THE IMPACT OF TEACHER QUALITY ON READING ACHIEVEMENT OF FOURTH GRADE STUDENTS: AN ANALYSIS OF THE 2007, 2009, 2011, AND 2013 NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS (NAEP)

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This study investigated the effects of teacher background variables on fourth grade reading achievement data collected from the 2007, 2009, 2011, and 2013 National Assessment of Educational Progress (NAEP) using a causal-comparative research design. Teacher quality variables related to teacher credentials, instructional methods, training, and support were selected from the NAEP background questionnaire. Descriptive and inferential statistical analyses were used to examine teacher background information and fourth grade reading NAEP scaled scores using measures of central tendency, independent *t*-tests, analysis of variance, and Tukey's HSD post hoc analysis. Findings suggest that certain teacher quality variables positively impact fourth grade reading achievement. Significant differences existed among fourth grade reading scaled scores for the following variables: teaching credentials [region ($p < .05$), traditional preparation route ($p < .001$), highest degree earned($p < .05$), years of experience ($p < .001$)]; instructional methods [reading aloud by students ($p < .01$), questioning character motives ($p < .01$), student selection of reading materials ($p < .001$), explaining/supporting text ($p < .05$), identifying main theme ($p < .001$), time spent on reading ($p < .001$), primary language arts integration ($p < .05$)]; teacher support [instructional grade level support/technical assistance by reading specialist ($p < .05$) and mentoring ($p < .05$)]. This study expands the current literature on teacher quality by exploring the effects of teacher variables on reading achievement.

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CHAPTER 1

INTRODUCTION

"Expert teachers are the most important and most inequitably distributed school resource" (Darling-Hammond, 2007, p. 41).

Unfortunately, all children in the United States are not learning to read well. According to the 2011 National Assessment of Educational Progress (NAEP) report card, 33% of fourth graders, and 24% of eighth graders were below basic reading level (NCES, 2011). According to the National Assessment of Adult literacy (NAAL), 30 million American adults age 16 and older are functionally illiterate (NCES, 2013a). Despite school reform legislation (e.g. No Child Left Behind), disparities in reading achievement continues to exist among school children in the United States. Political leaders continue to call attention to the deficiencies American children have in reading and writing, as compared to other countries. Educational headlines across the nation warn the public of failing schools and underachieving children. A current focus on illiteracy and school failure in the United States has shifted attention to teacher education and accountability. As a result, more emphasis is given to high-stakes testing data and results. In recent decades, there has been a focus on teacher quality as the impetus for educational reform (Phillips, 2010). Pressure from mandates implemented by No Child Left Behind (NCLB) present educators with significant obstacles. An important aspect of NCLB legislation requires that every child have access to "highly qualified" teachers (U.S. Department of Education, 2001). NCLB defines "highly qualified" as teachers with the appropriate state certification and knowledge in their content area or field. The Title II provision of NCLB invests approximately $3 billion annually to improve overall teacher quality and qualifications (U.S. Department of

Education, 2013). Therefore, it is not surprising that teacher quality, or the lack there of, is often blamed for declining student achievement in the reading, math, and science.

Problem of the Study

Over the past five decades, reading education and the teaching profession in general have endured many shifts in practice, research, and policy. Increased scrutiny is being placed on teacher preparation programs (TPP), questioning their ability to properly train teacher candidates. Accountability programs that were once only common in the public school arena are starting to emerge in teacher training institutions (Evans, Stewart, Mangin, & Bagley, 2001). As a teacher educator in the field of reading, it is critical to determine teacher quality variables that may have an impact on student achievement in reading. The focus of this study is to examine reading achievement data from the fourth grade results of the 2007, 2009, 2011, and 2013 National Assessment of Educational Progress (NAEP) to determine the effect of teacher credentials, teaching practices, teacher training, and teacher support on reading achievement. In order to understand the impact of teacher background variables on student achievement, more research is needed on the specific teaching practices, teacher credentials, and teacher training that impact reading achievement.

Significance of the Study

Research literature supports the importance of teacher quality on student achievement. Teachers are an important factor that accounts for some of the variation in student achievement, outside of student and family background (Darling-Hammond, 2010; Rice, 2003; Wendel, 2000). For the most part, there is a shared consensus among educators that high quality teachers, not reading programs, make the difference in student achievement (Allington,

2006; Darling-Hammond, 2006; Snow, Burns, & Griffin, 1998), but differences exist in the literature on exactly what characteristics or credentials make a high quality teacher (Pretorius, 2012). To understand the qualities of expert teachers more research is needed. The NAEP provides the "largest nationally representative and continuing assessment" of U.S. school childrens' achievement in reading (NCES, 2013a, Overview, para. 1). In addition to reading achievement scores of children, a large national sample of their teacher's characteristics are collected including background information related to teacher credentials, training, and classroom pedagogy. This data set will allow further investigation of the teacher quality variables that impact reading achievement. This study expands the current literature on teacher quality by exploring the effects of teacher variables on students' reading achievement.

Historical Background: School Reform

Increased accountability and state control of public schools has been pushed to the forefront of discussion for more than five decades. The Industrial Revolution initiated the need for an educated, technical, and highly-skilled workforce as America became more urban. As America transitioned from an industrial to a global technological society, school reform became the political agenda of governmental leaders (Resnick & Hall, 1998). This change brought economic and political turmoil which provided the catalyst for federal legislation pushing a reform agenda that called for better schools and skilled teachers (Resnick & Hall, 1998). In wake of the Cold War and the launch of Sputnik, federal involvement in public education began with the passage of the National Defense Education Act (NDEA) in 1958 which was designed to improve students' knowledge in math and science (Hoffman & Goodman, 2009). The American public feared that the Soviet Union was passing them as a world power, and placed most of the

blame on public schools. Funds were allocated through NDEA to help America's failing schools (Mondale & Patton, 2001). Sputnik also brought national attention to the quality of schools and their ability to adequately prepare tomorrow's leaders. America was falling behind other nations in math and science, and so the push for technical education began. Amendments to NDEA in the 1960s expanded funding to other subject areas including, English and reading (Flattau & Bracken, 2007).

In the late 1960s, Gallop surveys called more public attention to the quality of education in the U.S., particularly the declining quality of U.S. schools. During this time, public perception of overall school quality was at a all time low, and increased scrutiny from the public, put pressure on the federal government to increase educational opportunities for poor and minority children. The passage of the Civil Rights Act in 1964 banned racial discrimination and spurred the U.S. Department of Education to track data from ethnically diverse schools across the country (Brown, 2004). Years of segregation had caused educational disparities between schools of white and African American children. In 1965, the Elementary Secondary Education Act (ESEA) was passed to ensure that high standards were met in public education by allocating funds to schools that were considered educationally deficient. Unlike the NDEA, ESEA had accountability provisions for tracking at-risk students and evaluating the progress of schools receiving ESEA funds. Schools receiving ESEA funds were evaluated every five years and were expected to show student gains in reading and math achievement.

High inflation and unemployment in the 1970s caused a shift in focus from education to the economy until the National Commission on Excellence in Education (NCEE) put school reform back in the spotlight with the publication of A *Nation at Risk*. This spurred then

Secretary of Education, T.H. Bell, under the authority of Ronald Reagan to form the NCEE. In 1983, under the Regan administration, A *Nation at Risk* deemed that U.S. schools were mediocre, failing, and were responsible for the declining U.S. economy (Tyack & Cuban, 1995). The report also brought into question the quality of public universities and colleges and their role in the declining educational system. This report provided the impetus for sweeping changes and school reform that dominate U.S. education to this day. However, it was the passage of the No Child Left Behind Act (2001) that catapulted a shifted focus of the federal government from resources to student achievement (Mc Guinn, 2006) that still exists today. The emphasis of scientifically-based reading research (SBRR) and its impact on reading instruction, achievement, and policy have resulted in a constant stream of federal mandates that impact how local districts choose and train their teachers (Allington, 2006).

President George W. Bush signed the NCLB act on January 8, 2002. NCLB, which is the reauthorization and expansion of the ESEA, received overwhelming bi-partisan support in Congress. The focus of NCLB was to close the achievement gap for all children, especially children labeled at risk of failing. NCLB was designed to improve accountability of student achievement at the state and local levels by allowing more flexibility and local control. According to the U.S. Department of Education (2001) NCLB is based on four pillars: stronger accountability for results, scientifically based educational methods, flexibility and control at the local and state levels, and greater choices for parents. High stakes testing provided the means for tracking student progress and evaluating teacher performance. NCLB brought about many changes in education, especially in reading education and policy.

Research Questions

In order to understand the impact of teacher quality on reading achievement, it is critical that we gain better understanding about exactly what makes a highly qualified teacher. Darling-Hammond (2012) explains that "educators know—and research confirms – that every aspect of school reform depends for its success on highly skilled teachers and principals, especially when the expectations of schools and the diversity of the student body increase" (p. 8). In order to ensure success for all children, regardless of their background, it is imperative that we understand and identify the teacher background variables that make a difference in reading achievement. This study expands the current literature on teacher quality by exploring the effects of teacher variables on reading achievement. The following research questions guide this study:

1. What is the effect of the type and level of teacher credentials on the average scale score of fourth grade reading achievement as reported by the NAEP?

2. What is the effect of instructional methods for teaching reading and language arts on the average scale score of fourth grade reading achievement as reported by the NAEP?

3. What is the effect of teacher training specifically related to teaching reading and language arts on the average scale score of fourth grade reading achievement as reported by the NAEP?

4. What is the effect of the level of support available for classroom teachers on the average scale score of fourth grade reading achievement as reported by the NAEP?

Definition of Terms

For the purpose of this study, the following terms are defined as:

California Learning Assessment System (CLAS) was the standardized test used to measure students' knowledge and abilities in math, reading, and writing from 1991 until 1995.

Danielson's (1996) framework for teaching is a researched based set of standards for teaching and learning based on the Interstate Teacher Assessment and Support Consortium (InTASC) standards. Danielson's framework consists of 22 instructional components organized into four teaching domains: (1) planning and preparation, (2) classroom environment, (3) instruction, and (4) professional responsibilities.

Interstate Teacher Assessment and Support Consortium (InTASC) is a consortium of state and national educational organizations committed to reforming teacher preparation, licensing, and professional development.

Iowa Test of Basic Skills (ITBS) is a standardized test administered to students in kindergarten through eighth grade in conjunction with the Iowa Statewide Testing Program. The test measures students' abilities in vocabulary, word analysis, reading comprehension, listening, language, mathematics, social studies, and science.

The National Assessment of Educational Progress (NAEP) known as the "Nation's Report Card," provides the largest nationally representative and continuous assessment of reading achievement of America's school children in grades 4, 8, and 12 (NCES, 2013a).

National Board Certification (NBC) is an advanced teaching certification available to teachers with at least three years of teaching experience. NBC teacher recipients are required to demonstrate high levels of content and pedagogical knowledge in their field.

Professional learning community (PLC) is a team of people working interdependently toward continued improvement of a common goal (DuFour, 2003).

Professional development is a “comprehensive, sustained, intensive approach to improving teachers’ and principals’ effectiveness in raising student achievement” (National Staff Development Council, 2009, p. 1).

Teacher effectiveness is a “‘value-added’ assessment of the degree to which teachers who are already in the classroom contribute to their students’ learning, as indicated by higher-than-predicted increases in student achievement scores” (Goe & Stickler, 2008, p. 2).

Teach for America (TFA) is a nonprofit organization that provides a nontraditional path to certification by enlisting recent college graduates, often with no teaching experience, to teach in high-need areas in the United States.

Teacher credentials refers to the paper qualifications that a teacher has earned including: college degree; college courses taken; certification status, level, and type; college major and minor; and years of teaching experience.

Teacher qualifications are “the credentials, knowledge, and experiences that teachers bring with them when they enter the classroom” (Goe & Stickler, 2008, p. 2).

Teacher quality includes the qualifications/credentials, characteristics and teaching practices that lead to increased student achievement.

Teacher practices are “the ways in which teachers interact with students and the teaching strategies they use to accomplish specific teaching tasks” (Goe & Stickler, 2008, p. 2).

Limitations

There are several limitations that impact the results of this study. The following limitations were present:

1. The study relied on self-reported teacher surveys. The survey item data may be influenced by teachers' attitudes and opinions or self-reports of classroom practices.
2. This study was a secondary analysis of data collected by the NAEP. I had no control over the creation, implementation, or reporting of the survey information or student achievement measures reported by the NAEP.
3. Standardized test scores may not accurately reflect the reading achievement levels or academic capabilities of all fourth grade students.
4. Original test scores of individual students are unavailable on the NAEP website, regulating data analysis to collected measures of central tendency.
5. Because of the nature of ordinal data used in survey research, non-parametric would be the most appropriate use of inferential statistics. However, this creates limitations on critical post-hoc analyses. Attempts to determine where differences may exist between multiple groups would require repeated Mann-Whitney U tests and increase the risk of Type I error. Therefore, parametric inferential statistics were employed to determine important variations in independent variables.

Summary

This chapter is organized into the following areas: (a) introduction, (b) purpose of the study, (c) significance of the study, (d) historical background, (e) research questions, (f) definition of terms, and (f) limitations. The remainder of this study is divided into four chapters. Chapter 2 focuses on the relevant research investigating the effects of teacher quality variables on student achievement. Chapter 3 explains the methodology for this study. Chapter 4 and 5 presents the data analysis, results, and conclusions for this study.

CHAPTER 2

LITERATURE REVIEW

"While many studies attest that some teachers contribute more to their students' academic growth than other teachers, research has not been successful at identifying the specific qualifications, characteristics, and classroom practices that are most likely to improve student learning" (Goe & Stickler, 2008, p. 1).

For decades, researchers have examined the influence teachers have on student achievement. A significant body of research exists on the relationship between teacher quality and student learning outcomes (Glasser, 1990; Darling-Hammond, 2000); however, there is much debate over the specific teacher qualities or characteristics that impact student achievement. The purpose of this study was to examine reading achievement data from the fourth grade results of the 2007, 2009, 2011, and 2013 National Assessment of Educational Progress (NAEP) to determine whether a relationship exists between reading achievement and teacher credentials, teaching practices. In order to understand the impact of teacher background variables and teaching practices on student achievement, more research is needed on the specific teaching practices, teacher credentials, and teacher support that increase reading achievement. The research investigating the relationship between teacher quality and student achievement is vast; therefore, I focus my review of literature on the empirical research that examines the impact teacher qualifications, teacher support, and teaching practices have on student reading achievement scores.

Theoretical Underpinnings: Conceptualizing Teacher Quality

Conceptualizing teaching quality is a difficult task. Since the Coleman report was published in 1966, many researchers have investigated the impact teachers have on overall student learning (Darling-Hammond & Youngs, 2002; Goe, 2007; Rice 2003; Wayne & Youngs, 2002) with mixed results and differing perspectives. Developing a theoretical framework is an important, but challenging task for any investigation (Simon, 2011). Simon (2011) explains that "a good theoretical framework assures the reader that the type of investigation you propose is not based solely on your personal instincts, but rather informed by established theory and empirical facts obtained from credible studies" (p. 276). In the following section, I will present a conceptual definition of teacher quality by examining the different perspectives represented in the research literature.

Most researchers agree that teacher quality is strongly correlated with student achievement; however, there is no clear agreement on the specific characteristics that contribute to teacher quality (Goe, 2007). Berliner (2005) explains that when defining teaching quality a judgment of value must be made; these judgments ultimately lead to disagreements among researchers. The term teacher quality has been used to explain a range of characteristics or variables that have a positive impact on student achievement. The launch of Sputnik in 1957 brought national attention to the issue of teacher quality. Post Sputnik, the focus of teacher quality was on the technical skill sets needed to be an effective teacher. More than five decades later, teacher quality is still an important educational issue. Current NCLB (2001) legislation requires that all teachers are 'highly qualified'. NCLB legislation defines 'highly qualified teachers' as meeting the following requirements: state teacher certification, a minimum of a

bachelor's degree from an accredited college or university, and content area knowledge and teaching skills in subjects they teach. This definition of teacher quality focuses primarily on the credentials and qualifications teachers have (inputs), rather than the processes and outcomes that impact student achievement.

Recently, researchers have used a multidimensional approach to defining and conceptualizing teacher quality (Berliner, 2005; Fenstermacher & Richardson, 2005; Goe, 2007), which focuses on credentials, teacher content knowledge, teacher actions, and student achievement outcomes. Goe (2007) conceptualizes and measures teacher quality using four distinct, but related teacher quality indicators: teacher qualifications, teacher characteristics, teacher practices, and teacher effectiveness. Goe (2007) categorizes the indicators as inputs (teacher qualifications and teacher characteristics), processes (teacher practices), and outcomes (teacher effectiveness). Goe (2007) clarifies the difference between teacher quality and teaching quality.

> *Teacher* quality implies that there is a set of inputs (such as certification, teacher test scores, and college degrees) that serves as indicators of who will be successful in the classroom. On the other hand, *teaching* quality implies that it is not what the teachers *have* in terms of training and certification, it is what they *do* in the classroom that indicates quality. (p. 8)

Fenstermacher and Richardson (2005) divide teacher quality into two dimensions: good teaching and successful teaching. "Good teaching" is defined as a teacher who holds all the necessary credentials and qualifications (e.g. certification, teacher training/preparation, and use of appropriate instructional methods) for their content or certification area. On the other

hand, “successful teaching” translates to an impact on student achievement or learning outcomes. Fenstermacher and Richardson explain that teacher quality cannot be defined without considering both dimensions.

Teacher quality is also discussed using measurements of teacher effectiveness. Teacher effectiveness is defined as “a ‘value-added’ assessment of the degree to which teachers who are already in the classroom contribute to their students’ learning, as indicated by higher-than-predicted increases in student achievement scores” (Goe & Stickler, 2008, p. 2). Teacher effectiveness is often used to describe the overall impact teachers have on student achievement. Several studies of teacher effectiveness at the classroom level have been conducted using the Tennessee Value-Added Assessment system (TVAAS). The TVASS measures the effectiveness of school districts, schools, and teachers over time using student achievement scores (Sanders & Horn, 1998). The TVAAS provides an expansive longitudinal database linking student learning outcomes to Tennessee school districts, schools, and teachers. Research using the TVAAS suggests differences in teacher effectiveness as the greatest contributor to student achievement, regardless of class size or other contextual factors (Sanders & Horn, 1998). Other studies using this data set also indicate strong evidence to support the individual teacher’s role in student achievement (Sanders & Rivers, 1996; Sanders &Horn, 1998). Sanders and Rivers (1996) specifically explored the influence teacher effectiveness has on achievement gains using the TVAAS. Evidence suggests that several years of ineffective teachers have detrimental and residual effects on student achievement (Sanders & Rivers, 1996).

Strong (2011) explains that the construct of teacher quality vary in the literature and are often dependent on the perspectives or beliefs of the author. Strong explains that definitions

focus on the following areas: (1) teacher qualifications, (2) teacher attributes and attitudes, (3) pedagogical practices or methods used, and (4) teacher's ability to increase student achievement. Considering all perspectives discussed above, I present a conceptual definition of teacher quality that includes the qualifications, characteristics, and teaching practices that impact student achievement and positive learning outcomes.

