

RELATIONSHIPS AMONG TEACHER QUALITY CHARACTERISTICS AND  
READING AND MATHEMATICS ACHIEVEMENT IN TITLE I SCHOOLS  
IN THE ALABAMA BLACK BELT

by

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## ABSTRACT

The purpose of this study was to examine relationships existing among teacher quality characteristics and reading and math achievement on the Alabama Reading and Math Test in Title I schools in the Western and Midwestern regions of Alabama. The population identified was 57 schools in 13 school districts (seven feeder schools, five schools with sixth grade only, one school with fifth through sixth grades, and one school with fourth through sixth grades). The sample consisted of 29 schools and 9 school districts and a sample of 284 teachers.

This study used descriptive statistics, bivariate (Spearman) correlation, and multiple regression to analyze data to answer three research questions addressing relationships among teachers' pedagogical knowledge, educational background, years of experience, grade level configuration (assignment) and professional development (independent variables), and reading/mathematics achievement (dependent variables) on the Alabama Reading and Math Test. A field test was conducted in a neighboring school district to assist the researcher in evaluating the participants' responses to survey questions, to determine whether the survey questions had the potential to produce the desired data, and to evaluate the wording of the questions on the survey. Particularly, this study verified that teachers' grade level configuration is significantly related to the students' math and reading achievement on the Alabama Reading and Math Test. In the same way, this study also confirmed that teachers' years as a full-time teacher is a significant predictor of student math achievement and teachers' years taught in the public school sector is a significant predictor of student reading achievement.

Also, this study confirmed that teachers' professional development components such as Alabama Reading Initiative Training (ARI) is negatively significant to reading achievement on the Alabama Reading and Math Test.

These findings were consistently constructed based on statistical analyses, which may have important and practical implications. In effect, such information may be useful for school administrators to continue to examine teacher quality characteristics to determine, which teacher quality characteristics influence student achievement.

Furthermore, these findings may guide strategic decisions, mostly those referred to implement policies to improve teacher quality as well as other education policies to motivate high-quality teaching.

## LIST OF ABBREVIATIONS

AMSTI- Alabama Math and Science Technology Initiative

ARI- Alabama Reading Initiative

ARMT- Alabama Reading and Math Test

B- Beta

PD- Professional Development

SASS- School and Staffing Survey

USDOE- United States Department of Education

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## CHAPTER 1

### INTRODUCTION

#### Background

Superintendents, principals, teachers, and policymakers are constantly reviewing and reading about scientifically-based strategies, programs, and techniques to implement into today's classrooms. The primary reason for this attention to such strategies is to accommodate the academic needs of struggling students, particularly those who have failed one or more reading subtests on state mandated assessments (Buly & Valencia, 2003). Educators and policymakers are concerned about standardized test results because these numbers show how well schools perform academically (Wilson, Martean, & Arya, 2005). Over the last decade, policymakers and researchers have increasingly recognized that teacher quality is the most powerful predictor of student achievement. Despite this growing consensus, too few educational and political leaders agree on how to ensure that every student has access to quality teachers and teaching (Teaching with Data, 2010).

Equally important, accountability standards for school districts and schools are centered on national and local standards that dictate the requirements of the No Child Left Behind Act (NCLB). The NCLB passed by the United States Congress was signed by President George W. Bush and became effective on January 8, 2002, as Public Law 107-110. NCLB (2001) amended and reauthorized the Elementary and Secondary Education Act of 1965 (20 U.S. C. 6301 et Seq.). NCLB represents one of the most far-reaching reforms for K-12 education since the

Elementary and Secondary Education Act was first adopted in 1965. Some of the principle themes of the NCLB include school accountability and highly qualified status for all professional employees. NCLB dictates the accountability standards for public education. This federal mandate states that all students in Grades 3-12 will perform at a proficient level of 100% in the content areas of reading and math by 2014.

Officials at the Alabama State Department of Education have designed an academic matrix, which specifies that all third through eighth grade students must perform at a certain percentile in the content areas of reading and math each year, and reach 100% by 2013-2014. All students in Grades 3 through 8 must perform at levels of mastery (III or IV) in reading and math and the scaled scores ranged from 300 to 800. In Alabama schools, this accountability standard is based on each school's adequate yearly progress. The No Child Left Behind Act focused more effort on the proficiency of teachers by mandating that all teachers must become highly qualified, and must receive specified hours of professional development. By mandating teachers to become highly qualified, teachers are believed to be better equipped to increase student achievement and to prepare students to compete with other countries in the area of globalization. Wilson et al. (2005) contended that the "government is accountable to citizens for the effectiveness of its policies, and school systems are accountable to the community for the literacy of students" (p. 622). Accountability standards in education are often measured with numbers; Tarter (2006) once asked "what do the numbers tell you about a study?" Many researchers argued that accountability with numbers paints a clear picture of the true story of the problems associated with reading deficiencies. Wilson et al. (2005) pointed out that numbers are often used to show academic growth, to demonstrate accountability, and to determine whether students qualify for free and reduced lunches in school districts. Fisher, Lapp, and Flood (2005)

argued that it is difficult for educators and parents to deal with the increasing focus of accountability because the media often demoralizes teachers and administrators when test results are released that reveal that schools are deemed as “failing.” Benson (2002) showed the average U.S. school served neighborhoods where 13% of the households were in poverty; the average school in the study sample served neighborhoods where 19% of the households were in poverty.

Data retrieved from the Alabama State Department of Education (2011) accountability website revealed significant differences between students who attend lower socioeconomic schools versus students who attend affluent schools. For example, Mountain Brook and Vestavia elementary schools in North Alabama school districts have a low percentage of students who received free or reduced lunch. In contrast, several Title I schools in the Western and Midwestern regions have 65% or higher percentage of students who received free or reduced lunch. Several studies have attributed the improvement of student achievement to teacher quality characteristics (Darling Hammond, 1999; Sanders & Rivers, 1996). For the past 10 years, the Alabama State Department of Education data have focused efforts on improving reading achievement by providing extensive professional development, which is often embedded into the schools’ and districts’ professional development plans (Alabama State Department of Education, 2011). This study examined relationships existing among teacher quality characteristics and reading and math achievement on the Alabama Reading and Math Test in Title I schools in the Western and Midwestern regions of Alabama Black Belt. The quality of teachers is discussed openly among interested stakeholders (Center for Public Education, 2008). Haskins and Loeb (2007) ascertained that teacher quality is one of the single features of the schools that drive student achievement. Effective teachers possess qualities needed to impact significant gains in students when compared to teachers who are less effective (Education Week, 2004). Sanders and

Rivers (1996) conducted studies in Tennessee, which found significant differences in achievement between students who participated in classes taught by high-quality teachers for 3 consecutive years. The difference was sizeable with approximately 50 percentile points on standardized tests. Wayne and Young (2003) proposed that policymakers and researchers examine techniques needed for K-12 education; yet, one of the enduring techniques has been to focus on teachers. More than 2 decades of research findings are unequivocal about the connection between teacher quality and student learning. “What Matters Most: Teaching for America’s Future” (National Commission on Teaching and America’s Future, 1996) reported three simple premises for reforming the nation’s schools. The premises were as follows: (1) what teachers know and can do is the most important influence on what students learn; (2) recruiting, preparing, and retaining good teachers is the central strategy for improving our schools; and (3) school reform cannot succeed unless it focuses on creating the conditions under which teachers can teach and teach well.

The key teacher quality provisions of the No Child Left Behind Act underscore the importance of improving student achievement. The No Child Left Behind Act goal of closing the achievement gap by 2014 is the requirement that all teachers be highly qualified by the end of the 2005-2006 school year and new teachers should meet existing state certification requirements and demonstrate mastery of the content area in which they teach, either by passing a content knowledge test or by having majored in the subject in an undergraduate or graduate program.

The National Center for Education Statistics 2004 estimates showed the number of teachers who have not yet met the highly qualified standard at 20% in elementary schools and 25% in secondary schools (U.S. Department of Education, 2004). Teacher quality does not solely rely on qualifications and credentials but entails how teachers use their knowledge and skills in

teaching a subject so that all students are empowered. Student achievement may be associated with teacher quality and how resources are used (Cohen et al., 2000). In addition, researchers disagree about the definition of “high quality” as used by NCLB.

### Importance and Usefulness of Topic

As a principal and an aspiring superintendent or assistant superintendent, the findings from this study have the potential to uncover new knowledge about the relationships of student achievement in reading and math. The researcher believed that these findings may provide a framework for research-based assessment that can be used to enhance professional development, and to correlate intervention strategies to improved reading achievement outcomes for a master teacher and for student learning. With the continued efforts of policymakers to redefine the areas of improving teacher knowledge, professional development, teacher certification, policies and procedures, and hiring highly qualified teachers in rural school districts, improved teacher quality may one day be a reality in public school districts across the nation.

### Theoretical Underpinning

The conceptual framework for this study was based on the work of Darling Hammond (2000). Darling Hammond (2000) argued that teacher quality characteristics examined in relationship to student achievement are content knowledge, teacher certification, teaching experience, pedagogical knowledge, and professional development (see Figure 1). Darling Hammond’s (2000) study indicated that the measures of teacher preparation and certification are the strongest correlations with student achievement in reading and mathematics. Darling Hammond’s (2000) study concluded that mandated qualifications, skills, and practices of

teachers have instigated debate within the profession by questioning which teacher quality characteristics are predictive of student achievement. A number of recent studies have shown a significant correlation between teacher experiences and the effectiveness of teachers as measured by student achievement (Darling Hammond, 2000; Hanushek, 1996; Wenglinsky, 2000).

