districts in North Carolina for a total of 115 schools. The number of predictor variables for this study was eight, which was then multiplied by 15 for a total of 120 samples (Gall et al., 2007). The sample of 115 schools was sufficient to produce the desired results for this study. The archival data collected for teachers' perceptions of leadership were taken from the 2014 NCTWC Survey. The archival student achievement data were extracted from the North Carolina Public School Report Card (Education First: NC School Report Card, 2014).

In April 2014, the teacher survey was administered by North Carolina Department of Public Instruction, and the results were released on the NCTWC website in May 2014. From every district in the state of North Carolina, 93,178 teachers participated in the survey. This study focused on eight indicators of the survey, which had anywhere from 6 to 20 questions per indicator. The scores on each question in an indicator were averaged to give the school a composite score on that indicator. The student achievement archival data were extracted from the 2014 North Carolina School Report Card website (Education First: NC School Report Card, 2014.). According to the Public Schools of North Carolina Accountability Services Division, scores that were three and above were considered to be on grade level (State/LEA and School Test Performance, n.d.). For the EOG test for grade five, a composite score was created by adding the percentage of students who scored a 3, 4, and 5 on the exams.

## Instrumentation

### Teacher Working Conditions Survey

Archival data in this study were extracted from the NCTWC website (NCTWC Survey, 2014). Composite scores were used to divide the target school into categories to be entered into SPSS for data analysis. Composite scores were determined by adding the percentage of teachers who *agreed* or *strongly agreed* to each question in a teacher working conditions indicator. A school's overall score for each indicator was an average of the response composite scores to each question. Each school had a composite score for each of the eight indicators in the teacher working conditions survey.

The NCTWC website describes how the Governor's Teacher Working Conditions Initiative started in North Carolina in 2002 ("North Carolina teacher working conditions," 2014). This survey was created by the North Carolina Professional Teaching Standards Commission (NCPTSC) after a lengthy literature review and the analysis of additional data that were provided by the National Center for Education Statistics' School and Staffing Survey. Because of their research, the NCPTSC discovered the following issues affected a teacher's future employment decisions: "time, empowerment, leadership, decision-making, and facilities and resources" ("The new teacher," n.d., para. 7). A survey was created to determine if the aforementioned conditions existed in North Carolina schools and to what degree the conditions exists. The North Carolina Office of the Governor implemented the first teacher conditions survey near the end of the 2002 school year. The About section of the NCTWC (2014) website explained this survey had been administered to teachers every other year since 2002.

Teachers voluntarily responded to an on-line administration of the survey instrument from March 10, 2014 until April 14, 2014. The teachers could respond on any day or time, as long as it

was between the survey windows. As outlined in the NCTWC (2014) website, the access codes for teacher participation were randomly distributed to the teachers (Frequently Asked Questions 2014, 2014). The codes could only be used once and could not traceable back to any single teacher. The results are reported for each school, district, and state around five weeks from the closing of the survey (“North Carolina teacher working conditions,” 2014)

The purpose of the survey was to help all interested parties determine if educators were being supported in their work environment. According the NCTWC (2014) website, "This unique data represents the perceptions of those who understand these conditions best—the educators who experience them every day" (“Using your NC teacher working,” n.d., p. 1). The Data Use Guide also recommended that data retrieved from this survey be used to build the foundation for a positive working environment (“Using your NC teacher working,” n.d.). According to Hirsch and McKinney (2010), the purposes of the survey included the following:

- Efforts to align standards and expectations across all areas of human capital (induction/mentor standards, evaluation instruments, etc.)
- Revisions to teacher and principal preparation programs to ensure all new educators can meet state standards
- School Improvement Planning processes
- Training and support on utilization of the teacher principal and training and support on utilization of the teacher, principal, and superintendent evaluation (p. 16)

For the most part, the teaching conditions survey contained questions using a 4-point Likert-type scale that ranged from *strongly disagree* (1) to *strongly agree* (4). The titled sections included the following:

- demographics

- time
- facilities and resources
- community support and involvement
- managing student conduct
- teacher leadership
- school leadership
- professional development
- instructional practices
- overall
- new teacher support (NCTW Survey, 2014)

The sections of Demographics, Overall, and New Teacher Support were not scored on a Likert-type scale. This research focused solely on responses from sections two through nine of the survey. All of the questions in sections two through nine were scored with a Likert-type scale. The score for each question was calculated by adding the percentages of teachers that chose *agree* and *strongly agree* for each question. The scores for each question were then added and divided by the number of questions to give a composite score for that section.

The NCTWC Survey has been through validity and reliability testing to ensure accuracy. In the research section of the NCTWC (2014) website, the validity was tested using the "Rasch rating scale to examine the item-measure correlations, item fit, rating scale functioning, unidimensionality and generalizability of the instrument" ("Design, validity and reliability," 2014, p. 3). Reliability of the NCTWC Survey was completed to conclude that the survey instrument would produce similar results after repeated use. In the research section of the NCTWC (2014) website, it stated that reliability was tested "using both the Rasch model and Cronbach's alpha" ("Design, validity

and reliability,” 2014, p. 3). They concluded that the results of the reliability test ensured that similar results would occur after repeated use of the survey (“Design, validity, and reliability,” 2014).

### **Student Achievement Data**

Student archival achievement data were extracted from the North Carolina Public Schools website (Education First: NC School Report Card, 2014). Composite scores were used to divide the target schools into categories to be entered into SPSS for data analysis. Composite scores were calculated using student performances on North Carolina grade five EOG tests in mathematics and science. The student achievement on each section was given a score between 1 and 5. A school's overall score for grade five was combined to determine how many students scored in each of the five ranges on that specific test. The scores of 3, 4, and 5 were combined to give an overall score on student performance for the exams that were previously mentioned. Some scores have been listed as <5 or <95 because of privacy laws (Education First: NC School Report Cards, 2014, General overview). Any scores labeled as less than 5 were given an automatic score of 4, and any scores labeled as greater than 95 were given a score of 96. Table 1 illustrates the categories of composite scores pertaining to this study.

Table 1

#### *Grades 5 School Achievement Categories*

Category	Composite Scores
Mathematics	Scores of 3, 4, 5
Science	Scores of 3, 4, 5

The Public Schools of North Carolina Accountability Services Division (PSNCASD) performed the reliability testing for the EOG test in Mathematics and Science. The PSNCASD

used the internal consistency coefficient to establish reliability of the exams (Reliability of the North Carolina End-of-Grade, 2014). The PSNCASD wanted to identify the test items relationship using the coefficient alpha ( $\alpha$ ). According to the PSNCASD, the "North Carolina Statewide Testing Program meets or exceeds industry norms for reliability . . . as calculated by Cronbach Coefficient Alpha" (Reliability of the North Carolina End-of-Grade, 2014, para. 2).