Teacher Quality and Student Achievement

Recent debates and legislation have called into question the value of formal teacher education programs and full certification status (Darling-Hammond, 2000). Teacher quality is an issue that fuels the push for increasing control over teacher preparation programs. For decades researchers have searched for a connection between teacher quality and student learning outcomes (Darling-Hammond & Youngs, 2002; Rice, 2003). The research on teacher quality and student achievement over the past 20 years has produced inconsistent results. The National Commission on Teaching and America's Future (NCTAF) is an organization dedicated to providing quality teachers to every child in the U.S. In partnership with national, state and local agencies, NCTAF set a goal in 1996 to reform America's educational system within the decade by ensuring that all children have "access to competent, caring, qualified teaching in schools organized for success" (p. 10). The commission called for school reform using three basic premises: (1) teacher knowledge and skills are the most important influence on student learning; (2) recruitment, preparation, and retention of good teachers is the best plan for school improvement; and (3) school reform should focus on creating environments ideal for high quality teaching. A two-year study commissioned by the NCTAF (1996) revealed many barriers that prevent achievement of this goal; three barriers specifically relate to teacher

quality: (1) flawed teacher preparation; (2) limited professional development and incentives for teacher knowledge and skill; and (3) inadequate teacher induction.

Four expansive research syntheses on teacher quality have been conducted over the past decade. Darling-Hammond and Youngs (2002) conducted a synthesis of research focused on teacher qualifications and student learning outcomes in response to a report by U.S. Secretary of Education, Rod Paige, titled *Meeting the Highly Qualified Teacher Challenge*. In his report, Paige presents a scathing review of traditional teacher preparation programs and colleges of education, stating that the current system for certifying teachers is broken and imposes unnecessary course requirements and demands (U.S. Department of Education, 2002). In addition, the report calls into question the value of educational pedagogy, traditional teacher preparation programs, and time spent in preservice teaching. Darling-Hammond and Youngs (2002) refuted the following assumptions outlined in Paige's report: (1) teachers are important to student achievement; however, teacher preparation programs and certification are unrelated to teacher effectiveness; (2) verbal aptitude and content knowledge are the most important indicators of teacher effectiveness; (3) teacher education programs produce academically weak and unprepared teachers; and (4) Alternative certification programs provide academically superior teachers with higher retention rates. Darling-Hammond and Youngs (2002) synthesis reexamined the research used for their report and found little evidence to support the assumptions outlined by Paige. They note that verbal ability and content knowledge are important contributors to teacher effectiveness; however, they reported evidence to support the value of teacher preparation programs, specifically student teaching and professional methods courses in producing highly effective teachers.

Wayne and Youngs (2002) synthesis reviewed research connecting teacher characteristics to student achievement. The research included in their review was limited to studies that related student achievement on standardized tests to teacher characteristics and credentials. Specifically the researchers examined teacher quality by analyzing the ratings of undergraduate institutions, teacher test scores, degree sought, and methods coursework. The synthesis revealed a positive correlation between student achievement in math and a teacher's mathematics certification and coursework. The researchers were unable to find correlations between other content areas and student achievement. They also reported little evidence to support a connection between student achievement and the ratings of teacher preparation programs.

Similar to Wayne and Youngs (2002), Rice (2003) examined the correlation between teacher characteristics and student achievement scores. Specifically, Rice examined the relationships among teaching experience, degree sought, teacher preparation, teacher certification, coursework, and student achievement scores. Rice concludes that the research investigating the relationship between student achievement and teacher characteristics is lacking. Rice synthesis revealed the following conclusions about teacher characteristics that are positively related to student achievement: (1) teaching experience makes a difference; (2) current research on teacher preparation provides limited insight on how teacher training increases teaching effectiveness and student learning outcomes; (3) teacher certification is important, especially for secondary mathematics; (4) teacher coursework in pedagogy and content has a positive influence on student achievement; and (5) measures of teacher verbal

abilities and literacy are positively correlated with teacher performance and student achievement.

Goe (2007) conducted a research synthesis for the National Comprehensive Center for Teacher Quality designed to examine the teacher quality attributes that impact student achievement. Like Rice (2003) and Wayne and Youngs (2002), Goe limited the synthesis to research that linked teacher quality attributes to student achievement as measured by standardized test scores. Goe organized the research on teacher quality in the following four categories: (1) teacher qualifications; (2) teacher characteristics; (3) teacher practices; and (4) teacher effectiveness. Goe's research linked specific teacher qualifications to increased student achievement. Specifically, Goe reported a positive correlation between student achievement and a teacher's content area knowledge and certification in secondary mathematics. In addition, several studies examined by Goe revealed a positive correlation between a teacher's degree and certification in mathematics and student achievement in high school. However, Goe reported no evidence to support a connection between advanced degrees and student achievement. Several studies in the synthesis revealed that advanced degrees have a negative impact on student achievement (Monk, 1994; Rowan, Correnti, & Miller, 2002; Clotfelter, Ladd, & Vigdor, 2006). Similar to Rice (2003) and Wayne and Youngs (2002), Goe reported a lack of available empirical evidence linking other content areas to student achievement. In addition, Goe reiterated previous findings of the U.S. Department of Education's report (2002) that suggests teaching experience matters, but only in the beginning years of teaching.

Teacher Qualifications and Student Achievement

Goe and Stickler (2008) define teacher qualifications as "the credentials, knowledge, and experiences that teachers bring with them when they enter the classroom" (p. 2). For the purposes of this study, I will include a review of the existing literature related to teacher qualifications and student achievement in the following areas: teacher certification, content area knowledge, teaching experience, and teacher preparation/professional development. Several empirical studies have investigated the relationship between teacher qualifications and student achievement. Teacher certification varies by state and usually requires the completion of a degree or alternative certification program and the passage of a state licensure exam. According to NCLB, teacher certification is an important factor in teacher quality (U.S. Department of Education, 2002); however, the empirical evidence available to support this assumption is inconsistent (Wayne and Young, 2002). A previous study conducted by Hawk, Coble, and Swanson (1985) indicated that full teacher certification impacts student learning outcomes and is not dependent on content area specification; however, this study has been criticized for overestimating the influence of teacher qualifications and underestimating the impact of socioeconomic status (Phillips, 2010).

Darling-Hammond (2000) used reading and math data from the NAEP to examine the relationship between the percentage of highly qualified teachers by state and student learning outcomes. Darling-Hammond reported a positive correlation between the percent of highly qualified teachers (e.g. full state certification/licensure, bachelor's degree from an accredited college, and content area knowledge and teaching skills) at the state level and student achievement in math and reading. Carr (2006) reported significant gains in achievement when

students were taught by highly qualified teachers. Goldhaber and Brewer (1999) analyzed data from the National Education Longitudinal Study of 1988 (NELS: 88) to investigate the relationship between secondary mathematics teacher certification and student achievement in mathematics. The research revealed a positive correlation between teachers certified in mathematics and student achievement in mathematics at the secondary level. In addition, they reported no difference in student achievement scores among the teachers with advanced degrees in mathematics (e.g. traditional university or college route) or teachers trained in emergency or alternative certification programs emphasizing mathematics.

Data from several studies have investigated the relationship between teacher content area knowledge and student achievement. As a whole, these studies have not shown a consistent relationship between teacher content knowledge and student achievement (Darling-Hammond, 2000). Monk (1994) used secondary NAEP mathematics and science data to investigate the impact of subject area knowledge on student achievement. Monk used teacher content area coursework as a measure of subject area knowledge. His findings suggest teacher content knowledge positively increases achievement in secondary mathematics and science, but only in the first few courses a student takes in the subject area. In a similar study, Wenglinksy (2000) used eighth grade NAEP data set to investigate the relationship among teacher content area knowledge and mathematics and science achievement. Wenglinksy reported student achievement in math and science was higher when students' teachers majored or minored in the content area they were teaching. Byrne's (1983) research synthesis investigating the connection between student achievement and teacher's content area

knowledge also revealed mixed results. Byrne was unable to find a consistent positive or negative relationship between student achievement and teacher content knowledge.

Darling-Hammond, Holtzman, Gatlin, and Heilig (2005) investigated the impact of teacher certification and teaching experience on student achievement by examining approximately 4,000 connected student and teacher data sets from fourth and fifth grade in the Houston public school system. The research revealed uncertified teachers and teachers with nonstandard certification routes had a negative influence on student learning gains. The study also examined the impact teaching experience has on student achievement by investigating the impact Teach for America (TFA) teachers have on student learning outcomes. TFA provides a nontraditional path to certification by enlisting recent college graduates, often with no teaching experience, to teach in high-need areas in the United States. TFA assists recruits in obtaining teacher licensure which varies by state. Overall, TFA teachers had lower student achievement scores ranging from one half to three months lower than teachers with full certification; however, TFA teachers with full certification were not statistically different than non TFA teachers. Decker, Mayer, and Glazerman (2004) also investigated the math and reading achievement gains of students with TFA teachers with opposite results. The data set used included approximately 2,000 students in grades 1-5 from 100 classrooms in the United States. A control group was comprised of students with teachers from traditional and alternative certification programs, as well as uncertified teachers. The authors reported TFA teachers had a positive influence on student math achievement when compared to the control group. Gains in student math achievement were greater when compared to novice teachers in the control group; however, achievement gains in reading were not statistically significant.

Cavalluzzo (2004) examined connected student and teacher data sets in the Miami-Dade County public school system to investigate the impact NBC and other teacher qualification variables (e.g. teaching experience, type of certification in mathematics, advanced degree, and undergraduate institution) have on student learning outcomes. National Board Certification (NBC) is an advanced teaching certification available to teachers with at least three years of experience. NBC teacher recipients are required to demonstrate high levels of content and pedagogical knowledge in their field. The undergraduate institution was the only variable that did not positively correlate with increased student achievement gains. Teachers with NBC were shown to have a small increase in student achievement when compared to similar teachers without NBC. Vandevoort, Amerin-Beardsly, and Berliner (2004) reported increased student achievement gains for students with NBC teachers in their investigation of 14 school districts in Arizona. The authors used survey data from principals and teachers as well as student achievement data and found academic gains of 1.3 months for students taught by NBC teachers. In a similar study, Sanders, Ashton, & Wright (2005) investigated the impact of NBC and other teacher quality variables (e.g. teacher qualifications, test scores) on student achievement in mathematics and reading using student connected teacher data sets from two North Carolina school districts. The study analyzed over 250,000 student records and approximately 4,500 teachers; however, the researchers did not find statistical differences in student achievement between the NBC and non-NBC teachers. McColsky et al. (2005) were also unable to find significant differences in their investigation of the relationship between NBC and student achievement of fifth grades students in the North Carolina school system.

Hanuskhek, Kain, O'Brien, and Rivkin (2005) found teaching experience positively increased middle and secondary student achievement in mathematics; however, the gains were not significant past the second year of teaching. Rockoff's (2004) investigation of teaching experience and student achievement yielded similar results where teaching experience increased student achievement in elementary mathematics, but only in the first few years of teaching. In an earlier study, Greenwald, Hedges, and Laine (1996) examined 60 research studies related to teacher expertise (e.g. teacher education level, licensure exam score, and years of teaching experience) and student achievement. The meta-analyses yielded a positive relationship between student achievement and teacher expertise. Ferguson's (1991) analysis of 900 school districts in Texas also indicated a positive relationship between teacher expertise and student achievement. Carr (2006) investigated the link between teacher qualification variables (e.g. teaching experience, level of degree, NCLB highly qualified status) and student achievement using connected teacher student achievement data from Ohio public and charter schools. Conversely, Carr reported no relationship between teaching experience and level of degree and student achievement in either school setting. NCLB highly qualified status was linked to positive achievement gains, but only for public school students. Gallagher's (2004) investigation of Los Angeles charter schools also yielded no positive relationship between teaching experience and student achievement.

Teacher Practices/Professional Development and Student Achievement

The practices teachers employ in the classroom are an important component of teacher quality. Goe and Stickler (2008) define teacher practices as "the ways in which teachers interact with students and the teaching strategies they use to accomplish specific teaching tasks" (p. 2).

The research linking teacher practices and student achievement is vast. Goe and Stickler (2008) categorize the research available on teacher practices and student achievement into seven categories: (1) instruction and assessment alignment, (2) setting clear learning objectives and purposes, (3) challenging instruction, (4) level of student engagement and discussion in explaining assignments, (4) frequent and ongoing assessment, (5) active learning, and (6) evaluation of teacher practices.

Teacher preparation and professional development has been linked to positive gains on student achievement (Darling-Hammond, 2000; Hill, Rowan, & Ball, 2005). Several studies have linked instruction and assessment alignment to gains in student achievement. Using self-reported teacher surveys, Cohen and Hill (1998) investigated the relationship the 1985 Mathematics Framework for California public schools had on student achievement using the California Learning Assessment System (CLAS). CLAS was the standardized test used to measure student's knowledge and abilities in math, reading, and writing from 1991 until 1995. The CALS mathematics assessment was specifically aligned to the 1985 Mathematics Framework which outlined the mathematics standards for California public schools. The researcher focused on the impact professional development and instructional units aligned with the Mathematics Framework have on student achievement using the CLAS. The research revealed instructional practices and professional development aligned with the Mathematics Framework positively impacted math achievement on the CALS. In a similar study, McCaffrey et al. (2001) investigated the relationship between teachers' self-reported instructional practices aligned with the National Council of Teachers of Mathematics (NCTM) standards and 10th grade students' math achievement. The investigators indicated a positive relationship between

teachers who reported more frequent use of NCTM aligned instruction and student achievement in mathematics courses aligned with NCTM standards.

Many studies have investigated the relationship between instructional practices aligned with Danielson's (1996) Framework for Teaching and student achievement. These studies also investigated the relationship between teacher evaluation systems and student achievement. Danielson's framework is a researched based set of standards for teaching and learning based on the Interstate Teacher Assessment and Support Consortium (InTASC) standards. Danielson's framework consists of 22 instructional components organized into four domains. Heneman, Milanowski, Kimball, and Odden (2006) used connected student teacher data to investigate the relationship between student achievement and teachers' performance evaluations using Danielson's Framework for Teaching domains: (1) planning and preparation, (2) classroom environment, (3) instruction, and (4) professional responsibilities. The researchers reported positive relationships between student achievement gains and teacher performance ratings based on Danielson's Framework for Teaching. Holtzapple (2003) and Milanowski (2004) also reported a positive correlation between teachers' ratings on performance measures using Danielson's instructional domains and student achievement in elementary and middle school math, reading, science, and social studies. Both studies indicated students assigned to teachers with advanced ratings in planning and preparation, classroom environment, instruction, and professional responsibilities had higher gains in achievement than students assigned to teachers with lower ratings. Conversely, Kimball, White, Milanowski, and Borman (2004) reported only a slight correlation between teachers' performance ratings based on Danielson's framework and student achievement. The evaluation system used Danielson's framework to

assess teacher performance in the following areas: (1) pedagogy and content knowledge, (2) lesson design and assessment alignment, (3) meeting student needs, and (4) student engagement and appropriate instructional strategies. Using linked teacher performance data from 398 third, fourth, and fifth grade teachers, the researchers were unable to find a significant relationship between teacher performance ratings and student achievement. The impact of Intellectual challenge/engagement and instructional quality were also examined. These variables were found to marginally impact student achievement.

Frome, Lasater, and Cooney (2005) used student surveys and teacher qualifications to investigate the relationship between teacher quality variables and eighth graders' achievement gains. The following teacher quality variables were found to positively impact student achievement: (1) teacher motivation, (2) teacher expectations for students, (3) teacher mentoring experiences, (4) content area coursework, (5) pedagogical coursework, and (6) instructional practices. Similar to Kimball et al. (2004), cognitive engagement and challenge of instruction were reported to marginally impact middle school student achievement in reading and math. Frome et al. (2005) also linked group work, reporting and discussing assignments, and using manipulatives to increased math achievement in middle school students. Marcoulides, Heck, and Papanastasiou (2005) also reported a positive relationship between discussing assignments and student achievement in middle school students' math and science achievement.

Wenglinsky (2000, 2002) used NAEP data to investigate the relationship between teaching practices and student achievement. Wenglinksy's research revealed a positive relationship between hands-on teaching practices and student achievement in math and

science. Further, Wenglinksy (2000) found teacher subject area knowledge and professional development in higher-order thinking and laboratory skills positively impacted student achievement. The value of frequent assessment was also found to positively impact student achievement in math and science (Wenglinksy, 2002). Newmann, Bryk, and Nagaoka (2001) investigated the impact that intellectually demanding assignments had on student achievement as measured by the Iowa Test of Basic Skills (ITBS). The ITBS is a standardized test administered to kindergarten through eighth grade students in conjunction with the Iowa Statewide Testing Program. The test measures students' abilities in vocabulary, word analysis, reading comprehension, listening, language, mathematics, social studies, and science. The study linked over 2000 student assignments given by Chicago teachers in grades three, six, and eight to student achievement scores on the ITBS. Each assignment was given a rating of average or challenging. Study findings indicated student achievement was significantly higher when students were placed in classrooms with intellectually demanding assignments.

Professional Learning Communities/Teacher Support

The value of teacher support, collaboration, and shared decision making should also be considered when investigating the impact teacher quality variables have on student achievement. The research is beginning to emerge on the value of professional learning communities (PLC) as a promising strategy for school improvement; however, there is no universal consensus on the definition or characteristics of an effective PLC model. DuFour (2003) defines a PLC as a team of people working interdependently toward continued improvement of a common goal. A review of the literature points to several characteristics that are important to student achievement. Overall, effective PLCs have five important

characteristics: (1) shared vision, (2) collective responsibility for student achievement, (3) reflective dialogue and professional inquiry, (4) collaborative activity, and (5) promotion of individual and group learning (Stoll, Bolam, McMahon, Wallace, & Thomas, 2006).

Several studies have revealed PLCs to be an effective strategy for school improvement and increased student achievement (Kruse, Louis, & Bryk, 1994; Louis & Marks, 1998; Wiley, 2001). According to DuFour and Eaker (1998) collaboration among teachers within the context of a PLC is an effective strategy for school reform and improvement. Newmann and Wehlage (1997) examined five years of research collected by the Center on Organization and Restructuring of Schools. The synthesis examined data from 1,500 elementary, middle school, and secondary schools across the United States in the process of restructuring effort to improve student learning outcomes. The authors reported schools with high levels of professional learning community and support had positive impacts on student achievement gains. The study also revealed that assessment driven instructional decisions had positive effects on student achievement. Similarly, the Center on Organization and Restructuring of Schools investigated the level of professional community using data from 11,000 secondary students in 820 schools in the United States (Lee, Smith, and Croninger, 1995). Specifically, the researchers examined the impact of schools characterized as PLCs on secondary student achievement in reading, math, science, and history. The research revealed increased student achievement in all four content areas. Overall, students in schools organized as PLCs had students that were engaged in academically challenging learning assignments when compared to schools without PLC organization. Lee and Smith (1996) investigated the impact of professional community on student achievement of eighth and tenth grades students from 820 disadvantaged high schools

in the United States. The researchers reported schools where teachers took collective responsibility for student performance had higher student achievement gains in reading, math, science, and social studies. The research literature available substantiates the significance of PLCs on student achievement in all content areas.