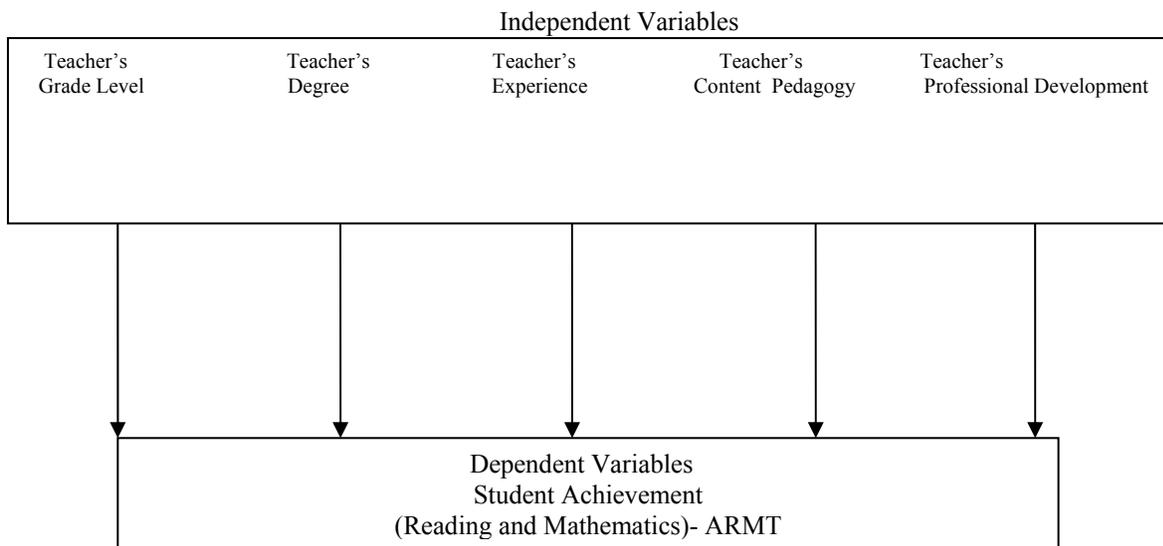


Figure 1. Teacher quality attributes: Theoretical underpinning

Ferguson (1991) reported that teaching experience accounted for approximately 10% of the difference in student achievement and reading scores on standardized state examinations. Teaching experience was calculated by the percentage of teachers in a district with 9 or more years of experience. Ferguson contended that secondary teachers with 9 or more years of experience significantly influenced student achievement scores. Wenglinsky (2002) investigated the effectiveness of teacher quality on students' mathematics achievement. One finding revealed an unassuming correlation between students' mathematics achievement scores and teachers' major. The level of teacher education and years of experience of the teacher were unrelated to student mathematics achievement. Further data analysis revealed, however, that teachers' participation in activities addressing special populations and higher order thinking skills were substantially related to student achievement.

In this study, the researcher proposed to examine the relationships among certain teacher quality characteristics (certification, teaching experience, professional development, and degree) and student achievement on the Alabama Reading and Math Test, as illustrated in Figure 1.

### Statement of the Problem

The Title I schools for this study were located in the Western and Midwestern regions of the Alabama Black Belt. According to the 2010-2011 Alabama Accountability Assessment Data, Title I schools performed at a lower proficiency compared to non-Title I schools (Alabama State Department of Education, 2011). For this study, reading and mathematics achievement were chosen as dependent variables because these core subject areas are arguably the two most important subjects in the elementary school curriculum, yet many students still struggle with foundational literacy and numeracy skills.

Recent research supported the idea that teacher quality impacts reading achievement for minority students who are classified as low performers in the area of reading (Burt, Ortlieb, & Cheek, 2003). Professional development for teachers provides teachers with the necessary instructional tools required to improve reading instruction. School districts classified as low-performing school districts are not performing at the same academic level as affluent school districts in Alabama. On average, rural school districts performed significantly lower on criterion referenced tests like the Alabama Reading and Math Test (Alabama State Department of Education, 2010).

## Purpose of the Study

The purpose of this study was to examine relationships existing among teacher quality characteristics and reading and math achievement on the Alabama Reading and Math Test in Title I schools in the Western and Midwestern regions of the Alabama Black Belt.

## Research Questions

1. To what extent are teachers' characteristics related to Reading and Math Achievement on the Alabama Reading and Math Test?
2. To what extent do teachers' pedagogical knowledge, educational background, years of experience, grade level configuration, and professional development hours predict students' reading achievement on the Alabama Reading and Test?
3. To what extent do teachers' pedagogical knowledge, educational background, years of experience, grade level configuration, and professional development hours predict students' math achievement on the Alabama Reading and Test?

## Assumptions

1. The modified Public Teacher Questionnaire (Schools and Staffing Survey) was a precise instrument to measure teacher quality.
2. The teachers had an explicit understanding of the standards in the Public Teacher Questionnaire (Schools and Staffing Survey).
3. The teachers who completed the survey taught in Title I schools in the Western and Midwestern regions of Alabama.

4. The teachers who completed the Public Teacher Questionnaire (Schools and Staffing Survey) provided honest responses to the questions about their certifications, degrees, years of experience, and professional development hours.

#### Limitations of the Study

The limitations of this study included the following:

1. The results of this study can only be generalized to Title I teachers and students in the Western and Midwestern regions of Alabama.

2. The sample was limited in representation of the total population due to the study being conducted in the Western and Midwestern regions of Alabama.

3. Methodological limitations were identified through the use of a small single sample of Title I teachers.

#### Delimitations of the Study

The following were considered delimitations in this study:

1. The study was limited to a school district located in the Western and Midwestern regions. The results may be not the same in other school districts.

2. The study was limited to Title schools in the Western and Midwestern regions of the Alabama Black Belt.

3. The study was limited to a sample of fourth grade students and teachers in Title I elementary schools in the Western and Midwestern regions of the Alabama Black Belt.

4. The study was limited to data retrieved from the Alabama State Department of Education Data Collection Department.

## Definition of Key Terms

*Accountability* is a state of measuring what schools are mastering, as it relates to nurturing students' social and personal traits, as well as benchmarks for measuring academic progress (Adelman & Taylor, 2002).

*Alabama Reading and Math Test* is an Alabama criterion assessment used to test proficiency for Grades 3-8 in reading and mathematics (Alabama Interpretive Guide, 2011).

*Certification status* is defined as a measure of teacher qualifications that combine aspects of content and pedagogy knowledge (Darling Hammond, 2000).

*Content pedagogy knowledge* is defined as knowledge and pedagogy merged together and the teacher demonstrating this higher skill level by skillfully expressing what to teach (content knowledge) and how to teach (pedagogy; Shulman, 1966).

*Criterion referenced test* is intended to measure how well a person has learned a specific body of knowledge and skills (The Center for Fair and Open Testing, 2010).

*Grade level configuration( Assignment)* is the organizational structure of a school, inclusive of elementary, middle and high school levels, and the assignment of a student to one specific grade level(McEntire, 2005).

*Level I* is the level of performance that indicates the lowest level of proficiency on the Alabama Reading and Math and the score is below 600 (Alabama Interpretive Guide, 2011).

*Level II* is the level of performance that indicates a partial level of mastery on the Alabama Reading and Math Test and the score ranges from 600-652 (Alabama Interpretive Guide, 2011).

*Level III* is the level of performance that indicates the proficiency level of mastery on the Alabama Reading and Math Test and the score ranges from 653-686 (Alabama Interpretive Guide, 2011).

*Level IV* is the level of performance that indicates the advanced level of mastery on the Alabama Reading and Math Test and the score is over 686 (Alabama Interpretive Guide, 2011).

*Scaled score* is derived from the raw score (number correct out of the number possible) and allows a comparison on the same subtest (reading or math) from year to year (Jefferson County Interpretive Guide, 2012).

*Teacher quality and teacher characteristics* have been used interchangeably by several researchers in their pursuit to identify factors influencing student achievement (Darling Hammond, 2000).

### Organization of the Study

Chapter 1 includes the introduction, statement of the problem, research questions, hypothesis, significance of the study, assumptions, limitations of the study, definition of key terms, and methodology.

Chapter 2 includes the review of relevant literature related to teacher quality characteristics and student achievement in reading of disadvantaged students.

Chapter 3 includes a description of the methodology for this study.

Chapter 4 includes a summary of the methodology utilized in this study, the data, results and study results, and analysis of data.

Chapter 5 includes a summary of the results, answers to the six research questions, the conclusions, and implications relating to future research and to Alabama educator practices.

## CHAPTER 2

### REVIEW OF RELATED LITERATURE

#### Introduction

The mission of the Teacher Quality Enhancement Project in Alabama is to improve public education by improving teacher effectiveness (Alabama State Department of Education, 2010). Through the efforts of the Governor's Office and the Alabama Department of Education, Alabama has received a 3-year Title II grant from the federal government to provide funding that will allow the state to study issues that inhibit teacher effectiveness. Furthermore, the project is developing exciting new programs to improve the overall level of teacher quality in Alabama. In the release of the 1999 report *Teaching and Learning: Meeting the Challenge of High Standards*, the Alabama Task Force on Teaching and Student Achievement helped target educational areas in need of improvement in Alabama. The report of the Task Force has served as a guide to the state's more comprehensive effort as a partner with the 15-state network on the National Commission on Teaching and America's Future (Alabama State Department of Education, 2010).