### **Procedures**

This study involved the composite scores from eight indicators on the NCTWC survey archival data collected from the publically available school surveys online provided by the North Carolina Department of Public Instruction. The composite scores on the 5th grade EOG exams in mathematics and science were obtained from the publically available data published on the North Carolina Public Schools website. An exemption request form was submitted to the IRB for approval. Based on the nature of the study and the information available, this study was exempted from further review of the Institutional Review Board (IRB) because the source of the data was publically available and did not include any personal identifiable information.

The information needed to create composite scores from the NCTWC survey was accessed through the NCTWC website (NCTWC Survey, 2014). Under the *Results* tab on their website, the North Carolina Department of Public Instruction has the outcomes of the NCTWC survey for every district and school. By selecting a district, the results of the NCTWC survey from each school in the district are available. One school was randomly chosen from each school district in the state of North Carolina. After selecting the school, the individual results from each indicator were copied and pasted into an Excel document as text. The initial transfer of data included results for the 2012 and 2014 teacher working conditions survey. The 2012 results column was eliminated once data were transferred to the Excel document. The results of

the extraction gave each question in that indicator and the percentage of professionals who chose *agree* or *strongly agree* in that school. The scores for each question in the indicator were averaged to give the school an overall score for that indicator. This was repeated for each indicator in the NCTWC survey and subsequently executed for all 115 schools.

The archived student achievement data are available on the website maintained by the PSNCASD (Education First: NC School Report Card, 2014). At the time of data collection, November 2015, the 2013-2014 data had not been updated to this site. The link to the 2013-2014 data scrolled across the top of the page in blue letters. Clicking on that link took a viewer to the North Carolina school report card page. At the bottom of the webpage was a link to DPI home and should be selected by the user. This brought the user to the Public Schools of North Carolina: Building on Success for Superior Schools webpage. The *Testing* link at the top of the page needed to be selected to find the 2013-2014 archived data. Once the *Accountability Services Division* tab on the left was selected, the user needed to scroll down to the *2013-14 State, District, and School Level End-of-Course and End-of-Grade Assessments Report*. The 2013-2014 State, District, and School Level End-of-Course and End-of-Grade Assessments Report in Excel form could be located here (Accountability Services Division, 2014). The spreadsheet had drop-down menus to access data using specific criteria. For this study, under District Name, North Carolina was deselected and under School Name, the district results were deselected. The charter school and non-district affiliated were deselected as well because they were not included in this study. To obtain the scores that pertained to this study, the only selections under Subjects were Math Grade 5 and Science Grade 5. This procedure made it possible to select one randomly school from each district. The percentage of students who scored a 3, 4, or 5 were added together to give each

school the percentage of students who performed at or above grade level on each exam. These calculations were repeated for each of the 115 schools in this study.

### **Data Analysis**

Data for this study were analyzed using the Statistical Package for the Social Sciences (SPSS) software. The research questions and corresponding hypotheses were the basis for conducting the procedures of descriptive statistics, data screening, and multiple regression between variables, in SPSS. The purpose of non-experimental research “is to search for variables, measures at one point in time that predict a criterion variable measured at a subsequent point in time” (Gall et al., 2007, p. 331). Multiple linear regression analysis was used to determine the predictive relationship between the predictor and criterion variables. Shieh (2006) reported that multiple linear regression is the most common type of statistical analysis. This type of analysis has certain benefits that may not be attained through other types of inquiry. Gall et al. (2007) recognized the value of multiple regression analysis when they explained, “It provides estimates both of the magnitude and statistical significance of relationships between variables” (p. 353). The use of multiple linear regression identified the predictive attributes of the independent variables. Porter, Connolly, Heikes, and Park (1981) identified the multiple linear regression technique as one of the leading forms of analysis for predictive determinations. The use of this technique was the best choice for predicting which NCTWC indicators had the strongest relationship to North Carolina 5th grade EOG test scores in mathematics and science.

Using SPSS, a multiple linear regression test was deployed to examine the relationship between the predictor variables (Time, Facilities and Resources, Community Support, Manage Student Conduct, Teacher Leaders, School Leadership, Professional Development, and Instructional Practices) and the criterion variable of 5th grade mathematics and science EOG



scores. Multiple linear regression was used to establish a correlation between criterion variable and multiple predictor variables (Gall et al., 2007). Multiple regression is similar to partial correlation because both use “similar methods to statistically control for the other variables when assessing the individual contribution of each predictor variable” (Warner, 2013, p. 430). For each identified statistical analysis technique, all assumption tests were performed. Information was provided on how each statistical analysis technique was tested and the alpha levels for each one of the techniques. Warner (2013) explained that the comparison should be made between all X predictors and Y. To make the comparisons, a scatter plot graph for every pair of variables was created to test the assumption of multivariate normal distribution. Warner (2013) clarified, “The scatter plots should show linear relations, homoscedastic variance, and no extreme bivariate outliers” (p. 573). This multivariate correlational method allows researchers to examine relationships between multiple variables. Gall et al. (2007) described how the multivariate correlational method allows researchers to examine factors on a singular level and in combination with each other. Statistically significant results from this test allowed for a conclusion on which NCTWC indicator was the strongest predictor of student achievement on the North Carolina mathematics and science EOG exams.

A multiple regression test, with many predictor variables, was used to establish how accurately teachers' perception of school working conditions can predict student achievement. The student achievement data were compiled by the composite scores for grade five in mathematics and science EOG exams. The regression model used either the science or mathematics EOG score as the dependent/criterion variable with the Teacher Working Conditions factors as the independent/predictor variables. As a preliminary analysis, all the predictors were compared individually to the criterion variable using Pearson and Spearman correlations. Reported statistics

for the regression model included the 95% confidence interval for the beta weights, the  $F$  value, and the  $R^2$ .

This study added to the current research on factors that have a positive influence on student achievement. As noted in the research, higher student achievement levels and positive teacher perceptions of working environment are present in schools that focus on the eight indicators of time use, facilities and resources, community support and involvement, management of student conduct, teacher leaders, school leadership, professional development, and instructional practices.

## CHAPTER FOUR: FINDINGS

### Research Questions

The research questions for this study follow:

**RQ1:** How accurately can grade level scores on *North Carolina Science End of Grade (EOG) standardized assessment* be predicted from a linear combination of Teacher Working Conditions factors for grade 5 North Carolina elementary students?