Summary

Chapter 2 focused on the relevant research investigating the effects of teacher quality variables on student achievement. Several conclusions can be reached as a result of the empirical evidence available on teacher quality and student achievement. First, good instruction matters; however there isn't a clear consensus on the specific teacher quality variables that consistently impact student achievement. Second, a review of teacher qualifications research reveals a positive relationship between teacher certification and teacher content area knowledge in math and secondary student achievement. Evidence also suggests that a bachelor's degree in mathematics has a positive impact on student achievement gains; however, the empirical evidence linking teacher certification and teacher content area knowledge in reading, science, and social studies to student achievement is lacking and inconclusive. More research is needed on the connection between advanced degrees and student achievement in the content areas. Studies linking advanced certification (e.g. NBC) and student achievement produced mixed results. Third, teaching experience appears to have a positive impact on student achievement especially in the beginning years of teaching. Fourth, continuous professional development that focuses on instruction positively relates to student achievement gains in mathematics. Again, a lack of empirical evidence linking professional development to student achievement gains in reading was apparent in the literature review.

Finally, PLCs have proven positive strategies for overall school improvement and student achievement in all content areas. In conclusion, more research is needed on how teacher quality variables impact overall student achievement in reading. Chapter 3 explains the methodology for this study. Chapter 4 and 5 presents the data analysis, results, and conclusions for this study.

CHAPTER 3

DESIGN AND METHODOLOGY

"Reduced to its most essential elements, research is a process of identifying something unknown and then collecting data to make it known" (Gall, Gall, & Borg, 2003, p. 35).

This study investigated the effects of teacher background variables on fourth grade reading achievement on the 2007, 2009, 2011, and 2013 National Assessment of Educational Progress (NAEP). The data for this study was collected by the NAEP to measure the reading achievement of a national sample of fourth grade students in United State's schools. As part of the NAEP assessment, teacher variables were collected from a background questionnaire. Chapter three includes a description of the research methodology and information about the NAEP. The following information is provided: (a) research design, (b) instrumentation, (c) data collection procedures, and (d) NAEP Assessment overview.

Research Design

This study employed quantitative methods to investigate the effects of teacher background variables on fourth-grade reading achievement using causal-comparative research. Causal-comparative research attempts to determine the cause of differences among individuals or groups (Fraenkel & Wallen, 2009). Causal-comparative research is a common design in educational research and is used when independent variables cannot be manipulated because group differences already exist (Gay, Mills, & Airasian, 2005). Causal-comparative research aligns with this study because it allows for the investigation of the effects of various teacher background variables on reading achievement of pre-existing groups of students. Causal-

comparative research is important because it helps identify variables that warrant further experimental investigation.

Statistical Analyses

Specifically, this causal-comparative study explored the differences in students' reading achievement mean scores to determine the effects of teacher background variables on reading achievement. Descriptive and inferential statistical analyses were used to examine collected teacher background survey information and fourth-grade reading NAEP scaled scores by using measures of central tendency, independent *t*-tests, analysis of variance (ANOVA), and Tukey's Honestly Significant Difference (HSD) for post hoc analysis. Specifically, the mean was calculated for each variable examined. The standard deviation was also calculated to represent the amount of variability that exists between each teacher quality variables examined. Frequencies were used to summarize teacher background information such as highest degree earned, certification area, certification type, major/minor field of study, professional development received, and level/type of support. Tukey's HSD post-hoc analyses were conducted in cases where an ANOVA indicated statistically significant results. The Tukey HSD was used to clarify which groups in the sample differ. In cases where *t*-tests were used, Levene's test was used to test for homogeneity of variance. A weakness of causal-comparative research is the lack of manipulation of the independent variable because the effect and presumed cause have already taken place and must be studied after the fact. To minimize threats to internal validity, extraneous variables were controlled using ANOVA. Analysis of variance (ANOVA) was used to determine differences in reading achievement levels of students and certain types of teacher quality variables (e.g. teacher credentials, instructional methods,

teacher training, and teacher support). The data collected through teacher questionnaires was ordinal in nature. Standard practice would be to utilize non-parametric analysis of data to reduce the risk of Type I errors. However, given the extensive use of multiple Mann Whitney U analysis as a post-hoc analysis to determine areas of significant difference, the cost of Type I errors could not outweigh the statistical power gained by use of parametric counterparts (i.e. ANOVA and Tukey's HSD).

Independent Variables

Independent variables related to teacher qualifications and teaching practices were selected from the teacher background questionnaires administered by the NAEP assessment of fourth grade reading achievement. Patten and Bruce (2007) describe the independent variable as the condition manipulated by the researcher in order to understand the effects of the independent variable on the dependent variable. The independent variables for this study were used to examine the effects teacher background variables have on the reading achievement of fourth grade students. The independent variables selected for this study were: (a) type and level of teacher credentials, (b) instructional methods used to teach reading/language arts, (c) level of support for reading/ language arts teacher, and (d) type of teacher training.

Dependent Variable

The dependent variable for this study was reading achievement, as measured by the NAEP assessment of fourth grade students. This study explored the teacher's impact on differences in reading achievement among fourth graders.

NAEP Reading Assessment Overview

The NAEP, known as the "Nation's Report Card," provides the largest nationally representative and continuous assessment of reading achievement of America's school children in grades 4, 8, and 12 (NCES, 2013a). Two types of NAEP assessments are used to track reading achievement: Long-Term Trend and Main NAEP. The NAEP began tracking long-term trends in reading achievement for a nationally representative sample of children by age (e.g. 9, 13, and 17) in 1971. Long term NAEP assessments are conducted every four years and provide reading achievement results for student subpopulations by race, gender, SES, school type, and geographical region. Main NAEP results are reported every two years as average scaled scores for student groups on a 0-500 scale and as percentages of student achievement on three levels: Basic, Proficient, and Advanced. Scores are reported for student subgroups by gender, race, census region, community type, students with disabilities, English language learners (ELLs), SES/free or reduced price lunch eligibility, school type, and other teacher and student background variables.

The National Assessment Governing Board (NAGB) was formed in 1988 to supervise the development, implementation, and reporting of NAEP assessments (NCES, 2013a). The NAGB along with the National Center for Educational Statistics (NCES), Westat, Pearson Educational Measurement, and the Educational Testing Service (ETS) work together each cycle to execute the NAEP. NAEP frameworks determine the content and thinking skills assessed for each subject area. Teachers, school administrators, curriculum specialists, parents and community members contribute to the development process for each content area framework. As specified by the NAEP Reading Framework, the Main NAEP reading assessment measures reading skills

and comprehension (e.g. in school and out-of-school reading experiences) of literary and informational texts for grades 4, 8, and 12 (NCES, 2013a). Reading achievement results are reported at the national and state level. Reported scores represent overall reading achievement at the aggregate level, and do not identify the individual achievement of schools or students. For the purposes of this study, Main NAEP assessment data is used.

Sample

The NCLB Act of 2001 (U.S. Department of Education, 2002), requires all states and districts receiving Title I funding to participate in the NAEP assessments. Student and school samples are drawn from each state, the District of Columbia, and Department of Defense schools (NCES, 2013a). National Main NAEP assessment samples are selected using probability samples to ensure students and schools selected represent all subpopulations of public and nonpublic U.S. schools (NCES, 2013a). The number of participating schools and students for each cycle depends on the number of content areas and test items assessed. Approximately 30 students per content area assessed are chosen for each participating school (NCES, 2013a). State Main NAEP assessment samples are selected to represent all subpopulations for participating states. Stratified random sampling is used to ensure selected schools provide a representative sample of all student subpopulations (NCES, 2013a). On average, 100 schools from participating states are selected for Main NAEP assessments per cycle. Student samples for each school range from 30 to 150 students depending on school size and content areas assessed. National results are based on achievement results for both public and nonpublic schools; however, state achievement results do not include nonpublic school data (NCES, 2013a).

Participants

Participants for this study were a nationally representative sample of fourth-grade students and their teachers from public and private schools that participated in the 2007, 2009, 2011, and 2013 Reading Main NAEP (NCES, 2013a). Archival data from the last four NAEP testing periods were retrieved using the NAEP Main Data Explorer. Teacher background, training, and instructional practices information were also gathered from classroom teachers with at least one student participating in NAEP (NCES, 2013b). Classroom teacher survey questionnaires were used to collect this information for each testing period (NCES, 2013b). A link to the 2013 NAEP Reading and Mathematics Teacher Questionnaire is provided in the references section (NCES, 2013b). Participating students also completed a survey questionnaire to collect personal and family background information, as well as their in school and out of school reading experiences. Students with disabilities and English language learners (ELLs) participated in the Reading Main NAEP. Participants for each testing period included in this study were as follows: (1) 2007: 191,000 fourth-grade students and 384,000 teachers from 7,830 schools; (2) 2009: 178,000 fourth-grade students and 246,000 teachers from 9,530 schools; (3) 2011: 213,000 fourth-grade students and 1,071,000 teachers from 8, 500 schools; and (4) 2013: 196,000 fourth-grade students and 424,000 teachers from 7,920 schools.

Instrumentation

NAEP uses a variety of instruments to measure the reading and comprehension skills of fourth grade students in U.S. schools using both literary and informational texts. The NAEP Reading Framework specifies assessment of the following content areas: literary text, fiction, literary nonfiction, poetry, informational text, exposition, argumentation and persuasive text,

and procedural text/documents (NCES, 2009). In addition, the Main reading assessment provides a measure of reading cognitive processes (e.g. locate/recall, integrate/interpret, critique/evaluate) by text type and vocabulary knowledge. NCLB requires NAEP to collect background information about students, teachers, and schools. Teacher background and instructional practices information were collected and reported for the 2007, 2009, 2011, and 2013 NAEP cycle. This information allows further investigation of the teacher background variables that impact student reading achievement, specifically: background, education and training; and classroom organization and instruction in reading (NCES, 2013a). For the purpose of this study, teacher background questionnaire data and the Main NAEP fourth grade reading assessment data from the 2007, 2009, 2011, and 2013 cycle were used.

Data Collection

Data for this study were collected from the fourth grade reading achievement results and teacher background questionnaires for the 2007, 2009, 2011, and 2013 NAEP Main assessment. NAEP data is public information and can be taken from data spread sheets on the NAEP website. Properly trained NAEP field staff is responsible for implementation, processing, scoring, and reporting of the NAEP Main assessments (NCES, 2013a).

Reliability and Validity

To ensure reliability and validity of the Main NAEP many protocols were in place. The NCES supervises test item development and scoring rubrics for the NAEP. The Main Reading NAEP is developed using two types of test items: constructed response items and multiple choice questions (NCES, 2013a). Constructed response items require the student to explain their answer with a written response to the question. Throughout the development process,

the NAEP, NCES, and NGAB conduct extensive quality checks by multiple agencies/groups at regular intervals. To ensure reliability and validity of each assessment, the NAEP employs a rigorous test item development process and implementation which is carried out in the following three phases: (a) development of the reading framework and test specifications; (b) test item development, review, and pilot; and (c) final post assessment review (NCES, 2013a). Validity and reliability checks are also built into the scoring process. A primary program goal is to ensure that all items are scored to maintain objectivity, consistency, and validity (NCES, 2013a). The scoring process is implemented using numerous steps in three distinct phases: (a) development of scoring guides and pilot; (b) initial operational scoring (pre-calibration) and; (c) final operational scoring (NCES, 2013a). Numerous quality and validity checks are in place during all phases of the scoring process, including scanning, processing, and scoring of test documents. Rigorous quality control measures are taken to ensure scorers are properly trained and scoring is accurate, consistent, and valid. In addition, the following quality assurances are in place to ensure accuracy of scoring NAEP constructed response items: (a) identifying and training qualified scorers, (b) ensuring on-going quality through reliable scoring, cross-checking, and statistical monitoring of scoring quality; and (c) maintaining consistency over time using trend scoring and scorer recalibration (NCES, 2013a).

Protection of Human Subjects

Precautions are taken by the NCES to protect the privacy and confidentiality of participants. Federal and state mandates are used to protect the privacy rights of NAEP participants and their families. The Family Educational Rights and Privacy Act (FERPA) frame data collection protocols, information disclosure restrictions/procedures, and protect the

quality of the information collected (NCES, 2013a). Federal law prohibits identification of all NAEP participants. To ensure privacy and confidentiality, student names are physically removed from all testing materials after the assessment is completed. Individual scores are not reported for the NAEP Main assessment. Participant responses are combined and reported as national and state performance levels by demographic student groups (NCES, 2013a). To protect the integrity and accuracy of information collected, NAEP field staff receives extensive training on how to collect and safeguard NAEP assessment data. Each staff member is required to sign and uphold the NAEP Code of Ethics which outlines the principles for fair and accurate test information and data collection (NCES, 2013a).

Summary

The problem of this study was to examine reading achievement data from the fourth grade results of the 2007, 2009, 2011, and 2013 National Assessment of Educational Progress (NAEP) to determine the effect of teacher credentials, teaching practices, teacher training, and teacher support on reading achievement. This study examined the impact of teacher background variables and teaching practices on students' reading achievement. Chapter 3 presented a description of the research methodology used for this study. The following information was explained: (a) research design, (b) instrumentation, (c) data collection procedures, and (d) NAEP Assessment overview. Chapter 4 and 5 presents the data analysis, results, and conclusions for this study.

CHAPTER 4

PRESENTATION AND ANALYSIS OF DATA

This study investigated the effect of teacher credentials, teaching practices, teacher training, and teacher support on reading achievement. Data were collected from the fourth grade reading achievement results of the 2007, 2009, 2011, and 2013 NAEP. As discussed in chapter 3, the sample was comprised of fourth grade reading teachers with students that participated in the Main NAEP reading assessment. As a teacher educator in the field of reading, I was particularly interested in the teacher quality variables that impact student learning outcomes. In recent years, colleges of education in particular have been under fire about the quality of the teachers they are producing. In order to understand the impact of teacher background variables on student achievement, more research is needed on the specific teaching practices, teacher credentials, and teacher training that increase reading achievement. Chapter 4 presents the data analysis of this study.

Data Analyses

As part of the NAEP Main reading assessment, fourth grade reading teachers completed a survey containing questions related to their teaching background, including teacher credentials, teacher training, instructional practices, and teacher support. Items were selected from the teacher background survey if they directly related to my investigation of teacher quality variables and their impact on reading achievement. Detailed information related to the specific survey items that were used for each question is discussed in chapter 4. Four research questions were posed to investigate the effects of teacher credentials, teaching practices, teacher training, and teacher support on reading achievement. This chapter presents the data

analysis for each research question and the specific teacher questionnaire items that were used in the data analysis.

Analysis of Research Question 1

1. What is the effect of the type and level of teacher credentials on the average scale score of fourth grade reading achievement as reported by the NAEP?

The first research question investigated the type and level of teacher credentials that impact student reading achievement. Regional data was included in the analysis to determine if geographical location impacted student reading achievement. Data was retrieved from the NAEP website and entered into SPSS. Data was retrieved by state and regional level with scores reported on fourth grade reading assessments with mean scores for each state. NAEP divides the United States into nine regions and classifies states based upon these regions. Table 1 provides the classification of states by NAEP regions. Raw data from each region including mean and standard deviation for three collection years (2013, 2011, and 2009) are provided in Table 2. Data was unavailable for the 2007 collection year.

A one-way ANOVA was conducted to determine whether region has a significant impact on fourth grade reading achievement as reported on the NAEP. Based upon the results (see Table 3), evidence suggests that region has a significant effect on fourth grade reading achievement scores at the $p < .05$ level [F (8, 195) = 13. 84, $p < .001$]. In addition, post hoc analysis using Tukey's HSD indicated that the mean score for fourth graders who reside in New England state perform significantly higher ($p < .001$) than students who reside in the East South Central, Pacific, Mountain, West South Central and South Atlantic, as well as significantly higher ($p < .05$) than East North Central and West North Central regions. No significant difference existed between New England and Mid Atlantic regions.

Table 1

Classification of State by NAEP Region

State	Census Division	State	Census Division
Alabama	East South Central	Montana	Mountain
Alaska	Pacific	Nebraska	West North Central
Arizona	Mountain	Nevada	Mountain
Arkansas	West South Central	New Hampshire	New England
California	Pacific	New Jersey	Mid-Atlantic
Colorado	Mountain	New Mexico	Mountain
Connecticut	New England	New York	Mid-Atlantic
Delaware	South Atlantic	North Carolina	South Atlantic
District of Columbia	South Atlantic	North Dakota	West North Central
Florida	South Atlantic	Ohio	East North Central
Georgia	South Atlantic	Oklahoma	West South Central
Hawaii	Pacific	Oregon	Pacific
Idaho	Mountain	Pennsylvania	Mid-Atlantic
Illinois	East North Central	Rhode Island	New England
Indiana	East North Central	South Carolina	South Atlantic
Iowa	West North Central	South Dakota	West North Central
Kansas	West North Central	Tennessee	East South Central
Kentucky	East South Central	Texas	West South Central
Louisiana	West South Central	Utah	Mountain
Maine	New England	Vermont	New England
Maryland	South Atlantic	Virginia	South Atlantic
Massachusetts	New England	Washington	Pacific
Michigan	East North Central	West Virginia	South Atlantic
Minnesota	West North Central	Wisconsin	East North Central
Mississippi	East South Central	Wyoming	Mountain
Missouri	West North Central		

Fourth graders in Mid-Atlantic state regions also performed higher than counterparts in East South Central, Pacific, Mountain, South Atlantic and West South Central regions. Among other regions, other than New England and Mid-Atlantic regions, no significant difference existed in fourth grade reading achievement scores. Results of the post hoc analysis are included in Appendix A.

Table 2

Mean and Standard Deviations for NAEP Regions

	N	Mean	Std. Deviation	95% CI for Mean Lower Bound	95% CI for Mean Upper Bound	Minimum	Maximum
East South Central	16	217.06	5.73	214.01	220.12	208	226
Pacific	20	215.15	5.10	212.76	217.54	208	225
Mountain	32	218.09	6.52	215.74	220.45	206	227
West South Central	16	215.19	4.23	212.93	217.44	207	220
New England	24	227.83	4.47	225.95	229.72	219	237
South Atlantic	36	219.75	8.35	216.92	222.58	197	232
East North Central	20	221.25	2.61	220.03	222.47	217	226
West North Central	28	222.96	2.15	222.13	223.80	218	227
Mid Atlantic	12	226.42	3.00	224.51	228.32	222	231
Total	204	220.40	6.71	219.48	221.33	197	237

Table 3

ANOVA Comparing Regions of Country

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3308.681	8	413.585	13.837	0.000
Within Groups	5828.358	195	29.889		
Total	9137.039	203			

To determine the impact of earning and/or receiving certification through the National Board Certification for Professional Teaching Standards (NBPTS) in at least one content area, on fourth grade reading scores, data was collected by state and cross referenced by one of three criteria; completed NBPTS, working on NBPTS, or NBPTS not earned. Descriptive data for each category of NBPTS are provided in Table 4 along with results of the ANOVA (see Table 5) comparing the three classifications indicating a significant difference [F (2, 365) = 25.546, p < .001]. Post hoc analysis comparing NBPTS classifications indicated a significant difference

between the three groups where students with teachers working towards NBPTS perform significantly lower ($p < .001$) than students with teachers that have earned NBPTS or have not earned the credential. Furthermore, no significant difference existed between those fourth graders with teachers that have NBPTS and those who do not. Results of the post hoc analysis are included in Appendix B.