Alabama's Teacher Quality Enhancement Project was based on data analysis and consensus-building efforts of the Task Force. It identified three major goals: to strengthen the teacher component of the Alabama Professional Education Personnel Evaluation system, to recruit caring, qualified teachers to improve retention rates, and reduce the turnover rate of Alabama public school teachers; and to develop and implement a targeted professional development plan for teachers who receive a less than satisfactory evaluation rating or who

otherwise experience lack of success in the classroom. The project's ultimate goal is to move Alabama educational quality forward in assuring that its students have competent, caring teachers who will help them acquire the skills necessary for successful living in the Twenty-first Century (Alabama Teacher Quality Enhancement Project, 2010).

The purpose of this study was to examine relationships existing among teacher quality characteristics and reading and math achievement on the Alabama Reading and Math Test in Title I schools in the western region of Alabama. The review of literature for this study has been conceptualized under the following headings: Teacher Quality, Teacher Quality and Student Achievement, Teacher Quality and Certification, Teacher Quality and Years of Experience, Teacher Quality and Teachers' Degree, Teacher Quality and Pedagogy and Teacher Quality and Professional Development. To conclude the review of literature section, a summary will emphasize the importance of teachers' effectiveness and the impact it has on rural and urban student achievement.

### Teacher Quality

Teacher quality is a term that has been used to label the qualities of teachers who are often classified as "good" at what they do, which is instructing students. Teacher Quality encompasses terms such as teacher effectiveness, teacher qualifications, expertise, performance and success. On the contrary, the term teacher effectiveness has been more explicitly defined with a focus on teachers' input and students' results (Coggshall, 2007).

Maranzo (2003) revealed a 39 percentage-point difference in student achievement between students in classrooms with *most effective* and *least effective* teachers. For example, in classrooms headed by teachers characterized as *most effective*, students posted achievement gains

of 53 percentage points over the course of one academic year, whereas in classrooms led by *least effective* teachers; student achievement gains averaged 14 percentage points, a difference of 39 percentage points.

In recent research, Kannapel and Clements (2005) examined 26 high-poverty elementary schools in Kentucky, using a standardized school audit instrument developed by the state. They selected eight of these schools based on high ratings on the audit. When these schools were compared with low-performing, high-poverty schools, differences were noted in a number of areas. In terms of teacher quality, the authors reported that teachers in the high-performing, high-poverty schools were more likely to conduct frequent assessments and offer students feedback; deliver instruction aligned to learning goals, assessments, and diverse learning styles; demonstrate high expectations for student performance; participate in collaborative decision making and ongoing, job-embedded professional development; and incorporate staff development ideas in classroom settings (Betts, Zau, & Rice, 2003).

President Barack Obama's administration passed more than \$100 billion to be spent on education as part of the \$767 billion economic stimulus package, which provoked questions and criticism about the quality of teaching. In addition, states were able to receive a second installment of their share of \$48.6 billion. However, each state was responsible for adhering to four principles: adopting rigorous college- and career-ready standards and high-quality assessments, establishing data systems and using data for improvement, increasing teacher effectiveness and the equitable distribution of effective teachers, and turning around the lowest-performing schools (Center for American Progress, 2010).

In reviewing research literature, Goe's (2007) investigation of teacher quality focused on four categories of teacher quality indicator, teacher qualifications, teacher characteristics, teacher

practices, and teacher effectiveness, which Goe determined empirically capture the primary variables examined in research studies on teacher quality published between 2000 and 2007. Largely due to the “highly qualified teacher” provisions of the No Child Left Behind (NCLB) Act, these four categories align with the current national emphasis on certification and licensure, experience, and subject-matter knowledge.

A 2001 study performed by Langer appraised the performance of students in reading, writing, and English in 88 classrooms in California, Florida, New York, and Texas. These schools were classified as low performing schools by the state’s evaluations of school performance. All of the schools were classified as well-organized schools with actively engaged students, teachers, and parents. The study was conducted over a 2-year span. The findings of the study concluded that students with more skilled teachers performed higher than they were expected to perform on assessments (Langer, 2001). In a discussion of highly qualified teachers, Ferguson (1999) asserted highly qualified teachers have an increasing effect on students’ performance, so that students who have scored lower in early grades may still earn higher scores in upper grades, if instruction is provided by quality teachers.

### Teacher Quality and Student Achievement

An examination of San Diego Unified School District related student and teacher data in elementary through high school, using 1998-2000 data. The population for this study consisted of teachers and students in 123 elementary schools, 24 middle schools, 17 high schools, and 5 charter schools. Several variables were included in the analyses, including school, student, and teacher characteristics. The researchers used the following as teacher quality variables: experience, level of education, credentials, and subject matter knowledge. They found that the

correlations among these qualifications and student achievement varied substantially across grades and across subjects. The findings of the study showed elementary student gains in both mathematics and reading were lower when students were taught by an emergency credentialed teacher or a teacher with 1 year or less of experience, compared with those taught by certified teachers with 10 or more years of experience. The finding showed that teachers with masters' degrees contributed significantly more increased mathematics scores than teachers with only bachelors' degrees. In middle school, gains in reading were correlated with teachers holding Ph.D.s in any subject (for English teachers). Students' scores in middle school and high school were negatively impacted by having a teacher who held only an emergency credential. In middle and high school mathematics, a teacher's mathematics authorization (a proxy for subject-area knowledge) was the best teacher-level predictor of student achievement (Betts, Zau, & Rice, 2003).

A recent study by Decker, Mayer, and Glazerman (2004) assessed the achievement of students who had Teach for America teachers when compared with a control group of students with teachers who taught in the same grades in the same schools. Control teachers included traditionally certified, alternatively certified, and uncertified teachers. Using Grades 1-5 data from 17 schools, 100 classrooms, and nearly 2,000 students in Baltimore, Chicago, Los Angeles, Houston, New Orleans, and the Mississippi Delta during the 2002-2003 school year, the authors found that Teach for America teachers had a positive impact on their students' mathematics achievement. The difference in growth was statistically and practically significant, with Teach for America teachers' students gaining about one additional month of mathematics instruction compared with control teachers. Furthermore, when comparing novice control teachers with Teach for America teachers, the differences were even more pronounced. However, there were

no significant differences between student achievements in reading: Teach for America and control teachers contributed about equally to students' reading achievement. These results were stable across student subgroups, schools, and geographical regions.

In a study conducted by Aaronson, Barrow, and Sanders (2003), the authors found that teacher qualifications varied with higher student achievement by grade level. The results of the study showed stronger correlations exist between the achievement of secondary school students and their teacher's subject-area expertise (as reflected by various credentials) than exist between the success of younger students and their teacher's subject knowledge.

Darling Hammond and Youngs (2002) analyzed research on teacher qualifications and student achievement in order to examine opinions in the U.S. Secretary of Education's annual report on teacher quality (Office of Postsecondary Education, 2002). Darling-Hammond and Youngs deemed that the secretary of the United States was essentially calling for a lowering of standards for teacher qualifications. Goldhaber and Brewer (1997a) conducted an analysis using the nationally representative NELS: 88 data to investigate the impact of secondary school teacher certification on student achievement in mathematics. They found that students assigned to teachers who were certified in mathematics or who had earned a bachelor's or master's degree in mathematics, had higher test scores than those assigned to teachers who lacked mathematics certification; the researcher had controlled for other student and teacher characteristics. In contrast, they found that the mathematics scores of students assigned to teachers with master's degrees or certification in subjects other than mathematics were no different than scores of students assigned to teachers with fewer qualifications, further underlining the importance of subject-specific credentials, at least in high school mathematics.

Rowan, Correnti, and Miller (2002) cited the impact of teacher certification on elementary student achievement growth in mathematics and reading. This study used data from *Prospects: The Congressionally Mandated Study of Educational Opportunity* and hierarchical growth models that controlled for a variety of background factors to study the effects of teacher attributes on the performance of two student cohorts. The researchers found that subject-specific certification had no discernible impact on student achievement growth in mathematics or reading for either cohort.

Given the contrast between teacher supply and demand, alternative teacher certification programs have become an important policy issue. Darling-Hammond (1990) differentiated between alternative routes to certification, which do not change the standards but introduce other options for attaining them, and alternative certification, which changes the standards under which certification is granted. She argued that fully prepared and certified teachers are generally more highly rated than teachers without full preparation. Nevertheless, Hawley (1990) concluded that alternative certification programs will continue to emerge due to a number of factors, including the continuing teacher shortage in the context of high demand and the relatively low cost of some alternative certification programs.

Kimball, White, Milanowski, and Borman (2004) indicated the relationship between teacher evaluation scores and student achievement in nine grade-test combinations in Washoe County. The evaluation system used was adapted from Danielson's (1996) Framework for Teaching and rated teachers on the following: (1) pedagogical and content knowledge, (2) coherent lesson design and sequencing that correspond to student assessment, (3) adaptability to meet student learning needs, and (4) ability to engage students cognitively with strategies appropriate to learning goals. The teachers included 123 third-grade teachers, 87 fourth-grade

teachers, and 188 fifth-grade teachers. Data included about 43 to 45% of all students in the district with pretest and posttest scores, and 50 to 70% of all evaluated district teachers who could be linked to qualifying students. Using a two-level hierarchical linear model, the authors estimated teacher effects on student achievement after regressing out student demographic characteristics and pretest scores. The findings suggested that the evaluation of teacher performance does predict effectiveness.

Goldhaber and Brewer (2000) devoted their analysis of the NELS: 88 data to study the impact of different types of teacher certification on student achievement in high school mathematics and science. Based on their econometric analysis, they concluded that mathematics students whose teachers earned the standard certification do significantly better than students whose teachers hold private school certification or who are not certified in their subject areas. In contrast, they found no evidence that mathematics and science students of teachers with emergency credentials do any worse than students whose teachers have standard teaching credentials.