**RQ2:** How accurately can grade level scores on *North Carolina Mathematics End of Grade (EOG) standardized assessment* be predicted from a linear combination of Teacher Working Conditions factors for grade 5 North Carolina elementary students?

### Null Hypotheses

The null hypotheses for this study follow:

**H<sub>01</sub>:** There will be no significant predictive relationship between the criterion variable (Science EOG) and the linear combination of predictor variables (Time, Facilities & Resources, Community Support, Manage Student Conduct, Teacher Leaders, School Leadership, Professional Development, and Instructional Practices) for grade 5 North Carolina elementary students.

**H<sub>02</sub>:** There will be no significant predictive relationship between the criterion variable (Math EOG) and the linear combination of predictor variables (Time, Facilities & Resources, Community Support, Manage Student Conduct, Teacher Leaders, School Leadership, Professional Development, and Instructional Practices) for grades 5 North Carolina elementary students.

### Descriptive Statistics

Table 2 displays the descriptive statistics for the nine teacher working condition predictor variables (aggregated total score with eight individual factor scores) and the two criterion scores (math and science). The aggregated total score had a mean of  $M = 81.87$  ( $SD = 8.39$ ). This aggregated total score had a Cronbach alpha reliability coefficient of  $\alpha = .92$  based on the eight factor scores. The highest mean factor score was for community support ( $M = 87.14$ ,  $SD = 10.65$ ) while the lowest factor score was for time ( $M = 65.20$ ,  $SD = 12.86$ ). The descriptive statistics for the two criterion scores were as follows: math ( $M = 54.45$ ,  $SD = 15.78$ ) and science ( $M = 63.59$ ,  $SD = 16.32$ ).

Table 2

*Descriptive Statistics for the Predictor and Criterion Study Variables (N = 115)*

Variable	<i>M</i>	<i>SD</i>	Low	High
<b>Predictor Variables</b>				
Aggregated Total <sup>a</sup>	81.87	8.39	58.36	98.13
Time	65.20	12.86	35.24	96.63
Facilities and Resources	84.72	8.77	60.57	99.56
Community Support	87.14	10.65	46.48	100.00
Manage Student Conduct	87.04	11.82	47.49	100.00
Teacher Leaders	84.25	10.64	52.70	99.00
School Leadership	86.17	10.32	59.39	100.00
Professional Development	81.43	9.98	51.26	98.64
Instructional Practices	79.05	7.22	59.14	94.65
<b>Criterion Variables</b>				
Math	54.45	15.78	19.50	89.70
Science	63.59	16.32	17.80	99.20

<sup>a</sup> The aggregated total score was based on averaging together the eight teacher working condition factors. The resulting Cronbach reliability coefficient was  $\alpha = .92$ .

Table 3 displays the Pearson intercorrelations among the eight teacher working condition factor scores. For the resulting 28 correlations, the size of the correlation coefficients ranged from  $r = .36$  to  $r = .92$  with the median sized coefficient being  $r = .63$ . All correlations were significant at the  $p < .001$  level (see Table 3).

Table 3

*Pearson Intercorrelations Among the Teacher Working Condition Factors (N = 115)*

Factor	1	2	3	4	5	6	7	8
1. Time	1.00							
2. Facilities and Resources	.64	1.00						
3. Community Support	.40	.49	1.00					
4. Manage Student Conduct	.50	.54	.75	1.00				
5. Teacher Leaders	.62	.56	.67	.73	1.00			
6. School Leadership	.64	.60	.73	.82	.92	1.00		
7. Professional Development	.68	.67	.44	.51	.69	.72	1.00	
8. Instructional Practices	.62	.45	.36	.41	.60	.65	.78	1.00

*Note.* All correlations were significant at the  $p < .001$  level.

### Testing of Regression Assumptions

A series of analyses were performed to test the assumptions for the suitability for multiple regression analysis. The normality of the variables was tested several ways: Kolmogorov-Smirnov (K-S) tests (see Table 4), box and whisker plots (see Figure 1), frequency histograms, and normal Q-Q plots. Inspection of Table 4 found 8 of 11 K-S tests to be significant. For the boxplots (Figure 1), there were 11 outliers from 9 separate respondents. These patterns of non-normality were further confirmed with frequency histograms, and normal Q-Q plots. The nine respondents with univariate outliers were removed and the box plots were recalculated, which identified five more

respondents with outlier scores. This process was repeated a total of 6 rounds identifying a total of 28 schools with univariate outliers, which reduced the potential sample size from  $N = 115$  to  $n = 87$  (24.3% reduction in sample size), which was an unacceptable reduction. Multicollinearity was assessed three ways: Cronbach alpha reliability coefficient based on the eight factor scores (see Table 2), intercorrelations matrix for the eight factors (see Table 3), plus the VIF and tolerance statistics generated from preliminary regression models using all eight teacher working conditions factors together in the same model. Taken together, multicollinearity was deemed to be of concern. The independence of the observations was deemed acceptable two ways: by design of the study (there were 115 separate participating schools) and Durbin-Watson statistics, which are displayed in tables later in the study. Linearity was deemed acceptable based on scatterplots for each predictor variable with both criterion variables (18 scatterplots). Further tests of the assumptions of linearity and homoscedasticity were performed by plotting the standardized residual scores from the regression models against the predicted values. These assumptions were adequately met.

Table 4

*Kolmogorov-Smirnov Normality Tests (N = 115)*

Variable	Statistic	df	p
Aggregated Total <sup>a</sup>	.089	115	.03
Time	.045	115	.20
Facilities and Resources	.096	115	.01
Community Support	.120	115	.001
Manage Student Conduct	.140	115	.001
Teacher Leaders	.108	115	.002
School Leadership	.108	115	.002
Professional Development	.100	115	.006
Instructional Practices	.049	115	.20
Math	.054	115	.20
Science	.106	115	.003

Note: <sup>a</sup> The aggregated total score was based on averaging together the eight teacher working condition factors. The resulting Cronbach reliability coefficient was  $\alpha = .92$ .