Table 4

Descriptive Statistics of NBPTS Classification

	N	Mean	Std. Deviation	95% CI for Mean Lower Bound	95% CI for Mean Upper Bound	Minimum	Maximum
No	149	220.7584	7.4095	219.5589	221.9579	192	238
Yes	149	220.2282	7.81035	218.9638	221.4926	179	236
Working Toward	70	212.9857	9.18488	210.7957	215.1758	193	232
Total	368	219.0652	8.4477	218.1993	219.9312	179	238

Table 5

ANOVA for NBPTS Classification

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3215.905	2	1607.953	25.546	0.000
Within Groups	22974.529	365	62.944		
Total	26190.435	367			

To determine the impact of entering teaching through alternative certification versus a traditional route, data were collected through NAEP and categorized by state. NAEP describes a traditional route as teacher preparation provided through a college or university with teacher education programs. Descriptive statistics for each preparation route is provided in Table 6. Statistics were conducted; however, equal variances could not be assumed along all measures as calculated by Levene's test for equality of variances. Therefore, a reduction in degrees of

freedom was conducted to avoid committing a Type I error. Results of the independent *t*-test indicated a significant difference where teachers who have entered the profession through a traditional route (*M* = 221, *SD* = 6.4) have students who performed significantly higher on reading achievement as measured by NAEP than students with teachers who entered teaching through alternative certification (*M* = 216, *SD* = 9.2); *t* (241) = -5.3, *p* < .001.

Table 6

Descriptive Statistics for Preparation Route

	N	Mean	Std. Deviation	Std. Error Mean
Yes	138	216.0290	9.27436	0.78949
No	153	221.0392	6.44805	0.52129

Table 7

Independent t-test Comparing Preparation Route

	Levene's Test for Equality of Variances		*t*-test for Equality of Means					95% CI of the Difference	
	F	Sig.	*t*	Df	Sig. (2-tailed)	Mean Difference	Std. Error Diff.	Lower	Upper
Equal variances assumed	19.761	.000	-5.392	289	.000	-5.01023	0.92917	-6.83903	-3.18143
Equal variances not assumed			-5.296	241.182	.000	-5.01023	0.94606	-6.87383	-3.14663

Participants in the data collection were asked to indicate whether they received a major, minor, or no emphasis in the area of elementary education as a part of their undergraduate coursework. To determine the impact of having a major in elementary education on reading achievement scores, data were collected by state and cross referenced by one of three criteria: major in elementary education, minor in elementary education, or no elementary education

background. Descriptive data for each category are provided in Table 8 along with results of the ANOVA (see Table 9) comparing the three classifications. Results from the ANOVA indicated no significant difference [F (2,608) = 2.927; p = .054] existed in the fourth grade reading achievement scores of students as collected through NAEP regardless of whether or not their teachers have a major in elementary education, a minor in elementary education, or no emphasis in elementary education.

Table 8

Descriptive Statistics for Elementary Education Major at Undergraduate Level

	N	Mean	Std. Deviation	95% CI for Mean Lower Bound	95% CI for Mean Upper Bound	Minimum	Maximum
No Elem Educ	204	219.9853	6.87931	219.0356	220.935	194	236
Elem Educ Major	204	221.6471	6.99915	220.6808	222.6133	201	239
Elem Educ Minor	203	220.2118	8.57347	219.0253	221.3983	190	240
Total	611	220.6154	7.54556	220.0159	221.2149	190	240

Table 9

ANOVA for Elementary Education Major at Undergraduate Level

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	331.180	2	165.590	2.927	0.054
Within Groups	34399.436	608	56.578		
Total	34730.615	610			

Participants in the study were asked to indicate the highest degree earned on the following scale: high school diploma, associate, bachelor, master, specialist, doctorate and professional degree (e.g., M.D., LL.B., J.D., and D.D.S.). None of the participants responded as teaching with a high school diploma or associate degree. Descriptive data for each category of

education are provided in Table 10 along with results of the ANOVA (see Table 11) comparing the seven classifications. An ANOVA was conducted to determine the impact the level of degree awarded to a teacher may have on fourth grade reading achievement scores. Results indicated that degree earned does make a significant difference [F (4, 578) = 4.329, p = .002] on reading achievement scores. To determine where significant differences occur, a post hoc analysis using Tukey's HSD was conducted. Results indicated students whose teacher earned a master's degree performed significantly (p < .05) higher than students whose teacher earned only a bachelor degree. In addition, evidence suggested that earning a professional degree results in students who perform significantly higher than those who only earn a bachelor. However, the sample size for professional degree and doctorate degree was very small. Therefore, results should be cautiously interpreted. Results of the post hoc analysis are included in Appendix C.

Table 10

Descriptive Statistics for Degree Earned

	N	Mean	Std. Deviation	95% CI for Mean Lower Bound	95% CI for Mean Upper Bound	Minimum	Maximum
Bachelor	204	219.2157	6.47865	218.3213	220.1101	197	234
Master	204	221.7059	7.12186	220.7227	222.689	200	238
Specialist	169	220.7751	9.15068	219.3855	222.1648	192	245
Doctorate	3	222.6667	5.50757	208.9851	236.3482	219	229
Professional	3	231.3333	16.80278	189.5929	273.0737	213	246
Total	583	220.6192	7.70075	219.9928	221.2456	192	246

Table 11

ANOVA for Degree Earned

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1003.813	4	250.953	4.329	0.002
Within Groups	33509.652	578	57.975		
Total	34513.465	582			

Participants were asked to indicate their status in regard to being highly qualified according to NCLB standards. Participants could indicate whether they were highly qualified, highly qualified in one subject, or not highly qualified. As explained in chapter one, current NCLB (2001) legislation requires that all teachers are 'highly qualified'. NCLB legislation defines "highly qualified" teachers as meeting the following requirements: state teacher certification, a minimum of a bachelor's degree from an accredited college or university, and content area knowledge and teaching skills in subjects they teach. To determine the impact this variable has on fourth grade reading achievement scores, an ANOVA was conducted. Descriptive statistics are reported in Table 12 along with the results of the ANOVA (see Table 13). Results indicated no significant difference [F (2, 236) = 2.712, p = .068] existed between the three classification levels of highly qualified.

Table 12

Descriptive Statistics for Highly Qualified Classification

				95% CI for Mean			
	N	Mean	Std. Deviation	Lower Bound	Upper Bound	Minimum	Maximum
Yes	102	220.4608	6.4726	219.1894	221.7321	201	237
At least one subject	42	221.5952	10.02694	218.4706	224.7199	197	239
No	95	212.8632	39.92563	204.7299	220.9964	0	243
Total	239	217.6402	26.07609	214.3174	220.963	0	243

Table 13

ANOVA Comparing Levels of Highly Qualified Status

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3636.371	2	1818.186	2.712	0.068
Within Groups	158194.683	236	670.316		
Total	161831.054	238			

Participants were asked to indicate whether or not they completed a language arts course two years after certification. To determine the extent to which completing a language arts course two years after certification may impact fourth grade reading achievement scores as reported on NAEP, an independent *t*-test was conducted. Descriptive statistics are provided in Table 14. Statistics were conducted with equal variances assumed along all measures as calculated by Levene's test for equality of variances. Results of the independent *t*-test (see Table 15) indicated no significant difference existed between teachers who took a language arts course two years after certification (*M* = 219, *SD* = 7.2) and teachers who did not (*M* = 220, *SD* = 6.7); *t* (304) = -1.316, *p* = 1.89.

Table 14

Descriptive Statistics for Language Arts Course Participation

	N	Mean	Std. Deviation	Std. Error Mean
Yes	153	219.8889	7.19974	0.58206
No	153	220.9346	6.68726	0.54063

Table 15

Independent t-test Comparing Language Arts Course Participation

	Levene's Test for Equality of Variances		*t*-test for Equality of Means					95% CI of the Difference	
	F	Sig.	*t*	df	Sig. (2-tailed)	Mean Difference	Std. Error Diff.	Lower	Upper
Equal variances assumed	0.535	0.465	-1.316	304	0.189	-1.04575	0.79441	-2.60898	0.51748
Equal variances not assumed			-1.316	302.357	0.189	-1.04575	0.79441	-2.60902	0.51752

Participants were asked to indicate how many years of experience they had using one of four possibilities: 0-4 years, 5-9 years 10-19 years and 20 or more years of experience. Descriptive statistics indicating the years of experience and average scores for each classification are included in Table 16. To determine the extent to which years of experience may impact student performance on fourth grade reading scores, an ANOVA (see Table 17) was conducted. Results indicated that a significant difference [F (3, 757) = 15.276, p < .001] does exist in reading achievement scores depending on how much experience a teacher may have. To further understand the impact teaching experience has on reading achievement scores, a post hoc test using Tukey's HSD was conducted. Results indicated teachers with 10 or more years of experience (p < .001) have students with higher reading achievement scores than teachers with 0-4 years of experience or 5-9 years of experience. Furthermore, results indicated that no significant difference existed in the reading scores of teachers with 0-4 years of experience and 5-9 years of experience. Results of the post hoc analysis are included in Appendix D.

Table 16

Descriptive Statistics for Years of Experience

	N	Mean	Std. Deviation	95% CI for Mean Lower Bound	Upper Bound	Minimum	Maximum
0-4 yrs	201	216.9801	7.45718	215.9429	218.0173	198	237
5-9 yrs	203	218.7143	7.31722	217.7016	219.7269	191	238
10-19 yrs	204	220.6863	7.25466	219.6848	221.6878	195	238
20 + yrs	153	221.7778	7.3728	220.6002	222.9554	192	238
Total	761	219.4008	7.55321	218.8633	219.9383	191	238

Table 17

ANOVA Comparing Differences in Categories of Years of Experience

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2475.045	3	825.015	15.276	0.000
Within Groups	40883.715	757	54.008		
Total	43358.76	760			

Analysis of Research Question 2

2. What is the effect of instructional methods for teaching reading and language arts on the average scale score of fourth grade reading achievement as reported by the NAEP?

The second research question investigated the instructional methods that impact student reading achievement. Participants were asked to what extent they use or emphasize the following teaching methods with their students: reading aloud by students, questioning motives of characters, students read books of their own choosing, explain or support what is read, identify main theme of passage, interpret meaning of passage, and summarize the passage. To determine the extent to which instructional methods teachers use impact reading achievement scores, an ANOVA was conducted across the seven variables. Teachers were asked to identify the extent to which they employ the aforementioned instructional methods using ratings of never, seldom, often or always. Table 18 provides the descriptive statistics of the ratings along with corresponding scores. Results of the ANOVA (see Table 19) indicated a significant difference existed where the extent to which all of the instructional methods are used impacted reading performance: questioning motives of characters [F (3, 460) = 8.252, p < .001], reading aloud by students [F (3, 696) = 6.134, p < .001], reading books of their own choosing [F (3, 578) = 36.562, p < .001], explaining or supporting what is read [F (3, 598) =

11.828, $p < .001$], identification of main theme[F (3, 467) = 8.558, $p < .001$], interpreting meaning of passage[F (3, 456) = 9.295, $p < .001$], and summarization[F (2, 456) = 3.876, $p = .021$]. Post hoc analysis using Tukey's HSD indicated that teachers who often or always emphasize questioning the motives of characters have students with significantly ($p < .01$) higher performance than teachers who seldom or never use it. Teachers who never select read aloud as an instructional method have students who performed significantly ($p < .01$) lower on reading performance. Teachers who always allow students to read books of their own choosing have students with significantly ($p < .001$) higher performance on reading achievement scores. Teachers who often allow students to read books of their own choosing also performed significantly ($p < .001$) better than teachers who seldom or never allow students to read books of their own choosing. Teachers who teach students to explain or support what they read least often, have students who performed significantly ($p < .05$) higher than teachers who seldom or never do. Also teachers who never teach their students to identify theme have students whose reading scores are significantly lower ($p < .001$) than teachers who emphasize identification of theme at least seldom or more frequently. Insufficient data was available to determine post hoc significance for teachers that emphasize interpret or summarize meaning of passage.

Table 18

Descriptive Statistics for Instructional Methods Used by Teacher

					95% CI for Mean			
		N	Mean	Std. Deviation	Lower Bound	Upper Bound	Min	Max
QUESCHAR	Never	5	211.2	9.066	199.94	222.46	204	223
	Seldom	153	218.61	7.319	217.45	219.78	198	236
	Often	153	220.82	6.791	219.73	221.9	198	236
	Always	153	221.73	6.727	220.66	222.81	200	239
	Total	464	220.29	7.134	219.64	220.94	198	239
READALOUD	Never	95	210.52	55.688	199.17	221.86	0	246
	Seldom	197	223.34	28.845	219.29	227.39	0	245
	Often	204	222.75	6.806	221.81	223.68	202	241
	Always	204	218.9	6.817	217.96	219.84	195	234
	Total	700	220.13	26.367	218.17	222.09	0	246
CHOOSEBOOK	Never	53	211.28	13.355	207.6	214.96	179	232
	Seldom	126	211.47	12.278	209.3	213.63	167	235
	Often	199	215.8	8.828	214.57	217.04	187	236
	Always	204	221.53	6.513	220.64	222.43	201	239
	Total	582	216.46	10.335	215.62	217.3	167	239
EXPLAIN/ SUPPORT	Never	8	205.75	12.51	195.29	216.21	185	219
	Seldom	186	204.9	54.602	197	212.8	0	246
	Often	204	221.48	6.668	220.56	222.4	204	242
	Always	204	220.44	6.78	219.5	221.37	197	235
	Total	602	215.79	31.725	213.25	218.33	0	246
THEME	Never	12	210.75	9.488	204.72	216.78	196	227
	Seldom	153	221.04	7.296	219.87	222.2	201	239
	Often	153	221.22	6.658	220.16	222.29	200	239
	Always	153	220.42	6.812	219.33	221.51	200	234
	Total	471	220.63	7.165	219.99	221.28	196	239
INTERPRET	Never	1	170	.	.	.	170	170
	Seldom	153	216.63	19.561	213.51	219.76	0	236
	Often	153	220.8	6.766	219.72	221.88	200	237
	Always	153	221.21	6.805	220.12	222.3	198	238
	Total	460	219.44	12.916	218.26	220.62	0	238
SUMMARIZE	Never	0	.	.	.	.	.	.
	Seldom	153	221.72	7.713	220.49	222.95	204	243
	Often	153	221.32	6.617	220.26	222.38	202	237
	Always	153	219.6	6.834	218.51	220.69	194	235
	Total	459	220.88	7.115	220.23	221.53	194	243

Table 19

ANOVA Comparing Instructional Methods Used by Teacher

		Sum of Squares	df	Mean Square	F	Sig.
QUESCHAR	Between Groups	1203.364	3	401.121	8.252	0.000
	Within Groups	22359.937	460	48.609		
	Total	23563.302	463			
READALOUD	Between Groups	12516.386	3	4172.129	6.134	0.000
	Within Groups	473429.523	696	680.215		
	Total	485945.909	699			
CHOOSEBOOK	Between Groups	9898.424	3	3299.475	36.562	0.000
	Within Groups	52160.244	578	90.243		
	Total	62058.668	581			
EXPLAINSUPPORT	Between Groups	33882.806	3	11294.269	11.828	0.000
	Within Groups	571011.652	598	954.869		
	Total	604894.458	601			
THEME	Between Groups	1257.501	3	419.167	8.558	0.000
	Within Groups	22873.688	467	48.98		
	Total	24131.189	470			
INTERPRET	Between Groups	4412.487	3	1470.829	9.295	0.000
	Within Groups	72154.928	456	158.234		
	Total	76567.415	459			
SUMMARIZE	Between Groups	387.508	2	193.754	3.876	0.021
	Within Groups	22796.902	456	49.993		
	Total	23184.41	458			

Participants were asked how much time they devote to reading per week. Time spent on reading was collected using the following scale: less than 3 hours, 3-4.9 hours, 5-6.9 hours, 7-9.9 hours, and 10 or more hours. An ANOVA was used to determine the extent to which time spent per week on reading varied in relation to performance on reading scores as reported on NAEP. Descriptive statistics are provided in Table 20 along with the results of the ANOVA in Table 21. Results indicated that a significant difference [F (4, 945) = 34.556, p < .001] existed depending on how much time teachers spend on reading. Post hoc analysis using Tukey's HSD indicated that teachers who spend 5-6.9 hours per week on reading have students who score

significantly higher ($p < .001$) than students whose teachers spend 4.9 hours or less. It should be noted that no significant difference existed between teachers who spend 5-6.9 hours per week on reading and teachers who spend 7 hours or more.

Table 20

Descriptive Statistics for Time Spent on Reading

				95% CI for Mean			
	N	Mean	Std. Deviation	Lower Bound	Upper Bound	Minimum	Maximum
Less than 3 hours	136	213.6176	8.53755	212.1698	215.0655	186	232
3-4.9 Hours	202	217	8.67718	215.7961	218.2039	190	240
5-6.9	204	221.1863	7.82346	220.1063	222.2663	196	240
7-9.9	204	222.1029	6.61422	221.1899	223.016	201	241
10+	204	220.6373	6.82691	219.6948	221.5797	195	235
Total	950	219.2916	8.20536	218.7691	219.814	186	241

Table 21

ANOVA Comparing Time Spent Per Week on Reading

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	8153.198	4	2038.3	34.556	0.000
Within Groups	55741.034	945	58.985		
Total	63894.233	949			

Participants were asked to indicate to what extent they integrate language arts (i.e. LA organization) into the curriculum. Participants could select the following options: discrete subject, some integration, and primarily integration. Descriptive statistics for each option with corresponding means of reading scores are included in Table 22. An ANOVA was conducted to determine significant differences between the three groups (see Table 23). Results indicated a significant difference [F (2, 608) = 34.842, $p < .001$] existed between the three groups. Tukey's HSD Post hoc analysis indicated that teachers who use some integration have students who

score significantly higher ($p < .05$) than teachers who use primary integration. Teachers who use some integration have students who score significantly higher ($p < .001$) than teachers who integrate language arts as a discrete subject. Results of the post hoc analysis are included in Appendix E.

Table 22

Descriptive Statistics for Integration of Language Arts

	N	Mean	Std. Deviation	95% CI for Mean Lower Bound	95% CI for Mean Upper Bound	Minimum	Maximum
DISCRETE SUBJECT	203	215.266	8.67443	214.0655	216.4665	184	235
SOME INTEGRATION	204	221.6422	6.59709	220.7314	222.5529	201	238
PRIMARY INTEGATION	204	218.7745	7.74394	217.7055	219.8435	191	238
Total	611	218.5663	8.13393	217.9201	219.2125	184	238

Table 23

ANOVA Comparing Integration of Language Arts

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4149.925	2	2074.963	34.842	0.000
Within Groups	36208.14	608	59.553		
Total	40358.065	610			

Analysis of Research Question 3

3. What is the effect of teacher training specifically related to teaching reading and language arts on the average scale score of fourth grade reading achievement as reported by the NAEP?