In a critique of the Goldhaber and Brewer study, Darling-Hammond et al. (2001) argued that the emergency certified teachers included in the study are most likely veteran teachers who hold some sort of licensure, for instance, those who have moved and are not fully certified in the state where they are teaching. As a result, she argued, these individuals are similarly qualified to teachers holding standard certification, so one would not expect to see a difference in the effect of these two groups on student achievement. In their original article, Goldhaber and Brewer (2000) noted that teachers who have earned an alternative degree normally did not complete a bachelor degree in education. The NELS: 88 data do not provide more refined information on certification standards than the broad categories included in the Goldhaber and Brewer study,

prohibiting a resolution to this dispute about emergency certification among NELS: 88 teachers. In their rejoinder to the Darling-Hammond et al. critique, Goldhaber and Brewer (2001) defended their analysis and recognized the importance of getting more refined data on various teacher certification requirements to further refine the effects.

### Teacher Quality and Certification

Teacher qualifications are particularly necessary for admission into the classrooms, often when performance and other data are not readily available such as is the case with new teachers. Teacher qualifications are commonly used as indicators of teacher quality because of the relation to data collection and often which is a financial obligation for public school and school districts (Goe, 2007).

Nye, Konstantopoulos, and Hedges (2004) affirmed the notion of the actual degree of teacher effects on student achievement. They defined teacher effects as the portion of student achievement that remains unaccounted for after controlling for student demographics, class size, and school fixed and random effects. To examine achievement gains, the authors controlled for lagged test scores. The authors used data from the 4-year Tennessee Project STAR (Student Teacher Achievement Ratio) experiment in which students and teachers were randomly assigned to classrooms with a range of teacher-pupil ratios. Their sample included 79 elementary schools in Tennessee. They found that between-classroom effects on achievement gains ranged from 0.123 (third grade) to 0.135 (second grade) for mathematics tests and from 0.066 (first grade) to 0.074 (third grade) for reading tests. All effects were significant. The between-classroom effects on achievement status were similar. In findings of the study, the authors' examinations of teacher

experience and education effects through hierarchical linear modeling, for the most part, were either not significant or of small magnitude; some were even negative.

Hanushek, Kain, O'Brien, and Rivkin (2005) analyzed teacher certification exam scores, educational attainment, teacher race, and years of experience to determine the links between these characteristics and student achievement in mathematics on the Texas Assessment of Academic Skills (TAAS). Data were archival records for school years 1989-1990 through 2001-2002 and included fourth grade through eighth grade students and teachers in one large urban district (about 230, 000 student records). Using a value-added model, the authors found that experience predicted higher student achievement gains but only for the first few years of teaching. The authors determined that advanced degrees and certification exam scores were unrelated to student achievement scores on TAAS. In addition, they found that a match between student and teacher race improved achievement scores for minority students only. Moreover, they found that teachers who leave schools have significantly lower test score gains than those who stay in their placements.

In a prior study, Hawk and Schmidt (1989) evaluated 19 alternatively certified teachers with 53 teachers holding standard certification and found that the two groups were almost equally successful on several dimensions of the National Teaching Examination. While the alternatively certified teachers were as likely as those holding standard certification to meet standards for teaching practices, the alternatively certified teachers were less likely to exceed those standards. This study did not control for background characteristics of the two groups of teachers.

Lutz and Hutton (1989) elaborated further and studied 100 alternatively certified teachers across all grade levels and found that they were rated as high or higher by their

principals and mentor teachers than were first-year teachers with standard certification. The alternatively certified teachers also scored as high or higher on standardized measures of teaching performance. No, controls were used in this study.

Studies conducted by Guyton, Fox, and Sisk (1991) revealed 23 alternatively certified teachers with 26 teachers from standard certification programs on a number of measures, including teacher attitudes, teacher self-evaluations of performance, and principal or mentor's evaluation of the teacher's performance. The two groups of teachers were similar in characteristics such as subject area taught, gender, and socioeconomic status. In addition, the school characteristics of the two groups of teachers were comparable in terms of the type of community (rural, urban, suburban), economic conditions of the community, school size, average student ability level, administrative support, racial composition, and teacher attrition. The researchers found that alternatively certified teachers and teachers from standard certification programs were similar on almost all measures. The alternatively certified teachers expressed more positive feelings about the value of their teacher education programs, while the teachers with standard certification felt more positive about teaching at the end of the school year and were more enthusiastic about remaining in the teaching profession.

In relationship to National Board Certification and student achievement, McColsky et al. (2005) acknowledged the relationship between National Board Certification and student achievement. The study required several phases and was conducted on linked fifth grade student and teacher data in three school districts in North Carolina. In the first phase, the research used two-level hierarchical linear modeling to develop effectiveness scores for each teacher based on student test scores. In this phase, no significant differences were found between the aggregate student gains of NBPTS teachers and other teachers. In the second phase, the researchers

recruited the most and least effective teachers, based on their effectiveness scores and compared them to NBPTS teachers, using the following: (1) teachers' surveys of their own efficacy; (2) interviews about planning and assessment practices; (3) classroom observations focused on the level of cognitive demand of student and teacher questions, student behavior, and classroom management and intervention strategies; (4) analysis of the quality of reading comprehension assignments; and (5) teacher effectiveness ratings by trained classroom observers. For this phase, there were 25 NBPTS teachers and 282 non-NBPTS teachers. The researchers found that NBPTS teachers had slightly higher ratings on their planning practices and significantly higher ratings on the cognitive challenge of reading comprehension assignments. There were no significant differences in terms of the cognitive demands of student and teacher questions, classroom management strategies, or the numbers of disengaged or disruptive students. The most effective non-NBPTS teachers were rated significantly higher on the following four (of 15) teacher effectiveness dimensions than the least non-NBPTS teachers.

A succinct review of teachers' National Board Certification (Sanders, Ashton, & Wright, 2005) used more than 260,000 student records in mathematics and reading in two large North Carolina school districts. Of the more than 4,600 teachers included in the study, 281 were NBPTS mathematics teachers and 306 were NBPTS reading teachers. The authors tested four hierarchical models to examine student test data as a function of six fixed effects (year in school, previous year's test scores, race, sex, teacher experience, and NBPTS certification status) and a random teacher effect. They found that NBPTS teachers were not reliably more effective than the non-NBPTS teachers. In addition, they found that the variation among teachers with the same certification status was sufficiently large so that the small average differences between categories were trivial. In recent research, Vandevort, Amrein-Beardsley, and Berliner (2004) calculated

pretest to posttest effect sizes independently for NBPTS-certified and non-NBPTS teachers and then converted the difference into grade equivalents using the work of Glass (2005), which found that an effect size of 1.0 is roughly equivalent to one year's academic growth on a standardized test. The authors estimated that an effect size of 0.10 is equal to 1 month of academic growth, and they report impacts of NBPTS-certified and non-NBPTS teachers accordingly. Differences in effect sizes between NBPTS-certified and non-NBPTS teachers ranged from 0.335 in third grade reading to -0.230 (i.e., nothing) in fifth grade mathematics. An earlier research study revealed 300 alternatively certified teachers in Grades K-12 (Stafford & Barrow 1994) reported that principals were generally pleased with the work of alternatively certified interns and felt that the abilities of interns were similar to those of other first-year teachers. The researchers found no difference in student achievement between the two groups at the secondary level.

Miller, McKenna, and McKenna (1998) conducted a paired-comparison analysis of 82 fifth and sixth grade teachers (41 with standard certification and 41 with alternative certification). The two groups of teachers were similar in terms of years of experience, subject and grade level taught, and school where they worked. Based on their analysis, the researchers concluded that alternative certification did not lead to inferior teaching practices. Further, the researchers found no difference in student achievement scores or teachers' perceptions of their own teaching ability across the two groups of teachers.

Several studies by Kane, Rockoff, and Staiger (2006) pointed out the effects of teacher certification status (certified, uncertified, and alternatively certified) as well as the effects of teacher education and experience on student achievement scores on the New York City standardized mathematics and readings tests for Grades 3-8. Their sample consisted of 9,849 mathematics and reading teachers matched to elementary and middle school students (95%

match rate), excluding “mobile” teachers and those teaching high proportions of students with special needs. Using an educational production function, the researchers found variations in teacher contributions to student scores. Students of internationally recruited teachers scored 0.02 standard deviations lower on math tests than students taught by regularly certified teachers, whereas Teach for America teachers scored 0.02 standard deviations higher on mathematics tests than regularly certified teachers. Students of New York City Teaching Fellows teachers scored 0.01 standard deviations lower than regularly certified teachers’ students in reading. The authors also found that teacher effectiveness improved in the first years of teaching. The chief finding was that large within-group differences in effectiveness for each certification group surpassed the smaller between-group effects, meaning that the certification appeared to matter much less than other, unmeasured teacher characteristics independent of certification status.

Another point of research found negative effects associated with alternative teacher certification (McDiarmid & Wilson, 1991). They studied 55 elementary and secondary mathematics teachers; all of the individuals in the sample had earned undergraduate degrees in mathematics and subsequently participated in alternative certification programs. Based on questionnaire and interview data regarding teachers’ abilities to help students learn and understand mathematics, the researchers concluded that teachers entering the profession through alternative routes may be poorly prepared to help students develop an understanding of mathematics, particularly at the elementary school level.