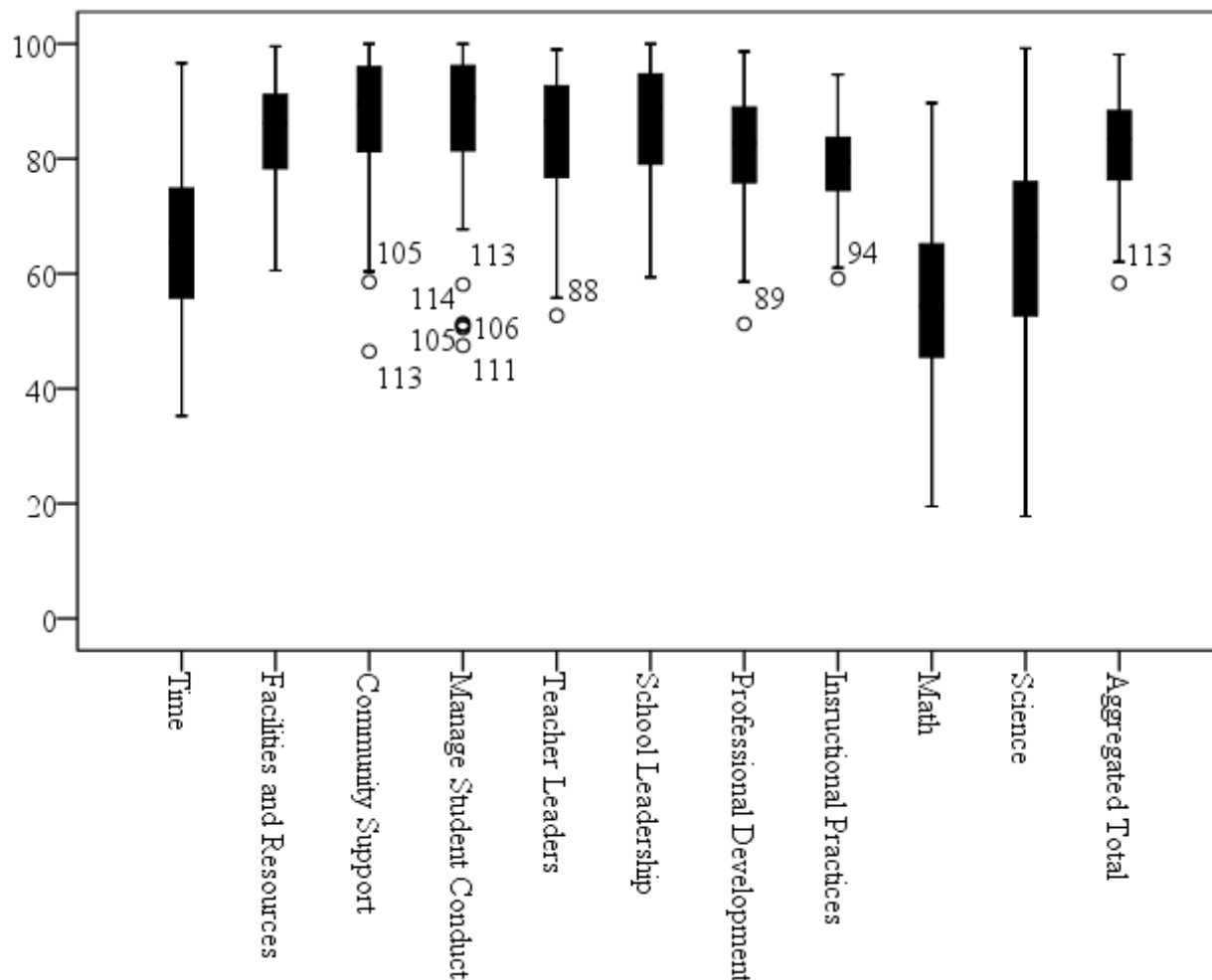


Figure 1. Box and whisker plots for the primary variables ( $N = 115$ )

Of largest concern were the assumptions of normality and multicollinearity. Normality problems were addressed by performing both Pearson and Spearman correlations between each of the nine predictor scores with both science and math scores. Inspection of Table 5 found similar sized correlations using either type of correlation which was not surprising given the size of the sample ( $N = 115$ ) and well established robustness of Pearson correlations to violations of assumptions (Howell, 2011). The problem of multicollinearity was addressed by correlating the aggregated total score with the science and math scores (see Table 5) as well as using stepwise multiple regression to remove all redundant predictor variables from the model (see Tables 6 and 7).



Table 5

*Pearson and Spearman Correlations for the Teacher Working Conditions Predictor Variables with the Science and Math Scores (N = 115)*

Predictor Variable	Science Score		Math Score	
	<i>r</i>	<i>r<sub>s</sub></i>	<i>r</i>	<i>r<sub>s</sub></i>
Aggregated Total <sup>a</sup>	.19 *	.22 *	.12	.13
Time	.12	.15	.00	.00
Facilities and Resources	.08	.09	.00	.01
Community Support	.24 **	.29 ***	.24 **	.28 ***
Manage Student Conduct	.19 *	.22 *	.16	.17
Teacher Leaders	.17	.17	.08	.10
School Leadership	.20 *	.21 *	.17	.18
Professional Development	.10	.14	.03	.06
Instructional Practices	.10	.12	.05	.06

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .005$ . \*\*\*\*  $p < .001$ .

*r* = Pearson correlation.

*r<sub>s</sub>* = Spearman correlation.

Table 6

*Stepwise Regression Prediction Model for the Science Score Based on the Teacher Working Condition Factors (N = 115)*

Factor	B	SE	$\beta$	t	p	95% CI	
						Lower	Upper
Intercept	0.31	0.12		2.53	.01	0.07	0.55
Community Support	0.37	0.14	.24	2.67	.009	0.10	0.65

*Note.* Final Model:  $F(1, 113) = 7.13, p = .009. R^2 = .059.$  Candidate variables = nine.

*Note.* Durbin-Watson statistic = 1.89.

Table 7

*Stepwise Regression Prediction Model for the Math Score Based on the Teacher Working Condition Factors (N = 115)*

Factor	B	SE	$\beta$	t	p	95% CI	
						Lower	Upper
Intercept	0.23	0.12		1.94	.05	0.00	0.47
Community Support	0.36	0.14	.24	2.67	.009	0.09	0.63

*Note.* Final Model:  $F(1, 113) = 7.10, p = .009. R^2 = .059.$  Candidate variables = nine.

*Note.* Durbin-Watson statistic = 1.89.

## Results

### Null Hypothesis One

This question was answered two ways: Pearson correlations between the aggregated total score with the science score (see Table 5) and a stepwise regression model using the science score as the criterion variable and the nine teaching working conditions as candidate predictor variables (see Table 6). Inspection of Table 5 found four of the nine teacher working conditions scores to be significantly related to the science score with the largest correlation being with community support,  $r = .24, p = .009$ . In Table 6, the final 1-variable stepwise regression model was significant ( $\beta = .24, p = .009$ ). This combination of findings provided support to reject the null hypothesis.