The third research question investigated the impact teacher training has on student reading achievement. Participants were asked to indicate whether or not they participated in specific types of professional development including: conferences, observations, workshops, and related reading. Participants selected yes or no as to whether they participated in the four

professional development opportunities. Descriptive statistics are provided in Table 24 indicating the mean scores for each professional development opportunity. An independent *t*-test was conducted to determine the extent to which participating in professional development may impact reading achievement scores of fourth grades students. Statistics were conducted with equal variances assumed along all measures as calculated by Levene's test for equality o*f* variances. Results of the *t*-test are included in Table 25 and indicated no significant difference in reading achievement scores of students whose teachers participated in the professional development opportunities and students whose teachers did not.

Table 24

Descriptive Statistics for Teacher Participation in Professional Development

	CODE	N	Mean	Std. Deviation	Std. Error Mean
CONFERENCES	Yes	102	220.5686	7.15114	0.70807
	No	102	220.9118	6.71942	0.66532
OBSERVATION	Yes	102	219.6765	7.01365	0.69446
	No	102	221.5392	6.84579	0.67783
WORKSHOP	Yes	102	221.2353	6.52668	0.64624
	No	102	220.4706	7.78766	0.77109
RELATED READING	Yes	102	221.0784	6.53655	0.64721
	No	102	221.1961	7.49394	0.74201

Table 25

Independent t-*test Comparing Teacher Participation in Professional Development*

		Levene's Test for Equality of Variances		*t*-test for Equality of Means					95% CI of the Difference	
		F	Sig.	*t*	df	Sig. (2-tailed)	Mean Diff.	Std. Error Diff.	Lower	Upper
CONF	Equal variances assumed	0.065	0.798	-0.353	202	0.724	-0.34314	0.9716	-2.25892	1.57265
	Equal variances not assumed			-0.353	201.222	0.724	-0.34314	0.9716	-2.25897	1.57269
OBSERV	Equal variances assumed	0.157	0.692	-1.92	202	0.056	-1.86275	0.97043	-3.77621	0.05072
	Equal variances not assumed			-1.92	201.882	0.056	-1.86275	0.97043	-3.77622	0.05073
WORK SHOP	Equal variances assumed	0.971	0.326	0.76	202	0.448	0.76471	1.00609	-1.21907	2.74848
	Equal variances not assumed			0.76	196.009	0.448	0.76471	1.00609	-1.21944	2.74885
RELATE READ	Equal variances assumed	0.708	0.401	-0.119	202	0.905	-0.11765	0.98462	-2.05909	1.8238
	Equal variances not assumed			-0.119	198.34	0.905	-0.11765	0.98462	-2.05931	1.82401

Participants were asked to indicate to what extent they learned about methods for conducting reading assessments, preparation for teaching reading to diverse students, and preparing students for standardized tests using the following scale: not at all, small extent,

moderate extent, or large extent. Descriptive statistics indicating the mean reading achievement scores for each variable corresponding to the respondent's description are included in Table 26. An ANOVA was conducted to determine the extent to which each of these variables may impact student reading achievement scores. Results (see Table 27) indicated a significant difference ($p < .05$) existed in reading achievement scores depending on the extent to which a teacher receives preparation in the three areas: methods for conducting reading assessments [F (3, 607) = 4.415, p = .004], preparation for teaching reading to diverse students [F (3, 608) = 35.782, $p < .001$], and preparing students for standardized tests [F (3, 608) = 3.763, p = .011]. Furthermore, post hoc analysis using Tukey's HSD was conducted and revealed significant differences between key points on the scale indicated by participants. In regard to teacher preparation in methods used to assess reading, teachers who reported "not at all" had students with reading scores significantly ($p < .01$) higher than those who indicated "large extent." No significant difference existed among student reading achievement scores of teachers who reported "not at all," "small extent," or "moderate extent." In regard to teacher preparation in preparing students for standardized tests, teachers who reported "not at all" had students with reading achievement scores significantly ($p < .01$) higher than teachers who indicated "large extent." No significant difference existed among student reading achievement scores for teachers who reported "not at all," "small extent," or "moderate extent." In regard to teacher preparation in teaching reading to diverse students, teachers who reported "not at all" had students with reading achievement scores significantly ($p < .01$) higher than those who indicated "moderate extent" or "large extent." Teachers who indicated "large extent" had

students who performed significantly lower ($p < .01$) than all other categories. Results of the post hoc analysis are included in Appendix F.

Table 26

Descriptive Statistics for Teacher Preparation in Reading Assessment, Preparing for Standardized Tests, and Teaching Reading to Diverse Students

Learned About:		N	Mean	Std. Dev.	95% CI for Mean Lower Bound	95% CI for Mean Upper Bound	Min	Max
Reading Assess	Not at all	152	221.9211	7.54635	220.7117	223.1304	206	243
	Small extent	153	221.5882	6.44463	220.5589	222.6176	204	237
	Moderate extent	153	220.4902	7.02638	219.3679	221.6125	198	236
	Large extent	153	219.2549	7.30224	218.0885	220.4213	197	237
	Total	611	220.8118	7.1503	220.2437	221.3799	197	243
Prepare for Stand. Tests	Not at all	153	221.8562	7.98718	220.5805	223.132	197	242
	Small extent	153	221.4575	7.04402	220.3324	222.5826	193	239
	Moderate extent	153	220.3203	6.81683	219.2314	221.4091	198	237
	Large extent	153	219.3333	7.23751	218.1773	220.4893	196	235
	Total	612	220.7418	7.33389	220.1596	221.324	193	242
Teach Read to Div. Stdts	Not at all	153	223.6144	7.35574	222.4395	224.7893	200	244
	Small extent	153	221.6797	6.50976	220.64	222.7195	200	237
	Moderate extent	153	218.5163	6.64722	217.4546	219.5781	196	234
	Large extent	153	216.0392	7.20095	214.889	217.1894	198	233
	Total	612	219.9624	7.50669	219.3665	220.5583	196	244

Table 27

ANOVA Comparing Teacher Preparation in Reading Assessment, Preparing for Standardized Tests, and Teaching Reading to Diverse Students

Learned About:		Sum of Squares	df	Mean Square	F	Sig.
Reading Asses						
	Between Groups	665.95	3	221.983	4.415	0.004
	Within Groups	30521.406	607	50.282		
	Total	31187.355	610			
Prepare for Stand. Tests	Between Groups	599.092	3	199.697	3.763	0.011
	Within Groups	32264.118	608	53.066		
	Total	32863.209	611			
Teach Read to Div Students	Between Groups	5166.606	3	1722.202	35.782	0.000
	Within Groups	29263.529	608	48.131		
	Total	34430.136	611			

Participants were asked to indicate to what extent they received professional development in the following areas: interpreting and analyzing literature, writing process, language arts strategies, and using language arts across the curriculum using the following scale: not at all, small extent, moderate extent, or large extent. Descriptive statistics indicating the mean reading scores for each variable corresponding to the respondent's description are included in Table 28. An ANOVA was conducted to determine the extent to which each of these variables may impact student reading achievement scores. Results (see Table 29) indicated a significant difference ($p < .05$) existed in reading scores depending on the extent to which a teacher receives professional development in two of the four areas; language arts strategies [F (3, 470) = 3.963, p = .008] and using language arts across the curriculum [F (3, 546) = 4.209, p = .006]. No significant difference existed in reading achievement scores of students whose

teachers participated in professional development related to analyzing literature [F (3, 605) = 1.914, p = .126] and the writing process [F (3, 485) = 2.258, p = .081].

Table 28

Descriptive Statistics for Professional Development in Interpreting and Analyzing Literature, Writing Process, Language Arts Strategies, and Using Language Arts across the Curriculum

Prof. Dev.		N	Mean	Std. Dev.	Std. Error	95% CI for Mean Lower Bound	95% CI for Mean Upper Bound	Min	Max
Interpret/ Analyze Literature	Not at all	151	221.2119	7.07824	0.57602	220.0738	222.3501	202	236
	Small extent	153	221.1242	7.35323	0.59447	219.9497	222.2987	194	238
	Moderate extent	153	220.2288	6.59495	0.53317	219.1754	221.2821	204	235
	Large extent	152	219.4539	8.42091	0.68303	218.1044	220.8035	194	243
	Total	609	220.5041	7.40801	0.30019	219.9146	221.0936	194	243
Writing Proc	Not at all	30	222.9667	9.0076	1.64455	219.6032	226.3302	195	236
	Small extent	153	221.7843	7.80009	0.6306	220.5384	223.0302	198	241
	Moderate extent	153	220.7516	6.83478	0.55256	219.6599	221.8433	198	237
	Large extent	153	219.9869	7.36277	0.59524	218.8109	221.1629	199	237
	Total	489	220.9714	7.48189	0.33834	220.3066	221.6362	195	241
LA Strategies	Not at all	19	224	6.60808	1.516	220.815	227.185	210	242
	Small extent	149	222.1141	8.11366	0.6647	220.8006	223.4276	186	242
	Moderate extent	153	221.2353	6.63401	0.53633	220.1757	222.2949	203	237
	Large extent	153	219.6405	7.32211	0.59196	218.471	220.8101	198	237
	Total	474	221.1076	7.41542	0.3406	220.4383	221.7769	186	242
LA across Curr	Not at all	91	222.3077	7.54791	0.79124	220.7358	223.8796	200	243
	Small extent	153	221.7778	6.76506	0.54692	220.6972	222.8583	201	239
	Moderate extent	153	220.7908	7.01563	0.56718	219.6703	221.9114	200	235
	Large extent	153	219.3791	7.56551	0.61164	218.1707	220.5875	195	238
	Total	550	220.9236	7.25778	0.30947	220.3157	221.5315	195	243

Furthermore, post hoc analysis using Tukey's HSD revealed significant differences between key points on the scale indicated by participants in two areas: language arts strategies and using language arts across the curriculum. In regard to language arts strategies, teachers who reported "small extent" had students with reading achievement scores significantly (p < .05) higher than teachers who indicated "large extent." In regard to using language arts across the curriculum, teachers who reported "not at all" or "small extent" had students with reading scores significantly (p < .05) higher than teachers who indicated "large extent." There was no significant difference between "not at all" and "small extent" for teacher preparation in language arts strategies or using language arts across the curriculum. Results of the post hoc analysis are included in Appendix G.

Table 29

ANOVA Comparing Reading Scores and Professional Development in Interpreting and Analyzing Literature, Writing Process, Language Arts Strategies, and Using Language Arts across the Curriculum

Prof Dev		Sum of Squares	df	Mean Square	F	Sig.
Inter/Analyze Lit	Between Groups	313.71	3	104.57	1.914	0.126
	Within Groups	33052.53	605	54.632		
	Total	33366.24	608			
Writing Proc	Between Groups	376.214	3	125.405	2.258	0.081
	Within Groups	26941.385	485	55.549		
	Total	27317.599	488			
LA strategies	Between Groups	641.694	3	213.898	3.963	0.008
	Within Groups	25367.819	470	53.974		
	Total	26009.513	473			
LA across Curr	Between Groups	653.643	3	217.881	4.209	0.006
	Within Groups	28265.149	546	51.768		
	Total	28918.793	549			

Analysis of Research Question 4

4. What is the effect of the level of support available for classroom teachers on the average scale score of fourth grade reading achievement as reported by the NAEP?

The fourth research question investigated the impact teacher support has on student reading achievement. Participants were asked to indicate to what extent the reading specialist provides support for instruction for grade level, instruction by topic, teacher development, technical assistance, and enrichment using the following scale: not at all, small extent, moderate extent, or large extent. Descriptive statistics indicating the mean reading scores for each variable corresponding to the respondent's description are included in Table 30. An ANOVA was conducted to determine the extent to which each of these variables may impact student reading achievement. Results (see Table 31) indicated a significant difference ($p < .05$) in reading achievement scores depending on the extent to which the reading specialists provides instructional grade level support [F (3, 599) = 6.125, $p < .001$], teacher development [F (3, 577) = 2.785, $p = .040$], technical assistance [F (3, 548) = 7.706, $p < .001$], and enrichment [F (3, 400) = 4.182, $p = .006$]. No significant difference existed in the scores of students where the reading specialist provided specific instruction [F (3, 606) = 1.466, $p = .223$] or instruction by topic [F (3, 606) = 1.466, $p = .223$]. Furthermore, post hoc analysis using Tukey's HSD revealed significant differences between key points on the scale indicated by participants. In regard to the reading specialist providing instructional grade level support, teachers who reported "large extent" had students with reading scores significantly ($p < .05$) higher than teachers who indicated "not at all" or "small extent." In regard to the reading specialist providing teacher development, teachers who reported "small extent" had students with reading scores significantly ($p < .05$) higher than those who indicated "large extent."

Table 30

Descriptive Statistics for Support Provided by Reading Specialist

					95% CI for Mean			
		N	Mean	Std. Deviation	Lower Bound	Upper Bound	Min	Max
Grade Level Instruction	Not at all	145	218.6276	8.22846	217.2769	219.9783	195	235
	Small extent	152	217.4013	7.51357	216.1972	218.6054	193	234
	Moderate extent	153	219	8.33272	217.6691	220.3309	198	243
	Large extent	153	221.2745	8.17187	219.9693	222.5798	200	243
	Total	603	219.0846	8.16917	218.4312	219.7379	193	243
Specific Instruction	Not at all	151	219.7616	8.08761	218.4611	221.0621	200	244
	Small extent	153	218.6405	7.25713	217.4814	219.7997	194	232
	Moderate extent	153	219.451	8.33504	218.1197	220.7823	194	240
	Large extent	153	220.5621	8.71767	219.1697	221.9545	199	244
	Total	610	219.6033	8.12646	218.9571	220.2495	194	244
Instruction by Topic	Not at all	151	219.7616	8.08761	218.4611	221.0621	200	244
	Small extent	153	218.6405	7.25713	217.4814	219.7997	194	232
	Moderate extent	153	219.451	8.33504	218.1197	220.7823	194	240
	Large extent	153	220.5621	8.71767	219.1697	221.9545	199	244
	Total	610	219.6033	8.12646	218.9571	220.2495	194	244
Teacher Development	Not at all	128	217.9844	34.75924	211.9048	224.0639	0	243
	Small extent	148	222.7432	8.26526	221.4006	224.0859	195	241
	Moderate extent	152	219.7171	7.80085	218.467	220.9673	196	240
	Large extent	153	217.2484	7.75724	216.0093	218.4874	197	236
	Total	581	219.4561	17.83314	218.003	220.9092	0	243
Technical Assist	Not at all	100	207.92	57.84194	196.4429	219.3971	0	240
	Small extent	146	223.2329	8.09686	221.9084	224.5573	199	242
	Moderate extent	153	220.5817	8.19308	219.2731	221.8903	195	237
	Large extent	153	217.6209	7.69484	216.3919	218.85	195	237
	Total	552	218.1685	26.09202	215.987	220.3499	0	242
Enrichment	Not at all	102	221.5196	7.38037	220.07	222.9693	203	237
	Small extent	102	219.1373	7.92045	217.5815	220.693	192	237
	Moderate extent	102	218.2843	8.39422	216.6355	219.9331	193	235
	Large extent	98	217.8265	8.60116	216.1021	219.551	189	238
	Total	404	219.2054	8.17761	218.4056	220.0053	189	238

No significant difference existed among student reading achievement scores for teachers that selected “not at all,” “small extent”, or “moderate extent.” In regard to the reading specialist providing technical assistance, teachers who reported “small extent,” “moderate extent,” or “large extent” had students who performed significantly higher ($p < .05$) than teachers who reported “not at all.” In regard to the reading specialist providing enrichment, teachers who indicated “not at all” had students who performed significantly ($p < .05$) higher than teachers who indicated “moderate extent” or “large extent.” Results of the post hoc analysis are included in Appendix H.

Table 31

ANOVA for Support Provided by Reading Specialist

		Sum of Squares	df	Mean Square	F	Sig.
Grade Level Instruction	Between Groups	1195.807	3	398.602	6.125	0.000
	Within Groups	38978.88	599	65.073		
	Total	40174.687	602			
Specific Instruction	Between Groups	289.805	3	96.602	1.466	0.223
	Within Groups	39928.188	606	65.888		
	Total	40217.993	609			
Instruction by Topic	Between Groups	289.805	3	96.602	1.466	0.223
	Within Groups	39928.188	606	65.888		
	Total	40217.993	609			
Teacher Development	Between Groups	2632.521	3	877.507	2.785	0.040
	Within Groups	181819.61	577	315.112		
	Total	184452.131	580			
Technical Assistance	Between Groups	15184.647	3	5061.549	7.706	0.000
	Within Groups	359932.684	548	656.811		
	Total	375117.332	551			
Enrichment	Between Groups	819.603	3	273.201	4.182	0.006
	Within Groups	26130.345	400	65.326		
	Total	26949.948	403			

Participants were asked to indicate to what extent a reading specialist was available using the following scale: full time, part time or not at all. Descriptive statistics indicating the mean reading scores for each variable corresponding to the respondent's description are included in Table 32. An ANOVA was conducted to determine the extent to which each of these variables may impact student reading achievement scores. Results (see Table 33) indicated a significant difference [F (2, 451) = 9.167, p < .001] with regard to the availability of a reading specialist. To determine where significant difference exists, a post hoc analysis using Tukey's HSD was conducted. Results indicated that when a teacher had a reading specialist available to them full time, students performed significantly lower (p < .001) than when the specialist was available part time or not at all. There was no significant difference in the performance of students where the specialist was available part time or not at all. Results of the post hoc analysis are included in Appendix I.

Table 32

Descriptive Statistics for Availability of Reading Specialist

					95% CI for Mean			
	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Min	Max
Full Time	153	218.7255	8.01252	0.64777	217.4457	220.0053	194	237
Part Time	150	222.0933	7.23929	0.59109	220.9253	223.2613	205	241
Not at all	151	221.4702	6.55419	0.53337	220.4163	222.5241	197	238
Total	454	220.7511	7.42689	0.34856	220.0661	221.4361	194	241

Table 33

ANOVA Comparing Availability of Reading Specialist

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	976.095	2	488.047	9.167	0.000
Within Groups	24010.78	451	53.239		
Total	24986.874	453			

Participants were asked to indicate whether or not a reading specialist was available to assist students identified with a disability by responding yes or no. Descriptive statistics are provided in Table 34 indicating the mean scores for each option. An independent sample *t*-test was conducted to determine the extent to which the availability of a reading specialist to assist students identified with a disability impacts student reading achievement scores. Statistics were conducted with equal variances assumed along all measures as calculated by Levene's test for equality of variances. Results of the *t*-test (see Table 35) indicated a significant difference in reading achievement where students whose teacher did not have a reading specialist available to assist students with a disability (M = 221, SD = 6.4) performed better than students whose teacher did not (M = 221, SD = 7.4); t (304) = 2.4, $p < .05$.