Finally, an article by Darling-Hammond (1990) drew on literature in order to “get underneath the surface of [the debate over teacher education programs], assessing the design and potential outcomes of alternate route programs with reference to their perspectives and assumptions about teaching knowledge, teacher preparation, and their relationship to student

learning” (p. 124). This article reviewed studies that examined the relationship between teacher education and teacher effectiveness and found that all reviews of this relationship concluded that fully prepared and certified teachers are generally more highly rated and more successful with students than teachers without full preparation. Further, Darling-Hammond argued that teachers admitted through quick-entry alternative routes are frequently noted to have difficulty along a number of dimensions (e.g., curriculum development, pedagogical content knowledge, attending to students’ differing learning styles, motivation, and language arts achievement). These conclusions, coupled with the majority of findings presented above that report no difference between regular and alternatively certified teachers; suggest that more attention needs to be paid to this issue, particularly to what the various approaches to certification entail.

#### Teacher Quality and Years of Experience

In the research related to teacher certification, Boyd, Grossman, Lankford, Loeb, and Wyckoff (2005) found differences in outcomes for teachers in their first year of teaching. For mathematics teachers, temporary license holders were found to be similar to Teaching Fellows while Teach for America teachers were similar to college-recommended (traditionally prepared) teachers in terms of their contribution to student achievement. For students’ English achievement, the Teaching Fellows and Teach for America teachers performed worse than college-recommended teachers in terms of their contributions to student achievement. Temporary-license teachers fell between the college-recommended and alternatively prepared teachers. Teach for America and Teaching Fellows teachers’ effectiveness in mathematics increased with time, however, second-year teachers from these pathways caught up to traditionally prepared teachers.

To the degree that job learning occurs and leads to better teaching practices, experience can be construed as a measure of teacher quality. Some have argued this notion of “learning by doing” has the most pronounced effect on teacher effectiveness in the initial years of teaching (Murnane & Phillips, 1981). Teacher experience is an interesting variable from a policy perspective. First and foremost, experience is a central component of most teacher salary schedules (Odden & Kell, 2002). To the degree that teacher experience is an important predictor of student performance, policy efforts should be made to distribute teacher experience more equitably across schools and districts. Experience typically affords teachers more opportunity to choose the schools and districts where they want to work, and more experienced teachers often choose the best, most advantaged schools. Further, the relatively high turnover rates in low-income, low-achieving schools result in even lower levels of experience in these environments (Allgood & Rice, 2002). These distributional issues give rise to questions about the degree to which experience is an important dimension of teacher effectiveness and whether policies should aim to more equitably distribute experienced teachers.

Many studies have included teacher experience as an independent variable predicting student achievement or some other measure of teacher performance. In fact, Hanushek (1997) identified 207 such studies, more than any other teacher characteristic, in his review of the education production function literature. Hanushek found that 29% of the estimates of the impact of experience on teacher quality were statistically significant and positive, 5% were statistically significant and negative, and 55% were not statistically significant. While the majority of these studies report statistically insignificant effects, it is worth noting that, of the statistically significant findings, positive effects are reported almost six times as often as negative effects. As for the preponderance of statistically insignificant effects, it is not clear from Hanushek’s

analysis whether the studies were actually designed to test the impact of experience on student achievement, what other variables were included in the models tested, or what measure of teacher experience was employed by the studies. Further casting doubt on Hanushek's conclusions about teacher experience, Greenwald, Hedges, and Laine (1996) conducted a more sophisticated meta-analysis of education production function literature from which they concluded that teacher experience is, in fact, related to achievement.

As noted previously, Ferguson (1991) found that teacher experience accounted for slightly more than 10% of the variation in student reading and math scores across almost 900 Texas school districts serving more than 2.4 million students. Ferguson utilized two teacher experience variables: the percentage of teachers in a district with 5 to 9 years of experience and the percentage of teachers in a district with 9 or more years of experience. In the elementary grades, Ferguson found that these two teacher experience variables had roughly equal coefficients, suggesting that once teachers have 5 years' experience, additional years of teaching do not add to their effectiveness. For high school students, however, Ferguson found that teachers with 9 or more years of experience were associated with higher student scores than teachers with only 5 to 9 years of experience.

Carr (2006) suggested public schools' teacher quality (i.e., highly qualified teacher status) was significant in 18 of 21 models but teacher experience and advanced degrees did not significantly contribute to student achievement (when controlling for highly qualified status). Teacher variables made no statistically significant contribution in charter schools. Although the teacher quality effects in public schools were statistically significant, they were not large. This finding suggested that NCLB-authorized paper qualifications alone account for only a small

percentage of teacher contributions to student learning as measured by student achievement test scores.

Ferguson and Ladd's (1996) analysis of statewide Alabama data investigated the effect of teachers with 5 or more years of experience on student achievement at the district level. Their sample included 29,544 students in third, fourth, eighth, and ninth grades. Controlling for a variety of school and student variables, they found that teacher experience of 5 years or more exerts no statistically significant effect on math or reading achievement.

In Grissmer et al.'s (2000) analysis of state-level National Assessment of Educational Progress (NAEP) data, which included an investigation of the relationship between the proportion of teachers in a state with more than 2 years' experience and elementary student performance on the NAEP, the authors found that in states where a high proportion of teachers have at least 2 years of experience, there is a discernible, positive effect on achievement; however, the researchers found no evidence that additional years of teacher experience influence student achievement. Grissmer et al. (2000) interpreted this as a "turnover effect" because high teacher turnover usually results in more teachers with fewer years of experience. The researchers found that a portion of interstate variation in NAEP scores between students with similar family characteristics can be traced to teacher turnover rates; thus, in states with lower rates of teacher turnover, NAEP scores are higher.

Actual teaching experience does contribute to teacher quality (Greenwald et al., 1996). This fits with common sense understandings that what individuals learn on-the-job is likely to improve performance. Kennedy (2007) employed some limitations in the studies relating teacher experience with student achievement. She argued that,

Most studies examining the effect of teachers' experience gather their data at a particular moment in time, such as 1998 or 2002, so that researchers can't know

how populations of experienced teachers differ from others within their cohorts who have since left the field. Every one of them is susceptible to the rival hypothesis that observed differences between teachers with more or less experience reflect differences in qualifications at the time of original hire, or differences in the group that chose to remain in teaching versus those in the entire pool of entrants. It is possible that the experience itself has nothing to do with the appearance of differences in effectiveness. (pp. 1-2)

Ferguson (1991) compared teacher experience in almost 900 Texas school districts, serving over 2.4 million students, with student achievement on math and reading tests (TEAMS). He measured experience at the district-level using two variables, percentage of teachers with 5-9 years experience and percentage with more than 9 years experience. He found experience accounts for 10% of the variation in test scores across districts. For elementary teachers, he concluded that once teachers have 5 years' experience, additional years do not add to their effectiveness. At the high school level, though, the results suggested that teachers with 9 or more years produced better results than those with 5 to 9 years. This study underscores that experience matters, and that it varies with different grade levels.

Clotfelter et al. (2004) synthesized several studies that used 2000-2002 administrative data in North Carolina to examine how the distribution of teachers contributes to achievement gaps between minority and White students. They found that minority students in North Carolina are more likely to have a novice teacher. In an analysis of fifth grade students and their teachers, they found that

controlling for other teacher characteristics, the presence of a highly experienced teacher increases student achievement in math by close to a tenth of a standard deviation relative to a novice teacher and by a bit less in reading. Moreover, in both cases almost half of the achievement effect is attributable to the first years of teaching. . . . Regardless of how effective novice teachers may eventually become, during their first year of teaching they are clearly less effective than more experienced teachers. (p. 18)

Clotfelter et al. (2007) extended this work and again found that experience matters.

## Teacher Quality and Grade Level Configuration (Assignment)

Bedard and Do (2005) examined the effect on on-time high school graduation of moving from a junior high school system, where students remained in an elementary school setting, to a middle school system. They concluded that transitioning to a middle school system decreases on-time high school graduation by 1-3%. Rockoff and Lockwood (2010) employed a two-stage least squares approach and Schwartz et al. (2011) used an ordinary least squares approach using the same longitudinal data from New York City. Both studies showed that shifting dents from elementary to middle school in sixth or seventh grade causes significant declines in both math and English test scores.

The results of several studies indicated that students in the middle level grades, 6-8, obtained higher achievement in K-8 schools than in schools that were of the middle school configuration (Klump, 2006). Offenber (2001) concluded that eighth grade students performed at a higher achievement level in a K-8 school setting when compared to students educated in a middle school setting. He acknowledged that the significant factor for the lower achievement at the middle schools may have been the larger number of students at each grade level. Alspaugh (1998) supported the K-8 configuration when he cited in his study of 16 school districts that students who attended middle schools experienced greater achievement loss in moving to high school than those students who made the transition from schools that had a grade level span of kindergarten through eighth grade. The 1998 study also revealed that students placed in relatively small groups for long spans of time tend to experience better educational outcomes. These outcomes extend to more productive high school experiences.

While middle schools were introduced and held to be a viable method to alleviate the problems facing students at those grade levels, not all research supports this belief. Alspaugh

(1998) quoted a 1997 Pamperien research study that found the implementation of middle school practices had little influence on the achievement scores of the middle school student. Wihry, Coladarci, and Meadow (1992) found that eighth graders attending school in junior/senior high school performed less well than eighth graders in elementary settings (K-8, K-9, 3-8). Hough (2005) posted that it is conceivable that schools with configurations of Grades 5-8 or 6-8 are incorrectly calling themselves “middle schools.” While they may assert that they utilize the middle school practices, many do not. He stated that only those schools fully implementing the middle school philosophy as outlined in the National Middle School Association’s (2003) position paper should be labeled “middle schools.” He asserted that many school systems are conducting their own research and finding the students in Grades 6-8 who are attending a K-8 school are scoring higher than their counterparts in other grade span configurations. His assertion is that the successful K-8 “elemiddle school” is the school that is successfully implementing the middle school philosophy.