### Null Hypothesis Two

This question was answered two ways: Pearson correlations between the aggregated total score with the math score (see Table 5) and a stepwise regression model using the math score as the criterion variable and the nine teaching working conditions as candidate predictor variables (see Table 7). Inspection of Table 5 found one of the nine teacher working conditions scores (community support) to be significantly related to the math score ( $r = .24, p = .009$ ). In Table 6, the final stepwise 1-variable model was significant ( $\beta = .24, p = .009$ ). This combination of findings provided support to reject the null hypothesis.

## Summary

In summary, this quantitative correlational study used data from 115 schools to analyze teacher perceptions of their working conditions and to what extent the perceptions impact 5th grade student achievement in the areas of mathematics and science in North Carolina. Hypothesis 1 (prediction of science score) was supported (see Tables 5 and 6). Hypothesis 2 (prediction of math

score) was also supported (see Tables 5 and 7). In the final chapter, these findings will be compared to the literature, conclusions and implications will be drawn, and a series of recommendations will be suggested.

## CHAPTER FIVE: DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

### Discussion

The purpose of this study was to analyze teacher perceptions of their working conditions and to what extent the perceptions influenced 5th grade student achievement in the areas of mathematics and science in North Carolina. The United States has been falling behind other nations when it comes to educating students in the area of science, technology, engineering, and mathematics. This study can help schools determine where to focus their attention when trying to improve student achievement in mathematics and science. The literature reviewed in this study clearly outlined the relationship between the specific areas of the school environment, as perceived by teachers, and student achievement. The previous research does present conflicting and supportive arguments to the findings of this study.

### Research Question One

The first research question addressed in this study was: How accurately can grade level scores on *North Carolina Science End of Grade (EOG) standardized assessment* be predicted from a linear combination of Teacher Working Conditions factors for grade 5 North Carolina elementary students? It was hypothesized that the predictor variables of Time, Facilities and Resources, Community Support, Manage Student Conduct, Teacher Leaders, School Leadership, Professional Development, and Instructional Practices could predict grade 5 North Carolina EOG scores. This question was answered two ways: Pearson correlations between the aggregated total score with the science score (see Table 4) and a stepwise regression model using the science score as the criterion variable and the nine teaching working conditions as candidate predictor variables (see Table 5). The current study found three of the eight teacher working conditions scores (Managing Student Conduct, School Leadership, and Community Support and

Involvement) to be significantly related to the science score with the largest correlation being with community support,  $r = .24$ ,  $p = .009$ .

### **Significant Correlations to 5th Grade Science EOG Scores**

Of the eight-predictor variables used in this study, three were found to be significantly correlated to 5th grade EOG science scores. Out of the three identified variables, Community Support and Involvement had the strongest correlation to the criterion variable. The next strongest correlation was School Leadership, followed by Managing Student Conduct. The findings of this study are consistent with the literature that surveyed the relationship between these areas and student achievement.

It is difficult for a teacher to teach and for students to learn when conduct becomes an issue. Being constantly interrupted can be stressful for teachers trying to meet the needs of their class. Research has shown that a school-wide focus on student conduct can improve the teacher perceptions of the learning environment and satisfaction with the climate (Youngs et al., 2015). Students who are disruptive are often missing instruction or barring others in the class from learning. The literature in this study supports the notion that schools who apply measures to control student conduct can influence student achievement in a positive manner (E. Williams, 2009; Schumacher et al., 2011). In the current study, the correlation between Managing Student Conduct and the science scores does go along with the research on the topic. However, this variable was not a predictor of the North Carolina Science End of Grade standardized assessment.

Teachers ask the questions and the school leader is supposed to have the answers. Unfortunately, that is not always the case or at least they may not have all the right answers. Poor school leadership can have a detrimental effect on the climate of a school. A school leader

needs to be able to bring all of the resources together to create a positive atmosphere in a school. Creating an atmosphere of collaboration and using research based affective managerial practices is the key to creating a successful school (Huberman et al., 2012; Louis et al., 2010; Pepper, 2010; Soehner & Ryan, 2011). A strong leader can also help spur higher academic achievement. The literature confirms that competence in the practice of leading a school building has a relationship to student achievement (Louis et al., 2010; Siegrist et al., 2009). Although the results of the current study support a correlation between teacher perception of the working environment in the area of Educational Leadership and the North Carolina Science End of Grade (EOG) standardized assessment, it was not a predictor. The correlation results did produce a relationship between the two variable, which does support the research on the topic.

An African proverb states, “It take a village to raise a child.” This can be applied to a school setting because the responsibility should lie with everyone in the community to help educate the children. The schools should reach out to community members to increase the collaborative effort of educating students. Schools that make the effort to create a relationship with community members tend to see encouraging results. An underperforming Midwest district decided to implement an appreciative inquiry (AI) method to fix their issues. The AI model has schools focus on their strengths and visions, instead of deficiencies, to fix problems. After the implementation, the elementary teachers felt a more positive and trusting relationship with the community (Tschannen-Moran & Tschannen-Moran, 2011). The improved school to community relationship can improve student achievement. Previous research outlined the improvement in student achievement when communication with parents was a priority. Student academic success was realized in separate studies that focused on improving community involvement and communication (Donnell & Kirkner, 2014; McCoach et al., 2010). The current study results

support a significant correlation between teacher perception of the working environment in the area of Community Support and Involvement and North Carolina Science End of Grade standardized assessment. This factor was the only predictor, at approximately 5%, to the science scores for 5th grade North Carolina Students in 2014.

### **Non-Significant Correlations to 5th Grade Science EOG Scores**

Five of the eight-predictor variables in this study were not found to be significant predictors on 5th grade EOG science scores. The following five predictors were: Use of Time, Facilities and Resources, Teacher Leadership, Professional Development, Instructional Practices and Support. The findings of this study were not consistent with the literature, which surveyed the relationship between these areas and student achievement.

The amount of responsibilities that teachers face can have an effect on their ability to teach students. It would make sense that schools would want their teachers to focus on the task of educating the students. The added stress that teachers face with additional responsibilities tends to affect their outlook on their students and work environment (Nagar, 2012). If a school takes away the obstacles that prevent teachers from maximizing instructional time, then student achievement should improve. The literature review outlined how increased time of science instruction can improve student achievement. Separate research studies discovered a link between increasing science instructional time and improved science standardized assessments scores (Blank, 2013; Vitale & Romance, 2012). Based on the literature, there should be positive benefits to controlling teacher time to increase the amount of time focused on instruction. Unfortunately, the current study results do not support a significant association between teacher perception of the working environment in the area of Use of Time and North Carolina Science End of Grade standardized assessment.