Table 34

Descriptive Statistics for Reading for Availability of Reading Specialist to Students with a Disability

		N	Mean	Std. Deviation	Std. Error Mean
Reading Spec Assist Students w/ Disabilities	Yes	153	219.7516	7.40224	0.59844
	No	153	221.6013	6.39422	0.51694

Table 35

Independent t-test Comparing Reading Scores when a Reading Specialist is provided to Students with a Disability

		Levene's Test for Equality of Variances		*t*-test for Equality of Means					95% CI of the Difference	
		F	Sig.	*t*	df	Sig. (2-tailed)	Mean Diff.	Std. Error Diff.	Lower	Upper
Read Spec Assist Disabilities	Equal variances assumed	3.003	0.084	-2.339	304	0.020	-1.8497	0.79079	-3.4058	-0.2935
	Equal variances not assumed			-2.339	297.71	0.020	-1.8497	0.79079	-3.40593	-0.2934

Participants were asked to indicate whether or not specific language arts support structures were available to teachers including: mentoring, discussion groups, consultation, co-teaching, and collaboration. Participants were asked to indicate yes or no as to whether the support existed. Descriptive statistics for each support structure with corresponding average reading achievement scores are provided in Table 36.

Table 36

Descriptive Statistics for Availability of Language Arts Support Structures

	CODE	N	Mean	Std. Deviation	Std. Error Mean
MENTORING	Yes	102	219.6961	6.79661	0.67296
	No	102	221.6078	6.96975	0.69011
DISC GROUP	Yes	102	220.7451	6.84291	0.67755
	No	102	220.7255	7.05025	0.69808
CONSULTATION	Yes	102	219.8627	7.48337	0.74096
	No	102	221.3824	6.72522	0.6659
COTEACH	Yes	102	219.7451	6.80665	0.67396
	No	102	221.4902	7.20388	0.71329
COLLABORATIVE	Yes	102	220.1373	7.14356	0.70732
	No	102	220.9804	6.67192	0.66062

An independent sample *t*-test was conducted to determine if significant differences existed between teachers who have support in each category and teachers who do not. Statistics were conducted with equal variances assumed along all measures as calculated by Levene's test for equality of variances. Results of the *t*-test are provided in Table 37. Mentoring was the only support that indicated a significant difference, where teachers who did not receive mentoring (*M* = 221, *SD* = 7) had students with significantly higher reading achievement scores than those who received mentoring (*M* = 219, *SD* = 6.8); t (202) = -1.983, (*p* < .05). All other variables indicated no significant difference in scores of teachers who received the support and teachers who did not.

Table 37

Independent t-test Comparing Availability of Language Arts Support Structures

		Levene's Test for Equality of Variances		*t*-test for Equality of Means					95% CI of the Difference	
		F	Sig.	*t*	df	Sig. (2-tailed)	Mean Diff.	Std. Error Diff.	Lower	Upper
MENTOR	Equal variances assumed	0.046	0.831	-1.983	202	0.049	-1.91176	0.96391	-3.81239	-0.01114
	Equal variances not assumed			-1.983	201.872	0.049	-1.91176	0.96391	-3.8124	-0.01113
DISC GROUP	Equal variances assumed	0.048	0.828	0.02	202	0.984	0.01961	0.97282	-1.89859	1.9378
	Equal variances not assumed			0.02	201.82	0.984	0.01961	0.97282	-1.8986	1.93781

(table continues)

Independent t-test Comparing Availability of Language Arts Support Structures (continued)

		Levene's Test for Equality of Variances		*t*-test for Equality of Means					95% CI of the Difference	
		F	Sig.	*t*	df	Sig. (2-tailed)	Mean Diff.	Std. Error Diff.	Lower	Upper
CONSULT	Equal variances assumed	0.778	0.379	-1.525	202	0.129	-1.51961	0.99622	-3.48392	0.44471
	Equal variances not assumed			-1.525	199.738	0.129	-1.51961	0.99622	-3.48406	0.44484
COTEACH	Equal variances assumed	0.25	0.618	-1.778	202	0.077	-1.7451	0.98133	-3.68006	0.18986
	Equal variances not assumed			-1.778	201.354	0.077	-1.7451	0.98133	-3.68009	0.1899
COLLABORATIVE	Equal variances assumed	0.317	0.574	-0.871	202	0.385	-0.84314	0.96784	-2.7515	1.06523
	Equal variances not assumed			-0.871	201.065	0.385	-0.84314	0.96784	-2.75156	1.06528

Summary

The problem of this study was to examine reading achievement data from the fourth grade results of the 2007, 2009, 2011, and 2013 National Assessment of Educational Progress (NAEP) to determine the effect of teacher credentials, teaching practices, teacher training, and teacher support on reading achievement. This study examined the impact of teacher background variables and teaching practices on students' reading achievement. Chapter 4 presented and analyzed the data for each research question. Chapter 5 presents a discussion of the findings, conclusions, implications, and recommendations for future research.

CHAPTER 5

DISCUSSION, CONCLUSIONS, AND IMPLICATIONS

"Teacher quality is the most influential school-based factor in improving student learning" (Perry, 2011, p.1).

Statement of the Problem

Teacher quality in the United States continues to be a national concern. Current NCLB legislation holds states, local districts, teachers, and administrators accountable for student achievement. Under NCLB, each local education agency is mandated to disseminate information related to student performance at the state, district, and campus level (U.S. Department of Education, 2013). States are required to disseminate, district and campus level report cards summarizing student achievement proficiency levels, academic expectations of student achievement, teacher quality/background information (e.g. teacher degree and emergency/provisional credentials), and NAEP achievement levels/participation rates (U.S. Department of Education, 2013). In addition, under NCLB (2001), student performance on standardized tests may be tied to funding under Title I. A push for district and teacher accountability for student achievement continues to remain a strong issue in the United States. Teacher preparation programs have not escaped increased scrutiny by policymakers at the national and state level. Proponents of alternative certification argue that simplifying the route into teaching is the best way to attract qualified applicants (U.S. Department of Education, 2002), while opponents argue traditional university teacher preparation programs offer the best way to prepare teachers (Darling-Hammond 2002). Fierce debate continues over the specific teacher qualities and characteristics that have the most impact on student

achievement. While teachers are an important factor in student achievement (Darling-Hammond, 2010; Rice 2003; Wendel, 2000), there is no clear consensus in the research literature as to which teacher quality variables have the most impact on student achievement. This study contributes to current policy debate on teacher quality by examining the effects of specific teacher quality variables on reading achievement. The problem of this study was to examine reading achievement data from the fourth grade results of the 2007, 2009, 2011, and 2013 National Assessment of Educational Progress (NAEP) to determine the effect of teacher credentials, teaching practices, teacher training, and teacher support on reading achievement. Chapter 5 presents a discussion of the findings, implications for policy and practice, recommendations for further study, and conclusions.

Review of Methodology

The methodology, as explained in chapter 3, employed a quantitative research design to investigate the effects teacher background variables have on fourth-grade reading achievement using casual-comparative research. Descriptive and inferential statistical analyses were used to examine collected teacher background survey information and fourth-grade reading NAEP scaled scores by using measures of central tendency, independent *t*-tests, analysis of variance (ANOVA), and Tukey's HSD for post hoc analysis. Specifically, the mean was calculated for each variable examined. The standard deviation was also calculated to represent the amount of variability that existed between each teacher quality variable examined. Data related to teacher quality variables were collected from teacher background surveys administered by NAEP. Specifically, the independent variables of interest included: (a) type and level of teacher credentials, (b) instructional methods used to teach reading/language arts, (c) level of support

for reading/ language arts teacher, and (d) type of teacher training. The dependent variable of interest was reading achievement, as measured by the NAEP assessment of fourth grade students.

Reading achievement data were gathered from the fourth-grade NAEP Main assessment for 2007, 2009, 2011, and 2013 to answer the following research questions that guided this study:

1. What is the effect of the type and level of teacher credentials on the average scale score of fourth grade reading achievement as reported by the NAEP?

2. What is the effect of instructional methods for teaching reading and language arts on the average scale score of fourth grade reading achievement as reported by the NAEP?

3. What is the effect of teacher training specifically related to teaching reading and language arts on the average scale score of fourth grade reading achievement as reported by the NAEP?

4. What is the effect of the level of support available for classroom teachers on the average scale score of fourth grade reading achievement as reported by the NAEP?

Summary and Discussion of Findings: Research Question 1

Research question 1 investigated the type and level of teacher credentials that impact fourth-grade reading achievement as reported by the NAEP. Specifically, this question investigated 8 teacher quality variables related to teacher credentials, including: geographical region, NBCPTS status, teacher preparation route, college major/minor, degree earned, highly qualified status, language arts course participation after certification, and years of experience. Data analyses revealed a significant statistical difference existed among fourth-grade reading achievement scores for the following teacher quality variables: geographical region ($p < .05$),

NBPTS status ($p < .001$), teacher preparation route ($p < .001$), degree earned ($p < .05$), and years of experience ($p < .001$). No statistical difference existed among reading achievement scores for college major/minor, highly qualified status, or language arts participation after certification. A discussion of each teacher quality variable investigated for research question 1 is presented below.

As reported in chapter 4, geographical region may positively impact reading achievement scores of students residing in New England (e.g. Connecticut, Massachusetts, New Hampshire, Rhode Island, and Vermont) and Mid-Atlantic regions (e.g. New Jersey, New York, and Pennsylvania). Closer inspection of state classification by NAEP region revealed New York, a Mid-Atlantic region, as one of five states identified as a "mega state" by the NAEP. Currently five states (e.g. California, Florida, Illinois, New York, and Texas) are labeled mega-states because they educate almost one-third of United States school children, 18.7 million students (NCES, 2013a). Also, mega states are home to one-third of families in the United States identified as below the poverty line (e.g. 3.4 million families) (NCES, 2011). Interestingly, New York was the only mega state from a census region (e.g. Mid-Atlantic) that indicated statistical significance in reading achievement scores. A closer inspection of New York revealed a lower student/teacher ratio (e.g. 12.9), higher expenditure per student (e.g. $17, 746 per student), and lower number of English language learners (e.g. 237, 634 ELL students) when compared to the other mega states (NCES, 2011). In addition, all states in the New England and Mid-Atlantic regions had higher per pupil expenditures (e.g. 13, 224 or higher) when compared to other census regions (U.S. Census Bureau, 2011). Percentage comparisons by state suggest all states from the New England and Mid-Atlantic states have a higher percentage of students at or above

the proficient level in reading achievement (NCES, 2013a). The positive relationship between reading achievement and New-England and Mid-Atlantic regions could be related to a variety of factors including: population demographics, available resources provided by each state, quality of teacher preparation programs. It is unclear why these census regions outperformed other regions.

Evidence suggested NBPTS status may negatively impact fourth-grade reading achievement scores, but only for students with teachers working towards NBPTS. Furthermore, no significant difference existed between those fourth graders with teachers that have NBPTS and those who do not. These results support similar findings from McClosky et al. (2005) and Sanders, Ashton, & Wright (2005) who were also unable to find significant differences between NBPTS and non-NBPTS teachers. However, research investigating the impact of NBPTS on student achievement has produced conflicting results (Cavalluzzo, 2004; Vandevoort et al., 2004) with many studies finding positive gains in student reading achievement when teachers achieve NBPTS status. The difference may be in other content or grade areas considering the study only investigated fourth-grade reading achievement. Conversely, results of this study indicated statistical significant results where students with teachers working towards NBPTS performed significantly lower ($p < .001$) than students with teachers who have earned or have not earned NBPTS status. These results are inconsistent with the current NBPTS research literature available.

Teacher preparation route (e.g. traditional vs. alternative certification) had a significant positive impact ($p < .001$), on fourth grade reading achievement, but only for students whose teachers entered the profession through a traditional route (e.g. college or university teacher

preparation program). The research investigating the impact of teacher preparation route on student achievement has produced mixed results (Decker et al., 2004; Goldhaber & Brewer, 1999). In recent years, policymakers and researchers have scrutinized the quality and type of teacher preparation routes available (Darling-Hammond, 2000) calling into question the value of traditional teacher preparation programs. Darling-Hammond (2000) argues alternative certification programs devalue teacher professional status and lessens the teaching profession to a trade. Results from this study support previous research (Hawk et al., 1985; Darling-Hammond et al., 2005) findings emphasizing the value of traditional teacher preparation programs, specifically student teaching and professional methods courses in producing highly effective teachers. Consequently, a major or minor in elementary education, or a language arts course after certification did not statistically impact fourth grade reading achievement.

Degree earned had a positive impact on fourth-grade reading achievement where students whose teachers earned a master's degree performed significantly ($p < .01$) higher than students whose teacher earned a bachelor's degree. Small sample size made it impossible to determine whether a professional or doctorate impacts fourth-grade reading achievement. In contrast to current research, the degree earned had a positive impact on student performance. Available research has failed to link advanced degree status to improved student achievement in content areas (Carr, 2006; Goldhaber & Brewer, 1999). This finding emphasizes the need for more research investigating the impact of degree earned on reading achievement.

Highly qualified status did not indicate a statistically significant difference in fourth-grade reading achievement. NAEP defines highly qualified as meeting three criteria: full state certification/licensure, a minimum of a bachelor's degree earned, and content area knowledge

and teaching skills in the subject taught. Results contradict previous studies that indicate a positive correlation between the percent of highly qualified teachers at the state level and student achievement in math and reading (Darling-Hammond, 2000; Goldhaber & Brewer, 1999). Interestingly, research has not provided evidence of a consistent relationship between content knowledge and student achievement (Byrne, 1983; Darling-Hammond, 2000; Monk, 1994). This finding contradicts Wenglinksy's (2000) research that indicates a positive relationship between student achievement in math and science when their teacher majored or minored in the content area they were teaching. Highly qualified status, as reported by NAEP, only reports whether the teacher has at least a bachelor's degree and is trained in their content area. As highly qualified status depends on three criteria, it is difficult to determine what criteria impact student achievement the most.

Years of teaching experience had a positive impact on fourth-grade reading achievement where teachers with 10 or more years of experience ($p < .001$) have students with higher reading achievement scores than teachers with 0-4 or 5-9 years of experience. This finding contradicts current research investigating years of teaching experience and student achievement (Greenwald et al., 1996; Hanushek, Kain, O'Brien, & Rivkin, 2005; Rockoff, 2004) which reports a positive impact on student achievement, but only in the first few years of teaching. In addition, the available research on teaching experience primarily investigated math achievement of middle and high school students. These findings indicate a need for more research in other content areas and grade levels.

Summary and Discussion of Findings: Research Question 2

Research question 2 investigated the instructional methods that impact fourth-grade reading achievement as reported by the NAEP. Specifically, this question investigated 9 teacher quality variables related to instructional methods emphasized by teachers including: reading aloud by students, questioning motives of characters, allowing students to read books of their own choosing, explaining or supporting what is read, identifying main theme of passage, interpreting meaning of passage, summarizing, time spent on reading per week, and extent of language arts integration. Data analyses revealed a significant statistical difference existed among fourth-grade reading achievement scores for all nine teacher quality variables investigated; however, post hoc significance could not be determined for interpreting meaning of a passage and summarizing because of insufficient data. A discussion of each teacher quality variable investigated for research question 2 is presented below.

As indicated in chapter 2, the classroom practices teachers employ are an important component of teacher quality. Research supports the value of planning, preparation, and instruction on student achievement (Frome, Lasater, & Cooney, 2005; Holtzapple, 2003; Kimball et al., 2004; Milanowski, 2004). Results of this study indicated a statistical difference existed where the extent to which the instructional methods used [e.g. reading aloud by students (p < .01), questioning motives of characters (p < .01), allowing students to read books of their own choosing (p < .001), explaining or supporting what is read (p < .05), identifying main theme of passage (p < .001), time spent on reading per week (p < .001), and extent of language arts integration (p < .05)] positively impacted fourth-grade reading achievement. These findings are consistent with thirty years of reading research which reveals a plethora of knowledge about

the skills, strategies, and instructional methods that impact comprehension and overall reading achievement (Billmeyer & Barton, 1998; Duke & Pearson, 2008; Vaca, 2002). Strategic readers actively employ a variety of skills and comprehension strategies before, during, and after reading (Allington, 2012; Block, Gambrell, & Pressley, 2002; McLaughlin & Allen, 2002). In addition, strategic readers use existing knowledge and experience to make cross-curricular connections (Anderson, Hiebert, Scott, & Wilkinson, 1985; Boyle & Bragg, 2008), thus supporting the integration of language arts across the curriculum.

A significant body of research supports the explicit teaching of comprehension strategies (Allington, 2012; Block et al., 2002; Duke & Pearson, 2008; Farstrup & Samuels, 2002). In addition, effective teachers explicitly teach students how to interpret, interact with, and process textual information (National Reading Panel, 2002). Research-based comprehension strategies are well documented in the literature and include: previewing text and activating background knowledge (Irvin, Lunstrum, Lynch-Brown, Shepard, 1996; Vacca, 2002); predicting (Duke & Pearson, 2008); questioning, monitoring, interpreting, and making connections to text (Farstrup & Samuels, 2002; Vacca, 2002); visualizing (Duke & Pearson, 2008); summarizing and organizing text and information (Billmeyer & Barton, 1998; Duke & Pearson, 2008); elaborating, evaluating, and explaining text and information (Billmeyer & Barton, 1998; Block et al., 2002); and using previous life and literary experience to make cross-curricular connections across (Anderson et al., 1985; Boyle & Bragg, 2008). Research also links teaching across the curriculum and integration of the language arts to improved student motivation, comprehension, and engagement (Barnes & Shirley, 2007; Rennie, Venville, & Wallace, 2011).

Results of this study suggested that time spent on reading positively impacted fourth-grade reading achievement; however, experimental research linking time spent on reading and reading achievement is limited. The National Reading Panel (2002) report, which fueled NCLB reading mandates, cited a lack of experimental research to support the assumption that time spent on reading leads to reading achievement gains. While experimental research is lacking, a significant body of correlation research has linked increased time spent on reading to higher reading achievement gains (Allington & McGill-Franzen, 2003; Anderson, Wilson, & Fielding, 1998; Fisher & Frey, 2007; Krashen, 2001, 2004; Taylor, Frye, Maruyuma, 1990). The results of this study align with these findings, which suggest time spent on reading increases fourth-grade reading achievement. However, it is unclear what type of reading activities or the amount of time allocated for reading impact student achievement.

Summary and Discussion of Findings: Research Question 3

Research question 3 investigated the impact teacher training has on fourth-grade reading achievement as reported by the NAEP. Specifically, this question investigated 11 teacher quality variables related to teacher training/professional development including: participation in conferences, observation, workshops related readings; and preparation in methods for conducting reading assessments, teaching reading to diverse students, preparing students for standardized tests, teaching students to interpret and analyze literature, teaching the writing process, using language arts strategies, and integrating language arts across the curriculum . Data analyses revealed a significant statistical difference existed among fourth-grade reading achievement scores for the following teacher quality variables: preparation in methods for conducting reading assessments, teaching reading to diverse students, preparing

students for standardized tests, using language arts strategies, and integrating language arts across the curriculum. No statistical difference existed among reading achievement scores and participation in conferences, observation, workshops, preparation for teaching the writing process, or interpreting/analyzing literature. A discussion of each teacher quality variable investigated for research question 3 is presented below.