Hough (2005) cited a study of 500 schools that participated in a national study examining the relationship between grade span configurations and student achievement. The results were that K-8 “elemiddle schools’ were consistently producing more desirable results than schools with other configurations. Over the past few years, many states, including Louisiana, Maine, Texas, Colorado, Georgia, and Connecticut have looked at the feasibility of recommending conversion to K-8 configurations statewide. Many large urban school districts are looking at switching to K-8 schools as well. Abella (2005) noted in her study of Miami-Dade County schools that K-8 students had significant short-term beneficial effects on achievement, attendance, and suspension rates. She also observed that sixth and seventh grades showed greater improvement in mathematics and reading compared to the same grades in middle schools, but

the two groups had identical scores in ninth grade, so the effects were not long term. Abella cautioned that further research should be done to determine whether these effects remained true when taking into account factors such as greater numbers of students, lower performing schools, and K-8 schools operating for longer periods of time.

Byrnes and Ruby (2007) also compared the achievement of students in middle schools to students in K-8 schools in Philadelphia, using a sample of 41,000 eighth grade students across five cohorts from 95 schools. Their analysis used multilevel modeling to account for student, cohort, and school variation, and it controlled for population demographics and school characteristics. The researchers found that the older K-8 schools did perform significantly better than the city's middle schools, as expected, but these differences were related to differences in student and teacher populations, average grade size, and school transition rates. As one would expect, the newer K-8 schools did not achieve the same advantage, despite having smaller grade sizes and lower transition rates, due to the more disadvantaged student and teacher populations. After controlling for school transition and average grade size, there were no discernable differences between K-8 and middle schools in terms of academic achievement, according to this study. A study produced contrasting results, using administrative data on public school students in North Carolina (Cook et al., 2008) found that sixth grade students attending middle schools (Grades 6-8) were much more likely to be cited for discipline problems than those attending elementary school (Grade K-6). After adjusting for the socioeconomic and demographic characteristics of the students and their schools, that difference remained of practice in which learning, experimentation, and reflection are the norm.

Schmitt (2004) conducted a study of the impact of professional development and grade configuration on student achievement. Her sample included 292 middle grades teachers from 43

schools in Missouri, 22 of which were designated as high professional development schools and 21 as low PD schools. She found that neither professional development nor grade configuration had a direct relationship to student achievement, although teachers in Grades 6-8 schools were more likely to be highly engaged in professional development than their Grades K-8 or Grades 7-12 counterparts.

McKenzie et al. (2006) examined grade configuration as an environmental contextual factor that could potentially affect academic success. The researchers examined data from 35,000 Arkansas students in the fourth, sixth, and eighth grades (at each grade level each year for a total of 105,000 students per year) from spring 2001 to spring 2005. They found that grade configuration was not a statistically significant predictor of student academic success as measured by the state's criterion-referenced annual yearly progress exams. What did seem to matter in the fourth and sixth grades was the state's accountability system. That is, students in these grades often performed better in schools that were configured to match the state examination schedule (i.e., the last year at school was a year in which tests were administered). For students in the eighth grade, who were the lowest performing group, this effect was not evident. Weiss and Kipnes (2006) conducted a rigorous, multilevel analysis of the effects of different grade configurations on student outcomes in the School District of Philadelphia. The first wave of the study began during the summer of 1996 with a random stratified sample of 1,483 students attending 45 Philadelphia schools. Researchers found the following: There were significant population differences between the two school types: students in Grades 6-8 schools were more likely to have parents with lower education levels and to receive public assistance than those in Grades K-8 schools.

## Teacher Quality and Educational Background (Degree)

Rice (2003) concluded that “more refined measures of what teachers know and can do (e.g., subject-specific credentials, special coursework taken) are better predictors of teacher and student performance than are more conventional measures (e.g., highest degree earned, undifferentiated course credits earned)” (p. 50). Rice’s synthesis is a valuable contribution to the understanding about which qualifications matter most in terms of student achievement, but its scope is limited, “primarily due to the lack of availability of empirical data on critical points over the importance of subject matter versus education coursework in teacher preparation programs” (p. 55). An early analysis of science teacher preparation by Perkes (1967) explored the relationship between student achievement and the amount of academic work by junior high school science teachers in science and related subjects. Teacher preparation was measured by the amount of academic coursework in science, coursework in science education, grade point average in science, and recency of coursework. On the outcome side, distinctions were made between students’ ability to recall factual knowledge and their ability to apply that knowledge. The sample for the study included 32 general science teachers and 3,062 students enrolled in general science courses from one suburban school district. Correlational relationships were the basis for the findings reported, so no casual conclusions can be drawn from the analysis. Nonetheless, several interesting findings are worth noting here. First, the number of credits teachers earned in science was not markedly related to either student outcome variable, even after stratifying the sample by gender and level of intelligence (as measured by I.Q. scores).

Nelson and Wood (1985) studied 94 student teachers divided into groups based on supervisors’ ratings of their student teaching performance. The researchers found a statistically significant difference between the high and low-performing teachers in terms of their prior

performance in pedagogical courses. They concluded, “It would appear that as the content of coursework more closely relates to the knowledge and skills required in teaching, performance in that coursework can more reliably predict success in student teaching and subsequently (it is assumed) in teaching” (p. 56). This study did not identify the level of education or subject areas for which the teachers were prepared, and the lack of controls limit casual inferences from this analysis.

Eberts and Stone’s (1984) quasi-experimental study of public education included measures of teacher course-taking in its multivariate model that predicted the impact of teacher characteristics on mathematics achievement gains among fourth grade students. Specifically, the researchers included a variable indicating the number of college-level mathematics courses taken by teachers in the last 3 years. Controlling for student background and other teacher characteristics (including in-service training in the last 3 years), the researchers found no statistically significant effect on teachers’ recent mathematics coursework on student achievement.

Ferguson and Womack (1993) assessed the extent to which education and subject-matter coursework predict the teaching performance of student teachers completing one university’s teacher education program. In this study, teaching performance was measured by 107 survey items that assessed 13 categories of teacher expertise. Independent variables of interest were amount of education coursework, grade point average in the student’s major, and National Teacher Examination (NTE) specialty scores.

The latter two were interpreted by the researchers to represent measures of content knowledge. The sample of teachers included 266 secondary student teachers over a 7-semester

period between 1988 and 1991. Data were analyzed using analysis of variance and stepwise regressions. The researchers found that the proportion of variance in teacher performance explained by the amount of education coursework taken was 16.5%. In contrast, measures of content (in-major grade point average and NTE specialty score) explained less than 4% of the variance in teacher performance. These results suggested that education coursework was a more powerful predictor of teaching effectiveness than measures of content expertise, as indicated by grade point average and NTE specialty scores. Further, the researchers' conclusions were consistent with what they found in the literature on the subject: "while subject-matter knowledge is an important prerequisite for effective teaching, it is not sufficient in and of itself and knowledge beyond that typically required for certification does not result in increasing the quality of teaching performance" (p. 56).

Monk (1994) drew on more refined measures of teacher coursework to examine the impact of various types of teacher preparation on student achievement in mathematics and science. In addition, he compared the effects of teacher coursework with the effects of more conventional measures like experience and degree level. Teacher preparation was measured by the number of courses teachers took in various areas (i.e., mathematics content, science content, mathematics education, science education) and at different levels (i.e., undergraduate and graduate). In addition, the type of course (i.e., mathematics, life science, physical science) was considered to address the possible importance of matching teacher preparation with teacher assignment. Data for this study came from the Longitudinal Study of American Youth (LSAY), a nationally representative panel survey including a base-year sample of 2,829 students from 51 randomly selected public high schools. This study found that the amount of content preparation that teachers have is positively associated with student achievement in high school mathematics

and science, and that this effect depends on the subject being taught, the characteristics of the students being taught (e.g., advanced versus remedial), and additional teacher attributes. Monk reported a curvilinear relationship between subject-matter teacher preparation and student gains; for example, after taking five mathematical courses, each additional math course beyond five has a smaller effect on pupil performance compared to the effect of an additional mathematics course up to and including the fifth course. In addition, teacher coursework in pedagogy was found to contribute positively to student learning and sometimes had more powerful effects than additional preparation in content areas. On this matter, Monk concluded, a “good grasp of one’s subject area is a necessary but not a sufficient condition for effective teaching” (p. 142). Finally, Monk found that in contrast to course-taking variables, conventional measures (degree level, undifferentiated credit counts, and experience) tended to be either unrelated or negatively related to improvements in pupil performance.

Monk and King (1994) explored the effects of secondary mathematics and science teachers and subject-matter preparation on the performance gains of their pupils in these subjects. This study also drew on data from the Longitudinal Study of Australian Youth (LSAY) and used hierarchical linear models. The researchers hypothesized that the effects of teacher preparation are likely to exist at multiple levels within schools. They took account for this by distinguishing between the teachers that a student was assigned to in the classroom and the other teachers that contributed to education schoolwide. The results suggested that it is the cumulative effect of the set of teachers a student has had over time, rather than the subject-matter preparation of the entire faculty in the school, that affects student mathematics and science achievement. Further, results were found to depend on the type of student (high versus low pretest), and subject matter (mathematics versus science).

Druva and Anderson's (1983) meta-analysis of research on the relationship between science teacher characteristics (including course-taking) and student achievement found that the number of biology courses taken by biology teachers and the number of science courses taken are both positively associated with student achievement. In addition, the importance of pedagogical coursework versus content coursework is underlined in several reviews of this literature. Evertson, Hawley, and Zlotnik (1985) found a consistent positive effect of the pedagogical component of teacher preparation programs, but reported mixed results regarding the impact of coursework in the subject area they teach. Ashton and Crocker (1987) reviewed the literature on the effect of the amount of coursework taken by teachers in professional education compared to coursework taken in academic education. They found four of seven estimates (57%) of the impact of professional education to be significantly positive, compared to only 5 of 14 (36%) for academic education.