The proper facilities and sufficient resources in a school should benefit teachers and students. The climate of a school can sometimes be felt as soon as someone starts to walk through the front doors. Research has discovered a link between the school buildings' visual appeal and the nourishing learning environment in schools (Uline et al., 2010). Once the atmosphere is set, then the resources should be sufficient to allow for academic progress. This is even more important for students in lower socio economic areas where an influx of school resources has been shown to increase student achievement (Chien & Mistry, 2013). The literature suggests that facilities and resources create the proper conditions to improve the atmosphere and student achievement. The current study results do not support a significant association between teacher perception of the working environment in the area of Facilities and Resources and North Carolina Science End of Grade standardized assessment.

Taking advice from a teaching colleague can be more beneficial than hearing it from the boss or an outside professional developer. A teacher leader can provide a consistent partnership instead of a quick moment of direction. That type of atmosphere can help keep teachers satisfied with their work environment and provide support for improving instruction that leads to higher student achievement. The peer-to-peer relationship has been shown to be the preferred method of ideas exchange and support for new teachers (Kent et al., 2012; Schrum & Levin, 2013; Shernoff et al., 2011). This can help create a healthy cycle of teachers who step in as other teacher leaders move on. The benefits of teacher leadership can be witnessed by the change in student achievement for schools. Slavit et al. (2010) studied a project initiated in one school to develop teacher leaders for PLCs. The development of the teacher leading PLC in this school was found to contribute to a near 20% increase in student achievement on standardized assessment in science. The literature did outline how teacher leadership could lead to

satisfaction with the working environment and increase student achievement, but it is not reciprocated by the present study. The current study results do not support a significant association between teacher perception of the working environment in the area of Teacher Leadership and North Carolina Science End of Grade standardized assessment.

The world is ever-changing, so it is reasonable to require professionals to update their skills continually to meet those needs. Paying attention to the changes in the world can be particularly important for teachers because their students need the skills to navigate the environment after they leave school. The literature points out the benefits of content specific training for teachers. A study by Ferreira et al. (2012) discovered the results of content specific training for science teachers gave them a more positive outlook on their abilities to deliver quality instruction to students. Although research does point to a link between professional development for teachers and higher student achievement, the one-time professional development model does not seem to be the most effective. The literature outlines studies where professional development was applied continuously to various groups. The studies showed that sustained professional development actually raised student achievement in different content areas, which includes the subject of science (C. Johnson et al., 2010; Liu et al., 2010; Sailors & Price, 2010). The literature clearly supports the need for professional development to improve student achievement, but it is not supported by the present study. The current study results do not support a significant association between teacher perception of the working environment in the area of Professional Development and North Carolina Science End of Grade standardized assessment.

The United States seems to be constantly looking for the special ingredient to create the strongest academic gains. Teachers want to know what will help them reach their students, but

they need the support once they are able to identify what works. A teacher's drive continually to improve his or her pedagogy can be a manifestation of a work environment that encourages collaboration with peers, offers praise for improving practice, and inclusion on important transformational decisions (Wagner & French, 2010). The collaboration with peers can be a valuable vehicle when moving toward higher student achievement. An example of the power of collaboration was displayed in the study by Moller et al. (2013) where increased student achievement was the result of professional learning communities that focused on examining data and adjusting teacher practices based on the analysis. Although the literature described how improving professional practice can improve teacher motivation and student achievement, it was not revealed in the present study. The current study results do not support a significant association between teacher perception of the working environment in the area of Instructional Practices and Support and North Carolina Science End of Grade standardized assessment.

### **Research Question Two**

The second research question addressed in this study was: How accurately can grade level scores on North Carolina Mathematics End of Grade standardized assessment be predicted from a linear combination of Teacher Working Conditions factors for grade 5 North Carolina elementary students? It was hypothesized that the predictor variables of Time, Facilities and Resources, Community Support, Manage Student Conduct, Teacher Leaders, School Leadership, Professional Development, and Instructional Practices can predict grade 5 North Carolina EOG scores. This question was answered two ways: Pearson correlations between the aggregated total score with the math score (see Table 4) and a stepwise regression model using the math score as the criterion variable and the nine teaching working conditions as candidate predictor variables (see Table 6). Inspection of Table 4 found one of the eight teacher working conditions scores

(community support) to be significantly related to the math score ( $r = .24, p = .009$ ). In Table 5, the final stepwise 1-variable model was significant ( $\beta = .24, p = .009$ ).

### **Significant Correlations to 5th Grade Math EOG Scores**

Of the eight-predictor variables used in this study, one was found to have a significant correlation to 5th grade EOG mathematics scores. In addition, the Community Support and Involvement variable was the only significant predictor. The finding of this study are somewhat consistent with the literature, which surveyed the relationship between this area and student achievement.

The blame for poor student achievement usually falls on the school districts. LaRocque et al. (2011) noted in their report on the family role in student educational development that schools cannot educate students on their own. Students do spend a lot of time at school, but that is not the only place they spend their time. Finding an effective way to create community involvement and support is an area that can help schools, teachers, and students. The literature review is mixed with the benefits of community engagement. A study by Landeros (2011) described how teachers felt that too much parent involvement could actually hurt their ability to deliver quality instruction. Although the literature pointed out that teachers' perceptions of community engagement and support can negatively affect their ability to teach, that was not supported by the study by Quezada (2014). The researcher discovered that the schools with strong perceptions of parent involvement were witnessing higher mathematics proficiency in their students. Although the literature is mixed on the outcomes of community support and teacher perceptions, it does delineate a positive effect on student achievement. The results of the current study do support the literature review by outlining a significant correlation between teacher perception of the working environment in the area of Community Support and

Involvement and North Carolina Mathematics End of Grade (EOG) standardized assessment. This factor was the only predictor, at approximately 5%, to the math scores for 5th grade North Carolina Students in 2014.

### **Non-Significant Correlations to 5th Grade Math EOG Scores**

Seven of the eight predictor variables in this study were not found to be significant predictors on 5th grade EOG mathematics scores. The following seven predictors were Use of Time, Facilities and Resources, Teacher Leadership, Professional Development, Instructional Practices and Support, School Leadership, and Managing Student Conduct. The finding of this study were not consistent with the literature, which surveyed the relationship between these areas and student achievement.