As reported in chapter 4, participation in conferences, observation, workshops, or related readings did not impact fourth-grade reading achievement. In addition, preparation in methods for conducting reading assessments ($p < .01$), teaching reading to diverse students ($p < .01$), using language arts strategies ($p < .05$), and integrating language arts across the curriculum ($p < .05$) negatively impacted fourth-grade reading achievement where teachers who reported no preparation in these areas had students who scored significantly higher than teachers who reported extensive training in these areas. These findings contradict previous research that indicates a positive link between student achievement and professional development (Cohen & Hill, 1998; Darling-Hammond, 2000; Hill et al., 2005). Research indicates that effectively executed professional development, focused on specific student needs, has a positive impact on student learning outcomes (Darling-Hammond & Skyes, 1999; Darling-Hammond & Richardson, 2009; National Reading Panel, 2002). Research supports concentrated professional development in reading methods and assessments as a means of increasing student learning outcomes (McCutchen et al., 2002). Research positively linking professional development and student achievement provides for deep, hands-on, learning over time, rather than a short, fragmented work-shop approach (Darling-Hammond & Richardson, 2009). Preparation in language arts strategies and using language arts across the curriculum did not positively impact

fourth-grade reading achievement. These results contradict findings for research question 2, which revealed a positive impact on reading achievement of for students whose teachers integrate language arts across the curriculum.

Interestingly, preparing students for standardized tests had a negative impact on student achievement where students whose teachers received no training on preparing students for standardized tests performed significantly higher ($p < .01$). Increased accountability and state control of public schools has made standardized testing the norm in American education. Phelps' (2012) meta-analysis of testing research, spanning 100 years, revealed an overall positive effect of standardized testing on student achievement. Several other studies have reported a positive impact of test coaching on student achievement scores (Bangert-Drowns, Kulik, & Kulik, 1983; Berliner & Casanova, 1986; Dreisbach &Keogh, 1982). Conversely, standardized testing and related expenditures have dramatically increased since the passage of NCLB in 2002; however, world rankings for student achievement gains have not improved (Walker, 2010). These findings support research that links "teaching to the test" as a poor substitute for good instruction (Jacobs, 2007). More research is needed to determine if lack of specific test preparation training, equates to less instructional time 'teaching to the test' and more time dedicated to instructional methods that positively impact student achievement. Additionally, professional development in teaching students to interpret/analyze literature did not statistically impact fourth-grade reading achievement. These results contradict research findings discussed earlier which indicate the value of direct teaching of comprehension strategies.

Summary and Discussion of Findings: Research Question 4

Research question 4 investigated the impact teacher support structures have on fourth-grade reading achievement as reported by the NAEP. Specifically, this question investigated 13 teacher quality variables related to teacher support including: reading specialist provided instructional grade level support, specific instruction, instruction by topic, teacher development, technical assistance, and enrichment; availability of reading specialist to assist students identified with disabilities; language arts supports structures classified as mentoring, discussion groups, consultations, co-teaching, and language arts collaborative. Data analyses revealed a significant statistical difference ($p < .05$) existed among fourth-grade reading achievement scores for the following teacher support quality variables: reading specialist provided instructional grade level support, teacher development, technical assistance, and enrichment; availability of reading specialist to assist students identified with disabilities; and mentoring. No statistical difference existed among reading achievement scores where the reading specialist provided specific instruction or instruction by topic. In addition, no statistical difference existed among reading achievement scores when the following language arts supports structures were available: discussion groups, consultations, co-teaching, and language arts collaborative. A discussion of each teacher quality variable investigated for research question 4 is presented below.

According to the results, teacher mentoring and instructional grade level support/technical assistance provided by a school reading specialist positively impacted reading achievement. Conversely, teacher development and enrichment provided by the reading specialist appear to negatively impact fourth-grade reading achievement. In addition,

availability of a reading specialist to assist students identified with disabilities also had a negative impact on fourth-grade reading achievement. Consultations, discussion groups, co-teaching, and language arts collaborative did not significantly impact fourth-grade reading achievement.

Research linking reading achievement gains and support structures provided by a reading specialist is lacking. Negative relationships revealed in this study could be related to the lack of reading specialists available or the number of nonprofessionals currently holding reading specialist positions. Current reading specialist research focuses on the roles and responsibilities (e.g. enrichment, technical assistance, grade level support, teacher development) of the reading specialist rather than the impact they have on reading achievement. Current trends in U.S. schools show the number of reading specialist employed by schools is shrinking (Long, 1995; Quatroche, Bean, Hamilton, 2001; Tancock, 1995). Also, nonprofessionals are often hired to fulfill the roles and responsibilities traditionally assumed by the reading specialist (Long, 1995). Research indicates that the roles and responsibilities of a reading specialist vary by school district and are often dependent on context and classroom teachers are unclear about reading specialist expectations (Dole, 2004; Quatroche et al., 2001). Dole (2004) suggested reading specialists as a means for school reform through teacher coaching and mentoring. Results of this study indicated a positive relationship between mentoring and student achievement. The value of teacher mentoring and induction is well established in the literature and is supported by these findings. Research supports mentoring as an effective form of support and professional development for classroom teachers (Darling-Hammond &Sykes, 1999; Lyons & Pinnell, 2001);however, research specifically linking mentoring to student

achievement gains is limited and reports conflicting results (Black, Neel, & Benson, 2008; Fletcher, Strong, & Villar, 2008; Rockoff, 2008; Wang, Odell, & Schwille, 2008). More research is needed to determine the impact mentoring has on reading achievement.

Implications for Practice and Policy

This study examined reading achievement data from the fourth grade results of the 2007, 2009, 2011, and 2013 National Assessment of Educational Progress (NAEP) to investigate the impact of teacher credentials, teaching practices, teacher training, and teacher support on reading achievement. Although the findings did not indicate statistical significance for each teacher quality indicator tested, several implications for policy and practice are worthy of discussion.

Results indicated that preparation route, degree earned, and years of teaching experience matter. However, highly qualified status as measured by NCLB failed to significantly impact reading achievement. A noteworthy goal of NCLB legislation is to ensure every child has access to highly qualified teachers. As discussed earlier, NCLB defines "highly qualified" as teachers with the appropriate state certification and knowledge in their content area or field. Paper qualifications are the primary criteria for achieving highly qualified status. Annually, NCLB appropriates approximately 3 billion dollars to improve overall teacher quality and qualifications (U.S. Department of Education, 2013); however, reading achievement for U.S. children has remained virtually unchanged (NCES, 2013a) since NCLB was signed into law. The rationale behind the current definition is highly qualified teachers are highly effective teachers, which isn't always the case. Given discussions of reauthorization of NCLB, it makes sense to work toward a better definition of "highly qualified" which includes instructional methods,

teacher training and support, in addition to paper credentials. Additionally, stronger measures are needed to link student outcome data to specific teacher quality variables. Phillips (2010) questions whether NCLB legislation is mandating the "wrong kinds of teacher qualities" (p. 485). Highly qualified status should be measured in multiple ways including: teacher credentials (e.g. preparation route, degree earned, years of experience, content area knowledge, and NBPTS status), teacher performance evaluations, student performance, collegiality/service to the profession (e.g. participation in PLCs, mentoring, tutoring). More importantly, partnerships among teacher preparation program faculty, classroom teachers, school administrators, and policy makers should reformulate the way we think about highly qualified status.

More research is needed to fully understand the impact teacher quality variables have on student achievement. Availability of empirical research linking teacher quality to increased student achievement is lacking. Also, as discussed earlier, there is no clear consensus on the credentials, practices, professional development, support structures and background characteristics that significantly impact student achievement. Additional research that specifically links teacher quality variables to student performance in elementary, middle school, and high school is needed in all content areas. A review of the literature revealed a gap in the literature connecting student achievement to elementary and middle school achievement in reading/language arts, science, and social studies. Longitudinal studies are needed to track teacher performance over time, beginning with their initial coursework and following them from student teacher to classroom teacher.

Quality of teacher preparation and mentoring matters. This study supports current research that links traditional teacher preparation pathways to student achievement. With

increased scrutiny of teacher education programs, the results of this study are encouraging; however, more information is needed on how to best train our nation's teachers. Darling-Hammond (2007) outlines a marshall plan for teaching which includes improved teacher preparation models that allow teaching candidates to gain pedagogical and content knowledge and skills while gaining hands-on experience. While many universities have this professional development school model in place, resources are needed to strengthen existing school/university partnerships. In addition, mentoring new teachers (by university and school faculty) through high quality induction programs offers necessary support and increased competence to novice teachers. (Darling-Hammond, 2007).

Recommendations for Further Study

Several recommendations for further study can be made based on the findings. These recommendations expand on the existing research investigating teacher quality and student achievement.

1. Expand the current study to include student achievement data for all content areas tested (e.g. math, science, reading, and social studies). This allows the researcher to ascertain how teacher quality variables impact student performance across all content areas.
2. Expand the current study to include additional independent variables not investigated in the original study (e.g. self efficacy).
3. Expand the current study to include high-stakes achievement data for each state (e.g. STAAR). This allows the researcher to compare state and national results. Impact of geographical location on student achievement could also be

investigated. For example, do NAEP testing frameworks align with state testing frameworks? Also, does funding (e.g. expenditures per student) impact student achievement?

4. Expand the current study to include data from student and administrator background questionnaires. This allows the researcher to investigate the impact of teacher quality variables as reported by students and administrators.
5. Replicate the current study on a larger scale by increasing the sample to include grades 4, 8, and 12. This allows the researcher to determine the impact teacher quality variables have on grade level achievement. This study used fourth-grade data and many students are still acquiring and improving basic skills. Does grade level impact overall performance when teacher quality variables are investigated?
6. Replicate the current study on a smaller scale by investigating each teacher quality indicator separately (e.g. professional data). Add additional student achievement (e.g. state mandated formal and informal assessments) and teacher performance data (e.g. PDAS) to strengthen the results.
7. Conduct a longitudinal study to investigate the impact of teacher quality variables on student achievement over time, beginning the first year of teaching experience. Do new teacher induction programs, mentoring, or PLCs impact student achievement?
8. Conduct a similar investigation using an experimental design to test the effects of teacher quality variables on student achievement. The casual-comparative

research design employed in this study does not establish causation; therefore generalizations cannot be made outside this study.

9. Conduct a similar study to investigate the impact of state licensure/certification requirements (e.g. PRAXIS, TExES; field experience) on student achievement.

Summary

Research literature supports the importance of teacher quality on student achievement. For the most part, educators agree that quality teachers positively impact student achievement (Allington, 2006; Darling-Hammond, 2006), but differences exist in the literature on exactly what characteristics or credentials make a high quality teacher (Pretorius, 2012). This study expands the current literature on teacher quality by exploring the effects of teacher variables on reading achievement. While the results of this study suggest certain teacher quality variables in all four areas (e.g. teacher credentials, instructional methods, teacher training, and teacher support) may impact reading achievement more than others, many questions still remain.

APPENDIX A

POST HOC ANALYSIS COMPARING CENSUS DIVISION

(I) CENSUSDIVISION	(J) CENSUSDIVISION	Mean Diff. (I-J)	Std. Error	Sig.	95% CI Lower Bound	95% CI Upper Bound
East South Central	Pacific	1.9125	1.83372	0.981	-3.8398	7.6648
	Mountain	-1.03125	1.67395	1.000	-6.2824	4.2199
	West South Central	1.875	1.93291	0.988	-4.1885	7.9385
	New England	-10.77083*	1.76449	0.000	-16.306	-5.2357
	South Atlantic	-2.6875	1.64265	0.784	-7.8405	2.4655
	East North Central	-4.1875	1.83372	0.357	-9.9398	1.5648
	West North Central	-5.90179*	1.71334	0.020	-11.2765	-0.5271
	Mid Atlantic	-9.35417*	2.08778	0.000	-15.9035	-2.8049
Pacific	East South Central	-1.9125	1.83372	0.981	-7.6648	3.8398
	Mountain	-2.94375	1.55836	0.622	-7.8323	1.9448
	West South Central	-0.0375	1.83372	1.000	-5.7898	5.7148
	New England	-12.68333*	1.65524	0.000	-17.8758	-7.4909
	South Atlantic	-4.6	1.5247	0.070	-9.3829	0.1829
	East North Central	-6.10000*	1.72884	0.015	-11.5233	-0.6767
	West North Central	-7.81429*	1.6006	0.000	-12.8353	-2.7932
	Mid Atlantic	-11.26667*	1.9963	0.000	-17.529	-5.0043
Mountain	East South Central	1.03125	1.67395	1.000	-4.2199	6.2824
	Pacific	2.94375	1.55836	0.622	-1.9448	7.8323
	West South Central	2.90625	1.67395	0.723	-2.3449	8.1574
	New England	-9.73958*	1.47628	0.000	-14.3706	-5.1085
	South Atlantic	-1.65625	1.32826	0.945	-5.823	2.5105
	East North Central	-3.15625	1.55836	0.528	-8.0448	1.7323
	West North Central	-4.87054*	1.41474	0.020	-9.3086	-0.4325
	Mid Atlantic	-8.32292*	1.85062	0.000	-14.1283	-2.5176
West South Central	East South Central	-1.875	1.93291	0.988	-7.9385	4.1885
	Pacific	0.0375	1.83372	1.000	-5.7148	5.7898
	Mountain	-2.90625	1.67395	0.723	-8.1574	2.3449
	New England	-12.64583*	1.76449	0.000	-18.181	-7.1107
	South Atlantic	-4.5625	1.64265	0.129	-9.7155	0.5905
	East North Central	-6.06250*	1.83372	0.030	-11.8148	-0.3102
	West North Central	-7.77679*	1.71334	0.000	-13.1515	-2.4021
	Mid Atlantic	-11.22917*	2.08778	0.000	-17.7785	-4.6799
New England	East South Central	10.77083*	1.76449	0.000	5.2357	16.306
	Pacific	12.68333*	1.65524	0.000	7.4909	17.8758
	Mountain	9.73958*	1.47628	0.000	5.1085	14.3706
	West South Central	12.64583*	1.76449	0.000	7.1107	18.181
	South Atlantic	8.08333*	1.4407	0.000	3.5639	12.6028
	East North Central	6.58333*	1.65524	0.003	1.3909	11.7758
	West North Central	4.86905*	1.5208	0.041	0.0983	9.6398
	Mid Atlantic	1.41667	1.93291	0.998	-4.6468	7.4802

(table continues)

(I) CENSUSDIVISION	(J) CENSUSDIVISION	Mean Diff. (I-J)	Std. Error	Sig.	95% CI Lower Bound	95% CI Upper Bound
East North Central	East South Central	2.6875	1.64265	0.784	-2.4655	7.8405
	Pacific	4.6	1.5247	0.070	-0.1829	9.3829
	Mountain	1.65625	1.32826	0.945	-2.5105	5.823
	West South Central	4.5625	1.64265	0.129	-0.5905	9.7155
	South Atlantic	-8.08333*	1.4407	0.000	-12.6028	-3.5639
	West North Central	-1.5	1.5247	0.987	-6.2829	3.2829
	West North Central	-3.21429	1.37758	0.328	-7.5357	1.1071
	Mid Atlantic	-6.66667*	1.82236	0.010	-12.3834	-0.95
West North Central	East South Central	4.1875	1.83372	0.357	-1.5648	9.9398
	Pacific	6.10000*	1.72884	0.015	0.6767	11.5233
	Mountain	3.15625	1.55836	0.528	-1.7323	8.0448
	West South Central	6.06250*	1.83372	0.030	0.3102	11.8148
	South Atlantic	-6.58333*	1.65524	0.003	-11.7758	-1.3909
	East North Central	1.5	1.5247	0.987	-3.2829	6.2829
	West North Central	-1.71429	1.6006	0.978	-6.7353	3.3068
	Mid Atlantic	-5.16667	1.9963	0.198	-11.429	1.0957
West North Central	East South Central	5.90179*	1.71334	0.020	0.5271	11.2765
	Pacific	7.81429*	1.6006	0.000	2.7932	12.8353
	Mountain	4.87054*	1.41474	0.020	0.4325	9.3086
	West South Central	7.77679*	1.71334	0.000	2.4021	13.1515
	New England	-4.86905*	1.5208	0.041	-9.6398	-0.0983
	South Atlantic	3.21429	1.37758	0.328	-1.1071	7.5357
	East North Central	1.71429	1.6006	0.978	-3.3068	6.7353
	Mid Atlantic	-3.45238	1.88632	0.662	-9.3697	2.465
Mid Atlantic	East South Central	9.35417*	2.08778	0.000	2.8049	15.9035
	Pacific	11.26667*	1.9963	0.000	5.0043	17.529
	Mountain	8.32292*	1.85062	0.000	2.5176	14.1283
	West South Central	11.22917*	2.08778	0.000	4.6799	17.7785
	New England	-1.41667	1.93291	0.998	-7.4802	4.6468
	South Atlantic	6.66667*	1.82236	0.010	0.95	12.3834
	East North Central	5.16667	1.9963	0.198	-1.0957	11.429
	West North Central	3.45238	1.88632	0.662	-2.465	9.3697

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

APPENDIX B

POST HOC ANALYSIS COMPARING NBTS STATUS

(I) NBPTS	(J) NBPTS	Mean Diff. (I-J)	Std. Error	Sig.	95% CI Lower Bound	95% CI Upper Bound
No	Yes	0.5302	0.91918	0.833	-1.6329	2.6933
	Working Towards	7.77267*	1.14963	0.000	5.0672	10.4781
Yes	No	-0.5302	0.91918	0.833	-2.6933	1.6329
	Working Towards	7.24247*	1.14963	0.000	4.537	9.9479
Working Towards	No	-7.77267*	1.14963	0.000	-10.4781	-5.0672
	Yes	-7.24247*	1.14963	0.000	-9.9479	-4.537

APPENDIX C

POST HOC ANALYSIS COMPARING HIGHEST DEGREE EARNED

		Mean Diff. (I-J)	Std. Error	Sig.	95% CI Lower Bound	95% CI Upper Bound
Bachelor	Master	-2.49020*	0.75391	0.009	-4.5532	-0.4272
	Specialist	-1.55946	0.79199	0.283	-3.7267	0.6077
	Doctorate	-3.45098	4.42823	0.937	-15.5684	8.6665
	Professional	-12.11765*	4.42823	0.05	-24.2351	-0.0002
Master	Bachelor	2.49020*	0.75391	0.009	0.4272	4.5532
	Specialist	0.93073	0.79199	0.766	-1.2365	3.0979
	Doctorate	-0.96078	4.42823	1.000	-13.0782	11.1567
	Professional	-9.62745	4.42823	0.191	-21.7449	2.49
Specialist	Bachelor	1.55946	0.79199	0.283	-0.6077	3.7267
	Master	-0.93073	0.79199	0.766	-3.0979	1.2365
	Doctorate	-1.89152	4.43487	0.993	-14.0271	10.2441
	Professional	-10.55819	4.43487	0.122	-22.6938	1.5774
Doctorate	Bachelor	3.45098	4.42823	0.937	-8.6665	15.5684
	Master	0.96078	4.42823	1.000	-11.1567	13.0782
	Specialist	1.89152	4.43487	0.993	-10.2441	14.0271
	Professional	-8.66667	6.21692	0.632	-25.6787	8.3454
Professional	Bachelor	12.11765*	4.42823	0.050	0.0002	24.2351
	Master	9.62745	4.42823	0.191	-2.49	21.7449
	Specialist	10.55819	4.43487	0.122	-1.5774	22.6938
	Doctorate	8.66667	6.21692	0.632	-8.3454	25.6787