### Teacher Quality and Pedagogical Knowledge

It seems that knowledge of how to teach (pedagogical knowledge) is a sound indicator of teacher quality. Pedagogical knowledge involves the integration of several bodies of knowledge including learners and learning theory, instruction and assessment, and classroom management. Shulman has argued that good teachers know their content, but more importantly they know how to represent it meaningfully to learners and how to interpret and respond to learner's misconceptions and naïve understandings. He called this special knowledge teachers have pedagogical content knowledge, or PCK (Wilson, Shulman, & Richert, 1987).

Content knowledge refers to the subject matter the teacher is called upon to cover in lessons. Pedagogical knowledge relates to the techniques, procedures, attitudes, and elements of

cognitive and developmental psychology that impact student learning. Shulman (1986) merged what had been these two discrete areas of professional knowledge by creating a third category of professional knowledge, pedagogical content knowledge. By merging content with pedagogy, Shulman analyzed knowledge and pedagogy to a higher level where the teacher skillfully determines what to teach (content knowledge) and how to teach (pedagogy).

Darling-Hammond (2000) reported that studies on the connection between content knowledge and student achievement have been mixed. She found that content knowledge alone has not been shown to account for increased student achievement; pedagogy plays a significant role as well. The relationship between content knowledge and student learning is approximated by a curvilinear relationship.

Ball and Bass (2000, 2003) developed an instrument that captured not only the actual content teachers taught (e.g., decimals, area measurement, or long division) but also the specialized knowledge of mathematics needed for the work of teaching. “Specialized” content knowledge might include knowing how to represent quantities such as  $\frac{1}{4}$  or .65 using diagrams. The design measures of teacher knowledge also led developers to construct items centered directly on the content of the K-6 curriculum. The findings of the study revealed that teachers’ mathematical knowledge for teaching positively predicted student gains in mathematics achievement during the first and third as well as positively affecting student gains in the first grade suggested that teachers’ content knowledge plays a role even in the teaching of very elementary mathematics content knowledge for teaching, not just teachers’ computational facility or course-taking.

## Teacher Quality and Professional Development

The NCLB provisions loosely guide states to encourage professional development that increases teachers' knowledge of the academic subjects they teach, enables teachers to become highly qualified, improves classroom management skills, supports the recruiting, hiring and training of highly qualified teachers, including teachers who became highly qualified through state and local alternative routes to certification, advances teacher understanding of effective instructional strategies that are based on scientifically-based research; improves student academic achievement or substantially increases the knowledge and teaching skills of teachers; gives teachers and other instructional staff the knowledge and skills to provide instruction and appropriate language and academic support services to limited-English-proficient children; provides training for teachers and principals in the effective classroom use of technology; provides instruction in methods of teaching children with special needs; strengthens the ability of teachers and principals to use assessment results and other data to inform and improve classroom practice; and improves the ability of school personnel to work more effectively with parents. NCLB stated that professional development activities should be sustained, intensive, and classroom-focused to have a positive and lasting impact on classroom instruction--not an occasional daylong workshop or conference. These activities should be regularly evaluated for their impact on teacher effectiveness and student achievement, with the findings of the evaluations used to improve the quality of professional development. (ESEA Section 9101(34), 2000).

Thomas Carpenter et al. (1986) randomly placed first grade teachers either in a month-long workshop that familiarized them with research on how students understand addition and subtraction word problems or in professional development that focused on mathematical

problem-solving strategies but not on how students learn. Teachers who participated in the student learning workshop more often posed complex problems to students, listened to the processes students used to solve those problems, and encouraged students to seek different methods of finding answers. By contrast, teachers who were not in the workshop emphasized basic fact recall, getting answers quickly, and working alone rather than in groups. Paul Cobb and colleagues provided opportunities for teachers to examine new curriculum materials, solve mathematics problems that they would teach to students, and then study student learning. At the end of the school year, these teachers' students did better on conceptual understanding and maintained their basic (computational) skills.

Cohen and Hill (1998) found that teachers whose learning focused directly on the curriculum they would be teaching were the ones who adopted the practices taught in their professional development. These teachers embraced new curriculum materials when they were supported by training and, in some cases, workshops about the new state-required student assessment. The study also showed that students of teachers who participated in this kind of curriculum-focused professional development did well on assessments. Unfortunately, most teachers received less effective forms of training.

Continuing professional development provides opportunities for both novice and veteran teachers to develop their pedagogical knowledge. In most states, including Colorado, continuing professional development is a requirement for recertification. Teacher surveys about the content and effectiveness of professional development options (Hudson, McMahon, & Overstreet, 2002; National Center for Education Statistics [NCES], 2005) show that it is both ubiquitous and of uneven quality. While generic, 1-day workshops are less prevalent, there is wide variation in what has replaced them (Hill, 2007).

Research has linked professional development with enhanced student learning (Good, Grouws, & Ebmeter, 1983; Carpenter, 1989; Saxe, Gearhardt, & Nasir, 2001; McCutchen, 2001). These four well-designed studies involved randomly assigning teachers to focused, subject-matter specific professional development, most of which was sustained over time. Three programs focused on mathematics and one on reading instruction. In all four studies, students whose teachers experienced quality professional development showed statistically significant learning gains on content achievement tests.

Features of quality professional development include significant time (e.g., not 1-day workshops), a focus on subject-matter specific instruction and student learning, alignment with school improvement goals or curriculum materials, and the collective involvement of a number of teachers in the same program (Hill, 2007). Despite evidence of programs that do contribute to student learning, the system of professional development lacks coherence, and overall does not appear to contribute significantly to student achievement gains (Hill, 2007).

Several studies indicated that certain types of professional development contribute to teacher quality and student achievement. Specifically, professional development that is sustained, aligned with the curriculum, and focused on instruction was shown to positively influence school-level achievement in mathematics and science at both the elementary and high school levels (Cohen & Hill, 1998; Kannapel & Clements, 2005; Wenglinsky, 2000, 2002). Although Harbison and Hanushek (1992) found no beneficial relationship between professional development and student achievement in rural Brazilian schools, they speculated that this finding may be the result of targeting particularly under-qualified teachers for participation in the professional development programs.

Thomas Carpenter et al. (1986) randomly placed first grade teachers either in a month-long workshop that familiarized them with research on how students understand addition and subtraction word problems or in professional development that focused on mathematical problem-solving strategies but not on how students learn. Teachers who participated in the student learning workshop more often posed complex problems to students, listened to the processes students used to solve those problems, and encouraged them to seek different methods of finding answers. By contrast, teachers who were not in the workshop emphasized basic fact recall, getting answers quickly, and working alone rather than in groups.

Student achievement was consistently higher and growth in students' basic and advanced reasoning and problem-solving skills was greatest when their teachers' professional development focused on how students learn and how to gauge that learning effectively. This suggests that professional development that is rooted in subject matter and focused on student learning can have a significant impact on student achievement.

Survey data from the National Center for Education Statistics showed that in 2000, teachers typically spent about a day or less in professional development on any one content area. Meanwhile, only 18% of teachers felt that the training they received was connected "to a great extent" to other school improvement activities, while 10% to 15% (depending on the content area of the training) reported that they were given significant follow-up materials or activities. The proportion of teachers who felt their professional-development activity significantly improved their teaching ranged from 12% to 27% (NCES, 2001).

A 2000 study by the National Staff Development Council examined the award-winning professional development programs at eight public schools that had made measurable gains in student achievement. The study found that in each of the schools, professional development has

shifted from one shot sessions to reflective ongoing professional learning communities. Specifically, the study found that the schools' professional-development programs were characterized by collaborative structures, diverse and extensive professional learning opportunities, and an emphasis on accountability and student results (WestEd, 2000). A 2001 study by the Consortium of Chicago School Research found that "high quality" professional development programs (i.e., those characterized by "sustained, coherent study; collaborative learning; time for classroom experimentation; and follow-up") had a significant effect on teachers' instructional practices. The study also identified a reciprocal relationship between strong professional development offerings and a school's overall "orientation toward innovation," suggesting the two feed off each other (Smylie et al., 2001).

A longitudinal study commissioned by the U.S. Department of Education (2000) tracked the experiences of teachers participating in activities financed by the federal Eisenhower Professional Development Program (primarily for efforts in mathematics and science). The study found that professional development that focused on "specific, higher-order teaching strategies" for example, the use of problems with no obvious solutions, increased teachers' use of such strategies. That was particularly the case, the study found, if the professional development activity was collaborative in format; involved participation of teachers from the same subject, grade, or school; provided "active learning" opportunities for teachers; and was consistent with the teachers' goals and other activities (Porter et al., 2000).

### Summary

The importance of good teachers is no secret. Schools and their communities have always sought out the best teachers they could get in the belief that their students' success depends on it.

But what we know instinctively still leaves some big questions, especially for those in charge of hiring, training, and retaining a qualified teaching force. To begin with, how do you define a good teacher? What characteristics do you look for? Given all the factors related to student performance, how much impact can we expect from teachers? And, finally, if teachers are so important to student learning, how can we make sure all students receive the benefit of good teachers (Center of Public Education, 2007)? Research shows that good teaching matters. Effective teachers are capable of inspiring significantly greater learning gains in their students when compared with their weaker colleagues. Although criticized by some, value-added assessment studies in Tennessee showed that the difference in achievement between students who attended classes taught by high-quality versus those taught by low-quality teachers for 3 consecutive years is sizeable, approximately 50 percentile points on standardized tests (Sanders & Rivers, 1996).