The time afforded to teachers to instruct students shrinks with every additional task laid out before them. Most professionals would love to have more time in the day to complete required tasks, but that does not mean this is a problem that can be ignored. Previous research discussed the negative attitudes teachers can develop as a result of schools not reducing or regulating the multiple responsibilities bestowed upon teachers in addition to everyday instruction (Berry & Gravelle, 2013; Vannest et al., 2010). The literature is consistent in the portrayal of teaching as a physical and emotional challenge for teachers. California tried to reduce the pressure of time on teachers by reducing the amount of students in the classroom. California's Class Size Reduction (CSR) initiative showed, "Overall, the findings suggest that CSR increased achievement in the early grades for all demographic groups" (Jepsen & Rivkin, 2009, p. 247). The literature points to positive effects on student achievement when schools divert their attention to the time demand on teachers. The literature on the topic is not concurrent with the results of this study. The current study results do not support a significant association

between teacher perception of the working environment in the area of Use of Time and North Carolina Mathematics End of Grade standardized assessment.

Sufficient resources and facilities can allow teachers to focus on the task of instruction. Schools that pay attention to this aspect of school management have seen benefits. The balance between professional expectations and private life responsibilities can be daunting. Padma and Reddy (2014) found that schools that allocate resources to facilitate a healthy Work Life Balance (WLB) have employees with greater job satisfaction. The literature outlines the benefits of concentrating resources to help improve employee perceptions. Jimenez-Castallanos (2010) discovered a link between newer facilities and student achievement. The study by Shapely et al. (2011) found a positive link between technology immersion and mathematics achievement, but it was not a significant relationship. The literature is not clear about the difference resources can make in student performance in mathematics. The literature on the returns of school facilities and resources are mixed. Even with the benefits outlined by the literature, the current study results do not support a significant association between teacher perception of the working environment in the area of Facilities and Resources and North Carolina Mathematics End of Grade standardized assessment.

An orderly class can be a result of a school's emphasis on managing student conduct. When student conduct is under control, then a teacher can focus on classroom instruction. An example of the positive effects on teacher perceptions of the environment was evident in the research by Schaubman et al. (2011). These authors researched the results of the Collaborative Problem Solving (CPS) initiative in a school to reduce student behavior issues. The teachers in the study reported a reduction in stress because of the implementation. The reduction of stress can lead to satisfaction with their working environment and more applicable student-teacher

relationship, which has been found to have an association with student achievement and disciplinary issues (Maldonado-Carreño & Votruba-Drzal, 2011). The relationship between student and teacher can be a result of research-based programs that aim at improving student conduct. Schools that have implemented these types of programs have seen improvement in most content areas, which include mathematics (Freiberg et al., 2009; Swoszowski et al., 2013). Although the literature points to positive effects for schools that focus on managing student conduct, the current study does not support the previous inquiries. The current study results do not demonstrate a significant association between teacher perception of the working environment in the area of Managing Student Conduct and North Carolina Mathematics End of Grade standardized assessment.

Teacher input can be a benefit to schools who are looking for positive results. The literature on this topic points out how teacher leadership can affect both teacher perceptions and student achievement in a positive manner. The opportunity to lead should be presented to faculty members to foster growth of teacher leaders in a school. Carpenter and Sherretz (2012) discovered that teachers were more likely to take the leadership role after participating in a local university research project aimed at improving different areas in their school. The teachers in the study naturally flowed into the role of teacher leader while participating and presenting the findings of their study. This type of activity can lead to improved student achievement in some schools. The research by Sacks (2013) highlighted the results of middle school teachers who created a process to identify students who were not completing homework and remediated the problem during the school day. The report found that students were earning better grades and developing better homework habits. In addition, the teachers felt supported by administration and satisfied with their work environment. The literature strengthened the argument that the

development of teacher leaders can help improve student achievement and teacher perceptions of the work environment. The literature review was not reinforced by the outcomes of the current investigation. The current study results do not support a significant association between teacher perception of the working environment in the area of Teacher Leadership and North Carolina Mathematics End of Grade standardized assessment.

In some schools, the school leader makes the decisions that affect school climate and performance. The importance of school leadership, regarding teacher satisfaction, is outlined in the literature. Shaw and Newton (2014) hypothesized that school expenditures on improving instruction in schools would be futile if the school leader cannot create an environment that improves teacher retention. A supportive environment can be a result of the school leader's vision of where the school is heading. School leaders can no longer expect to let issues come to them, they must be proactive and constantly monitoring the pulse of the school (Kouzes & Posner, 2012; Louis et al., 2010). One way to monitor the enactment of the leader's expectations is the use of data. Fairbanks-Schutz (2010) came to the realization that a superintendent's act of constantly monitoring and sharing data was a significant factor in the improved academic performance of the marginalized student population in the school. The literature advocates for strong and effective school leadership to improve school districts. Unfortunately, the current study does not reciprocate the outcome of the literature review on this topic because the results do not support a significant association between teacher perception of the working environment in the area of Educational Leadership and North Carolina mathematics End of Grade standardized assessment.

A constant emphasis on continual education has become the norm for teachers. The literature on this topic does support an improvement in teacher satisfaction with their job because



of professional development. The peer interaction and collaboration during the continuous education opportunities for teachers seems to improve their perceptions (Marston, 2010; Wagner & French, 2010; Wei et al., 2014). If teaching professionals are afforded the opportunity to hone their skills over time, then the result can be improved academic achievement for the students. Shaha (2013) compared teachers who actively participated in an on-line professional development program to those who were not actively participating in the program. The teachers who did not actively participate saw little improvement in academic achievement, while the active participants saw huge gains in student achievement in mathematics from the prior school year. The literature explained that professional development can be even more beneficial to a school when it has a certain focus. Content specific professional development has an advantage when looking at teacher perceptions of the work environment and student academic success in mathematics (Berry et al., 2011; Telese, 2012). The literature reviewed on the subject of professional development outlined a much more positive picture than the current inquiry on the topic. The current study results do not support a significant association between teacher perception of the working environment in the area of Professional Development and North Carolina Mathematics End of Grade standardized assessment.

Instructional practices and support can be one of the most important factors for school improvement. The study by Renzulli et al. (2011) on the satisfaction differences between traditional and charter schoolteachers discovered that charter schoolteachers were more satisfied with their jobs, in part because of the autonomy they experienced. Allowing teachers to make the decisions on the methods they will use to reach their students can improve their outlook on the school environment and improve student achievement. Data can be one tool to help teachers decide what instructional practices will work best for their students. A school in California,

labeled as challenging because they were not meeting achievement goals, decided their data could no longer be ignored. Bernhardt (2009) reported that once the processes on proper data use were in place and continually used, the school showed improved achievement in every area and with every group for two years straight. Although the literature review is consistently positive, the current study results do not support a significant association between teacher perception of the working environment in the area of Instructional Practices and Support and North Carolina Mathematics End of Grade standardized assessment.