APPENDIX D

POST HOC ANALYSIS COMPARING YEARS OF EXPERIENCE

(I) YEARSEXP	(J) YEARSEXP	Mean Diff. (I-J)	Std. Error	Sig.	95% CI Lower Bound	Lower Bound
0-4 YEAR	5-9 YEARS	-1.73419	0.73126	0.083	-3.617	0.1486
	10-19 YEARS	-3.70618*	0.73037	0.000	-5.5867	-1.8257
	20+ YEARS	-4.79768*	0.78847	0.000	-6.8278	-2.7676
5-9 YEARS	0-4 YEAR	1.73419	0.73126	0.083	-0.1486	3.617
	10-19 YEARS	-1.97199*	0.72855	0.035	-3.8478	-0.0961
	20+ YEARS	-3.06349*	0.78679	0.001	-5.0893	-1.0377
10-19 YEARS	0-4 YEAR	3.70618*	0.73037	0.000	1.8257	5.5867
	5-9 YEARS	1.97199*	0.72855	0.035	0.0961	3.8478
	20+ YEARS	-1.0915	0.78596	0.507	-3.1152	0.9321
20+ YEARS	0-4 YEAR	4.79768*	0.78847	0.000	2.7676	6.8278
	5-9 YEARS	3.06349*	0.78679	0.001	1.0377	5.0893
	10-19 YEARS	1.0915	0.78596	0.507	-0.9321	3.1152

APPENDIX E

POST HOC ANALYSIS COMPARING LANGUAGE ARTS INTEGRATION

(I) LA INTEGRATE	(J) LA INTEGRATE	Mean Diff. (I-J)	Std. Error	Sig.	95% CI Lower Bound	Upper Bound
DISCRETE	SOME	-6.37615*	.76504	.000	-8.1736	4.5787
	PRIMARY	-3.50850*	.76504	.000	-5.3059	-1.7111
SOME	DISCRETE	6.37615*	.76504	.000	4.5787	8.1736
	PRIMARY	2.86765*	.76410	.001	1.0724	4.6629
PRIMARY	DISCRETE	3.50850*	.76504	.000	1.7111	5.3059
	SOME	-2.86765*	.76410	.001	-4.6629	-1.0724

APPENDIX F

POST HOC ANALYSIS COMPARING LEARNING ABOUT READING ASSESSMENT, PREPARATION FOR STANDARDIZED TESTS, AND TEACHING READING TO DIVERSE STUDENTS

Dependent Variable	(I) CODELEARN	(J) CODELEARN	Mean Diff. (I-J)	Std. Error	Sig.	95% CI Lower Bound	95% CI Upper Bound
READ ASSESS	Not at all	Small extent	0.33282	0.81206	0.977	-1.7592	2.4248
		Moderate extent	1.43086	0.81206	0.293	-0.6612	3.5229
		Large extent	2.66615*	0.81206	0.006	0.5741	4.7582
	Small extent	Not at all	-0.33282	0.81206	0.977	-2.4248	1.7592
		Moderate extent	1.09804	0.81073	0.529	-0.9905	3.1866
		Large extent	2.33333*	0.81073	0.022	0.2448	4.4219
	Moderate extent	Not at all	-1.43086	0.81206	0.293	-3.5229	0.6612
		Small extent	-1.09804	0.81073	0.529	-3.1866	0.9905
		Large extent	1.23529	0.81073	0.424	-0.8533	3.3239
	Large extent	Not at all	-2.66615*	0.81206	0.006	-4.7582	-0.5741
		Small extent	-2.33333*	0.81073	0.022	-4.4219	-0.2448
		Moderate extent	-1.23529	0.81073	0.424	-3.3239	0.8533
PREPARE FOR STAND. TEST	Not at all	Small extent	0.39869	0.83287	0.964	-1.7469	2.5443
		Moderate extent	1.53595	0.83287	0.254	-0.6097	3.6815
		Large extent	2.52288*	0.83287	0.014	0.3773	4.6685
	Small extent	Not at all	-0.39869	0.83287	0.964	-2.5443	1.7469
		Moderate extent	1.13725	0.83287	0.522	-1.0083	3.2829
		Large extent	2.12418	0.83287	0.053	-0.0214	4.2698
	Moderate extent	Not at all	-1.53595	0.83287	0.254	-3.6815	0.6097
		Small extent	-1.13725	0.83287	0.522	-3.2829	1.0083
		Large extent	0.98693	0.83287	0.637	-1.1587	3.1325
	Large extent	Not at all	-2.52288*	0.83287	0.014	-4.6685	-0.3773
		Small extent	-2.12418	0.83287	0.053	-4.2698	0.0214
		Moderate extent	-0.98693	0.83287	0.637	-3.1325	1.1587

(table continues)

Dependent Variable	(I) CODELEARN	(J) CODELEARN	Mean Diff. (I-J)	Std. Error	Sig.	95% CI Lower Bound	95% CI Upper Bound

TCHG RDG to DIVERSE STDTS	Not at all	Small extent	1.93464	0.7932	0.071	-0.1088	3.978
		Moderate extent	5.09804*	0.7932	0.000	3.0546	7.1414
		Large extent	7.57516*	0.7932	0.000	5.5318	9.6186
	Small extent	Not at all	-1.93464	0.7932	0.071	-3.978	0.1088
		Moderate extent	3.16340*	0.7932	0.000	1.12	5.2068
		Large extent	5.64052*	0.7932	0.000	3.5971	7.6839
	Moderate extent	Not at all	-5.09804*	0.7932	0.000	-7.1414	-3.0546
		Small extent	-3.16340*	0.7932	0.000	-5.2068	-1.12
		Large extent	2.47712*	0.7932	0.010	0.4337	4.5205
	Large extent	Not at all	-7.57516*	0.7932	0.000	-9.6186	-5.5318
		Small extent	-5.64052*	0.7932	0.000	-7.6839	-3.5971
		Moderate extent	-2.47712*	0.7932	0.010	-4.5205	-0.4337

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

APPENDIX G

POST HOC ANALYSIS OF PROFESSIONAL DEVELOPMENT COMPARING ANALYZING LITERATURE, WRITING PROCESS, LANGUAGE ARTS STRATEGIES, AND LANGUAGE ARTS ACROSS THE CURRICULUM

Dependent Variable	(I) CODEPD	(J) CODEPD	Mean Diff. (I-J)	Std. Error	Sig.	95% CI Lower Bound	95% CI Upper Bound
ANALYZ LIT	Not at all	Small extent	0.08774	0.84787	1.000	-2.0965	2.272
		Moderate extent	0.98316	0.84787	0.653	-1.2011	3.1674
		Large extent	1.75797	0.84925	0.164	-0.4299	3.9458
	Small extent	Not at all	-0.08774	0.84787	1.000	-2.272	2.0965
		Moderate extent	0.89542	0.84507	0.714	-1.2816	3.0725
		Large extent	1.67024	0.84646	0.199	-0.5104	3.8509
	Moderate extent	Not at all	-0.98316	0.84787	0.653	-3.1674	1.2011
		Small extent	-0.89542	0.84507	0.714	-3.0725	1.2816
		Large extent	0.77481	0.84646	0.797	-1.4058	2.9555
	Large extent	Not at all	-1.75797	0.84925	0.164	-3.9458	0.4299
		Small extent	-1.67024	0.84646	0.199	-3.8509	0.5104
		Moderate extent	-0.77481	0.84646	0.797	-2.9555	1.4058
WRITING PROC	Not at all	Small extent	1.18235	1.48819	0.857	-2.6541	5.0188
		Moderate extent	2.21503	1.48819	0.445	-1.6215	6.0515
		Large extent	2.97974	1.48819	0.189	-0.8568	6.8162
	Small extent	Not at all	-1.18235	1.48819	0.857	-5.0188	2.6541
		Moderate extent	1.03268	0.85213	0.620	-1.1641	3.2294
		Large extent	1.79739	0.85213	0.152	-0.3994	3.9942
	Moderate extent	Not at all	-2.21503	1.48819	0.445	-6.0515	1.6215
		Small extent	-1.03268	0.85213	0.620	-3.2294	1.1641
		Large extent	0.76471	0.85213	0.806	-1.4321	2.9615
	Large extent	Not at all	-2.97974	1.48819	0.189	-6.8162	0.8568
		Small extent	-1.79739	0.85213	0.152	-3.9942	0.3994
		Moderate extent	-0.76471	0.85213	0.806	-2.9615	1.4321

(table continues)

Dependent Variable	(I) CODEPD	(J) CODEPD	Mean Diff. (I-J)	Std. Error	Sig.	95% CI Lower Bound	95% CI Upper Bound
LA STRAT	Not at all	Small extent	1.88591	1.78969	0.718	-2.7283	6.5002
		Moderate extent	2.76471	1.78704	0.410	-1.8427	7.3721
		Large extent	4.35948	1.78704	0.071	-0.248	8.9669
	Small extent	Not at all	-1.88591	1.78969	0.718	-6.5002	2.7283
		Moderate extent	0.8788	0.84558	0.726	-1.3013	3.0589
		Large extent	2.47357*	0.84558	0.019	0.2934	4.6537
	Moderate extent	Not at all	-2.76471	1.78704	0.410	-7.3721	1.8427
		Small extent	-0.8788	0.84558	0.726	-3.0589	1.3013
		Large extent	1.59477	0.83997	0.230	-0.5709	3.7604
	Large extent	Not at all	-4.35948	1.78704	0.071	-8.9669	0.248
		Small extent	-2.47357*	0.84558	0.019	-4.6537	-0.2934
		Moderate extent	-1.59477	0.83997	0.230	-3.7604	0.5709
LA ACROSS CURR.	Not at all	Small extent	0.52991	0.95248	0.945	-1.9246	2.9844
		Moderate extent	1.51684	0.95248	0.384	-0.9377	3.9714
		Large extent	2.92861*	0.95248	0.012	0.4741	5.3831
	Small extent	Not at all	-0.52991	0.95248	0.945	-2.9844	1.9246
		Moderate extent	0.98693	0.82262	0.627	-1.1329	3.1068
		Large extent	2.39869*	0.82262	0.019	0.2788	4.5185
	Moderate extent	Not at all	-1.51684	0.95248	0.384	-3.9714	0.9377
		Small extent	-0.98693	0.82262	0.627	-3.1068	1.1329
		Large extent	1.41176	0.82262	0.316	-0.7081	3.5316
	Large extent	Not at all	-2.92861*	0.95248	0.012	-5.3831	-0.4741
		Small extent	-2.39869*	0.82262	0.019	-4.5185	-0.2788
		Moderate extent	-1.41176	0.82262	0.316	-3.5316	0.7081

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

APPENDIX H

POST HOC ANALYSIS COMPARING READING SPECIALIST SUPPORT AVAILABLE TO TEACHERS

Dependent Variable	(I) CODERDGSPEC	(J) CODERDGSPEC	Mean Diff. (I-J)	Std. Error	Sig.	95% CI Lower Bound	95% CI Upper Bound
GRADE LEVEL INSTRUC	Not at all	Small extent	1.22627	0.93643	0.557	-1.1862	3.6387
		Moderate extent	-0.37241	0.93493	0.979	-2.781	2.0362
		Large extent	-2.64692*	0.93493	0.025	-5.0555	-0.2383
	Small extent	Not at all	-1.22627	0.93643	0.557	-3.6387	1.1862
		Moderate extent	-1.59868	0.92381	0.309	-3.9787	0.7813
		Large extent	-3.87319*	0.92381	0.000	-6.2532	-1.4932
	Moderate ext.	Not at all	0.37241	0.93493	0.979	-2.0362	2.781
		Small extent	1.59868	0.92381	0.309	-0.7813	3.9787
		Large extent	-2.27451	0.9223	0.066	-4.6506	0.1016
	Large extent	Not at all	2.64692*	0.93493	0.025	0.2383	5.0555
		Small extent	3.87319*	0.92381	0.000	1.4932	6.2532
		Moderate extent	2.27451	0.9223	0.066	-0.1016	4.6506
SPECIAL INSTRUCT	Not at all	Small extent	1.12107	0.93112	0.625	-1.2777	3.5198
		Moderate extent	0.31061	0.93112	0.987	-2.0881	2.7093
		Large extent	-0.8005	0.93112	0.826	-3.1992	1.5982
	Small extent	Not at all	-1.12107	0.93112	0.625	-3.5198	1.2777
		Moderate extent	-0.81046	0.92805	0.819	-3.2013	1.5804
		Large extent	-1.92157	0.92805	0.164	-4.3124	0.4693
	Moderate ext.	Not at all	-0.31061	0.93112	0.987	-2.7093	2.0881
		Small extent	0.81046	0.92805	0.819	-1.5804	3.2013
		Large extent	-1.11111	0.92805	0.629	-3.5019	1.2797
	Large extent	Not at all	0.8005	0.93112	0.826	-1.5982	3.1992
		Small extent	1.92157	0.92805	0.164	-0.4693	4.3124
		Moderate extent	1.11111	0.92805	0.629	-1.2797	3.5019
INSTRUCT BY TOPIC	Not at all	Small extent	1.12107	0.93112	0.625	-1.2777	3.5198
		Moderate extent	0.31061	0.93112	0.987	-2.0881	2.7093
		Large extent	-0.8005	0.93112	0.826	-3.1992	1.5982
	Small extent	Not at all	-1.12107	0.93112	0.625	-3.5198	1.2777
		Moderate extent	-0.81046	0.92805	0.819	-3.2013	1.5804
		Large extent	-1.92157	0.92805	0.164	-4.3124	0.4693

(table continues)

Dependent Variable	(I) CODERDGSPEC	(J) CODERDGSPEC	Mean Diff. (I-J)	Std. Error	Sig.	95% CI Lower Bound	95% CI Upper Bound
	Moderate extent	Not at all	-0.31061	0.93112	0.987	-2.7093	2.0881
		Small extent	0.81046	0.92805	0.819	-1.5804	3.2013
		Large extent	-1.11111	0.92805	0.629	-3.5019	1.2797
	Large extent	Not at all	0.8005	0.93112	0.826	-1.5982	3.1992
		Small extent	1.92157	0.92805	0.164	-0.4693	4.3124
		Moderate ext.	1.11111	0.92805	0.629	-1.2797	3.5019
TEACHER DEV	Not at all	Small extent	-4.75887	2.14265	0.119	-10.2795	0.7617
		Moderate ext.	-1.73273	2.12953	0.848	-7.2195	3.7541
		Large extent	0.73601	2.12635	0.986	-4.7426	6.2146
	Small extent	Not at all	4.75887	2.14265	0.119	-0.7617	10.2795
		Moderate ext.	3.02614	2.04994	0.453	-2.2556	8.3079
		Large extent	5.49488*	2.04663	0.037	0.2217	10.7681
	Moderate extent	Not at all	1.73273	2.12953	0.848	-3.7541	7.2195
		Small extent	-3.02614	2.04994	0.453	-8.3079	2.2556
		Large extent	2.46874	2.03289	0.618	-2.7691	7.7066
	Large extent	Not at all	-0.73601	2.12635	0.986	-6.2146	4.7426
		Small extent	-5.49488*	2.04663	0.037	-10.7681	-0.2217
		Moderate ext.	-2.46874	2.03289	0.618	-7.7066	2.7691
TECH. ASSIST	Not at all	Small extent	-15.31288*	3.32668	0.000	-23.8855	-6.7402
		Moderate ext.	-12.66170*	3.2956	0.001	-21.1542	-4.1692
		Large extent	-9.70092*	3.2956	0.018	-18.1935	-1.2084
	Small extent	Not at all	15.31288*	3.32668	0.000	6.7402	23.8855
		Moderate ext.	2.65118	2.96506	0.808	-4.9896	10.2919
		Large extent	5.61196	2.96506	0.232	-2.0288	13.2527
	Moderate extent	Not at all	12.66170*	3.2956	0.001	4.1692	21.1542
		Small extent	-2.65118	2.96506	0.808	-10.2919	4.9896
		Large extent	2.96078	2.93015	0.743	-4.59	10.5116
	Large extent	Not at all	9.70092*	3.2956	0.018	1.2084	18.1935
		Small extent	-5.61196	2.96506	0.232	-13.2527	2.0288
		Moderate ext.	-2.96078	2.93015	0.743	-10.5116	4.59

(table continues)

Dependent Variable	(I) CODERDGSPEC	(J) CODERDGSPEC	Mean Diff. (I-J)	Std. Error	Sig.	95% CI Lower Bound	95% CI Upper Bound
ENRICHMENT	Not at all	Small extent	2.38235	1.13177	0.153	-0.5375	5.3022
		Moderate ext.	3.23529*	1.13177	0.023	0.3155	6.1551
		Large extent	3.69308*	1.14326	0.007	0.7436	6.6425
	Small extent	Not at all	-2.38235	1.13177	0.153	-5.3022	0.5375
		Moderate ext.	0.85294	1.13177	0.875	-2.0669	3.7727
		Large extent	1.31072	1.14326	0.661	-1.6387	4.2602
	Moderate extent	Not at all	-3.23529*	1.13177	0.023	-6.1551	-0.3155
		Small extent	-0.85294	1.13177	0.875	-3.7727	2.0669
		Large extent	0.45778	1.14326	0.978	-2.4917	3.4072
	Large extent	Not at all	-3.69308*	1.14326	0.007	-6.6425	-0.7436
		Small extent	-1.31072	1.14326	0.661	-4.2602	1.6387
		Moderate ext.	-0.45778	1.14326	0.978	-3.4072	2.4917

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

APPENDIX I

POST HOC ANALYSIS COMPARING AVAILABILITY OF READING SPECIALIST

(I) CODEREDGSPC	(J) CODEREDGSPC	Mean Diff. (I-J)	Std. Error	Sig.	95% CI Lower Bound	95% CI Upper Bound
Full Time	Part Time	-3.36784*	0.83839	0.000	-5.3393	-1.3964
	Not at all	-2.74471*	0.83698	0.003	-4.7129	-0.7766
Part Time	Full Time	3.36784*	0.83839	0.000	1.3964	5.3393
	Not at all	0.62313	0.84113	0.739	-1.3548	2.601
Not at all	Full Time	2.74471*	0.83698	0.003	0.7766	4.7129
	Part Time	-0.62313	0.84113	0.739	-2.601	1.3548

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

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