### **Conclusions**

The literature highlighted how all of the areas of the school environment, through the eyes of the instructors, can improve a school's climate and aide in the pursuit of higher student achievement. The most simplistic overview of the literature is this: Schools who make it a point to focus on any number of the seven working conditions should experience a positive outlook from their staff and academic success for their students. The current study outlined an entirely different picture regarding student success based on the opinions of the teachers. The most significant relationship was realized between Community Support and Involvement and standardized assessments in science and mathematics. While the relationship was small, it was the strongest factor for both science and mathematics on the 5th grade EOG in North Carolina. School budgets constraints can be an area of difficulty for any school. Finding ways to involve the community with the school can be done with little impact to the school resources. Inviting the community to the school or providing a platform for two-way communication with community members could make a difference in student achievement in the areas of mathematics and science. The truth is that students in the United States are falling behind their counterpart in other nations when it comes to the area of STEM education (Epstein & Miller,

2011; Gobble & Gwynne, 2011; Hanushek et al., 2014; Kelly et al., 2013; Miller et al., 2011; Peterson et al., 2011). The overall hope is that the United States starts to climb back to the top of international rankings in the area of STEM.

### **Implications**

Teachers and school leaders are under constant scrutiny when it comes to student achievement in their schools. Some call for disbandment of teacher unions because they allegedly protect poor performing teachers. School leaders constantly resign or are terminated because they are deemed as underperforming based on student results. Schools appropriate funds to buy new curriculums or new professional practices that are aimed at improving the areas that society has deemed insufficient. The current study helped bring to light an entirely different possible deficiency. The area of Community Support and Involvement had a relationship to student achievement in the areas of science and mathematics.

There are 365 days in a year, and schools typically have students for approximately 180 of those days. A student spends a little less than half of every year in school once he or she reaches the proper age. The bigger picture is even more alarming when comparing time in the community to school. If students typically stay in school until they are 18 years old, then they spend roughly 2,450 days of the 6,570 days available under the care of a school district. Almost two-thirds of a child's life is spent with his or her families or community. It makes perfect sense for schools to focus much attention on engaging the community and gaining their support for the goal of improving student achievement. Schools could help provide tools for parents to help educate their children when they are not attending school. The schools could create partnerships with community groups to help provide programs for student education outside of the instructional school day. As it was pointed out early in this chapter, "It takes a village to raise a

child.” From the results of the current study and the literature, “It takes a village to educate a child.”

### **Limitations**

One limitation of this study could be a matter of perspective, or a lack there of. Some teachers spend their entire careers in one school district. Although this is admirable, it does limit their perspective on the working conditions in their school. A teacher may be happy with the conditions because he or she is not aware of other possibilities. If the students were producing adequate results on standardized exams, then it would be difficult for the teachers to question the current conditions in the school unless, the teachers had experience in another district that was outperforming all others and elicited practices that closely mirrored the prior and current research.

The scoring of the Teacher Working Conditions Survey may create a problem when attempting to quantify the results. The survey displayed adequate reliability and validity performance, but the scoring could be more precise. The current survey had participants choose *agree* or *strongly agree* with the statements on the survey if they found the statement to be factual. The percentage of teachers who choose those two options were reported by the state. Increasing the options or only reporting the *strongly agree* may give a more accurate picture of the environment. A more accurate score could help with determining a more precise relationship between standardized achievement scores and the working environment.

This study is a narrow picture of how standardized assessment scores can be predicted. The sample size was adequate for this study, but may not be applicable to other states. While a shift to common standards is starting to take place, not all states prioritize education in the same

way. States have different formulas to determine per pupil spending, and this could affect the application of the results of this study in other areas of the United States.

### **Recommendations for Future Research**

So many factors can affect student achievement. One factor could be the free and reduced lunch population in a school. Additional research could focus on the schools in lower socio-economic areas to narrow down or eliminate the possible correlations to student achievement. School districts that are able to rise above the socio-economic effect on student achievement may be able to provide a clearer picture of where schools should focus their attention when it comes to increased student achievement.

The Teacher Working Conditions Survey used in North Carolina is also used by other states to gauge teacher perspective on the school environment. The population could be increased by using the results from other Teacher Working Condition surveys and comparing them to the results of a national standardized assessment, such as the NAEP exam. This would increase the sample size in hopes of creating a clearer picture on which environment has the strongest predictive relationship to test scores or reinforce the findings of this study.

One of the limitations of this study could also be a recommendation for future research. If teachers have only worked in one district, then they may have a distorted view of their working environment. Future research could create the same conditions and take the data analysis a step further. The survey results could be separated by teachers who have worked in one school and teachers who have worked in two or more schools. The additional perspective may produce a more accurate depiction of the current schools' working environment.

The introduction of the Common Core State Standards (CCSS) may help with future research. The states are adopting common standards that may make it possible to compare

multiple states and apply the results to a broader pool. The adoption of the CCSS also comes with common assessments that can be used to compare student performance. If the states with common standards and assessments could be convinced to use the Teacher Working Conditions Survey, then this study could be expanded. Because the implementation of the standards was still in its infancy at the time of this study, it may be wise to wait until the standards have been in place at least 10 years to ensure an accurate picture of student performance.

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**Appendix A: 2014 Teacher Working Conditions Survey**

<http://www.ncteachingconditions.org/results/report/157/62124>



**Appendix B: 2013-14 State, District, and School Level End-of-Course and End-of-Grade  
Assessments Report**

<http://www.dpi.state.nc.us/accountability/reporting/>

## Appendix C: Institutional Review Board Application

# LIBERTY UNIVERSITY.

## INSTITUTIONAL REVIEW BOARD

January 24, 2015

Jason Federico

IRB Application 2409: North Carolina Teacher Working Conditions and Student Achievement: Determining the Best Predictors of North Carolina Student Achievement on Grade 5 Mathematics and Science End-of-Grade Standardized Assessments

Dear Jason,

The Liberty University Institutional Review Board has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study does not classify as human subjects research. This means you may begin your research with the data safeguarding methods mentioned in your IRB application.

Your study does not classify as human subjects research because it will not involve the collection of identifiable, private information.

Please note that this decision only applies to your current research application, and any changes to your protocol must be reported to the Liberty IRB for verification of continued non-human subjects research status. You may report these changes by submitting a new application to the IRB and referencing the above IRB Application number.

If you have any questions about this determination or need assistance in identifying whether possible changes to your protocol would change your application's status, please email us at [irb@liberty.edu](mailto:irb@liberty.edu).

Sincerely,

*Administrative Chair of Institutional Research  
The Graduate School*

**LIBERTY**  
UNIVERSITY.

*Liberty University / Training Champions for Christ since 1971*