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. Often, the two definitions are linked or even conflated, so that there is an assumption that teacher quality ensures teaching quality or that teaching quality is an outcome of teacher quality (Goe, 2007). Effective teachers are ultimately essential for all children, if they are to succeed economically and contribute meaningfully to society. Teacher effectiveness is critically important for the poorest children because they are taught by a much larger percentage of inexperienced teachers or recent graduates who have not yet perfected their skills in the classroom (ECS Teaching Quality Research Reports, 2003). Recent research shows that teacher quality is critical to how much students learn from year to year. A Tennessee study found that students placed with effective teachers 3 years in a row performed better on a 100-point scale than their counterparts placed

with the ineffective teachers (Education Commission of the States, 2002). Students are not the only ones who are being shortchanged by marginal teachers. These poor performing teachers tarnish the reputations of the vast majority of teachers who are competent (Bridges, 1985; Tucker, 2004). Clearly, the nation's schools need to have the best teachers possible in every classroom if we are to maximize educational opportunities for all students.

Urban and rural school districts face significant challenges related to the induction of teachers new to the profession (Feistritzer & Chester, 2001). The critical determinant in student achievement will be end-of-year student assessment. The No Child Left Behind Act requires all school districts to make demonstrable annual progress in raising the percentage of students' who are proficient in reading and mathematics, and in narrowing the test-score gap between advantaged and disadvantaged students. Furthermore, teacher's effectiveness will be evaluated on the basis of students' scores on particular assessments (Coble & Azordegan, 2004).

## CHAPTER 3

### METHODOLOGY

The purpose of this study was to examine the relationships among teacher quality characteristics and reading and math achievement in the Western and Midwestern regions of Alabama. The study sought to answer the following research questions.

#### Research Questions

1. To what extent are teachers' characteristics related to Reading and Math Achievement on the Alabama Reading and Math Test?
2. To what extent do teacher's pedagogical knowledge, educational background, years of experience, grade level configuration, and professional development hours predict students' reading achievement on the Alabama Reading and Test?
3. To what extent do teacher' pedagogical knowledge, educational background, years of experience, grade level configuration, and professional development hours predict students' math achievement on the Alabama Reading and Test?

#### Research Design

In this study, a nonexperimental, descriptive, correlational and multiple regression analysis research design was used to examine relationships of the teacher quality characteristics with reading and math achievement. Correlational research designs examine the relationships among variables that have already occurred and variables that are expected to occur (Ary,

Jacobs, & Razavich, 1990). According to Gall, Borg, and Gall (2003), a major purpose of survey research is to ascertain sets of standards for reflection by individuals in finalizing decisions, posing crucial questions, and identifying future research needs. To measure teacher quality attributes, selected items from the Public School Teacher Questionnaire (Schools and Staffing Survey 2007-2008) were used to collect data about the identified teacher quality characteristics for this study in Alabama. In order to determine student achievement, this study used Alabama Reading and Mathematics Test data retrieved from the Alabama State Department of Education Data Collection Department. Math and reading achievement of students were measured using descriptive statistics, bivariate (Spearman) correlation, and multiple regression.

### Population and Sample

Because of the expense and time involved in conducting research on most of the population of interest, researchers must content themselves with studying a sample of persons who presumably represent the population (Gall et al., 2003). In nonexperimental research, populations of interest mean the entire group of persons having the characteristic or characteristics that interest the researchers (Gall et al., 2003). In conducting this study, two groups of the population were identified for study: third through sixth grade teachers and students registered in Title I schools in the Western and Midwestern regions of the Alabama Black Belt. The population was identified as 57 schools in 13 school districts (seven feeder schools, five schools with sixth grade only, one school with fifth through sixth grades, and one school with fourth through sixth grades) in the Western and Midwestern regions of the Alabama Black Belt. The sample consisted of 29 schools and 9 school districts and a sample of 284 teachers. The researcher employed a sample of convenience by utilizing the sample size

calculation developed by Krejci, R. V et.al (1970). Convenience sampling is a non-probability sampling technique where subjects were selected because of their convenient accessibility and proximity to the researcher (Gall et al., 2003). The lead investigator requested permission from selected school superintendents to administer surveys (see Appendix A) to teachers who taught third through sixth grade at selected schools in the district(s) 2010-2011 (see Appendix B). Once permission letters were signed by superintendents and returned to the lead investigator, selected principals were mailed a letter (see Appendix D) requesting permission to administer surveys to third through sixth grade teachers who taught at the designated schools the 2010-2011 school year. A follow-up attempt was made by telephone, and email, if permission letters were not returned to the lead investigator (see Appendix G). Once all permission letters were returned to the lead investigator, teachers received an email (see Appendix F) containing a consent form and a survey. Teachers indicated implied consent prior to accessing the survey link by clicking a link at the bottom of the email. A waiver of written documentation of informed consent was approved by the University of Alabama IRB (see Appendix H) Department and signature lines for teachers was placed on the informed consent form since clicking the link at the bottom of the email indicates implied consent. All teachers' surveys received a number code for third through sixth grade level teachers. The lead investigator and dissertation chair were the only persons allowed access to the survey number codes. The coding system allowed the lead investigator to determine whether a particular survey has been completed at a specific school. A second correspondence was emailed to teachers after seven days of disseminating the surveys. The lead investigator kept data collected from participants in a locked filing cabinet; afterwards, the lead investigator destroyed all research data after 1 year.

Table 1

*Description of Sample*

Description	Schools	Teachers
Total Available	57	570
Invited	34	284
Accepted Invitation	29	149
Rejected Invitation	5	135
Rate of acceptance	85%	53%

Because the Public School Teacher Questionnaire (Schools and Staffing Survey) was already developed, it was not necessary to develop a new instrument for this study. The Public School Teacher Schools and Staffing Survey is sponsored by the National Center for Education Statistics (NCES) of the Institute of Education Sciences within the U.S. Department of Education, and is administered by the U.S. Census Bureau. The Schools and Staff Survey is a nationally representative sample survey of public, private, and Bureau of Indian Education-fund, K-12 schools, principals, and teachers in the 50 states and the District of Columbia.

The Public School Teacher Questionnaire (Schools and Staffing Survey) was designed to support comparisons between new and experienced teachers (3 years or less of experience vs. more than 3 years of experience) at the state level for public school teachers and at the regional or affiliation level for private school teachers. Before the administration of the 2007-2008 survey, the Public School Teacher Questionnaire (Schools and Staffing Survey) had several changes made to the survey sample design, questionnaire content, procedures, and methodology by a group of experts at the National Center for Education Statistics. The Schools and Staffing Survey participant sample is a stratified probability to size sample. For the public school sample, the Institute for Education Sciences (IES) distributed surveys to all schools in the public sectors. To identify a definitive teacher sample, several schools were selected for the study based on the

percentage of teachers working in a specific school district; however, all schools were sampled. The schools for the sample were surveyed and later connected to the respective schools and districts. From the selected schools, teachers were sampled at a rate of at least 1 and no more than 20 teachers per school with an average of 3 and 8 teachers per school. The sample units were weighted in order to take into account the school selection probability, to reduce biases resulting from surveys that were not returned or not returned fully completed, and to improve the precision of sample estimates (Keigher, 2010).

For the 2007-2008 Schools and Staffing Survey data collection, surveys were distributed by mail with both telephone and in-field follow-up methods to remind school survey coordinators to collect and return questionnaires. Teachers who did not return questionnaires were contacted by telephone from a call center, in an attempt to encourage completion of the survey. Surveys were entered in an electronic file to check against the survey forms for accuracy. To safeguard confidentiality, identifying information was removed and replaced with identification numbers.

In order to use data from the Public School Teacher Questionnaire (School and Staffing Survey), the following sequence of steps were used for data collection: inputs from the dissertation chair and Behavioral Education Research committee member in research design, which included comments about the various parts of the survey and research design; comments about statistical analysis; recommendations about the proper scaling technique; and wording of options in the items of the survey. Lastly, the survey items selected for this study were field tested, in four schools in a neighboring Black Belt school district consisting of 30 teachers utilizing a modified version of the Public School Teacher Questionnaire (Schools and Staffing Survey 2007-2008 version).and the final version was distributed to third through sixth grade

teachers in rural school districts in the Western and Midwestern regions of Alabama. The Public School Teacher Questionnaire (Schools and Staffing Survey) used in this study consisted of 27 questions, and the format was a descriptive survey.

### Pilot Study

According to Gall et al. (2003), it is impossible to predict how items will be interpreted by respondents unless the researcher tries out the questionnaire and analyzes the responses of a small sample of subjects before starting the main study. The major reasons for a field test are as follows: to help the researcher evaluate the participants' responses to survey questions, to determine whether the survey questions have the potential to produce the desired data, to evaluate the wording of the questions on the survey, to receive comments from teacher participants in the field test, and to evaluate the clarity of the language and directions for completing the survey. The pilot study was conducted in four schools in a neighboring school district consisting of 30 teachers in grades third through sixth grades utilizing a modified version of the Public School Teacher Questionnaire (Schools and Staffing Survey 2007-2008 version).

### Survey Design

Survey research typically employs questionnaires and interviews to determine the opinions, attitudes, preferences, and perceptions of persons of interest to the researcher (Gall et al., 2003). Survey methodology was chosen for this study for the following reasons: to ask the same questions from all the participants in the study, to use descriptive research for summarizing and analyzing collected data, and to report the results of each research question with a larger number of inputs (McDonald, 1991). The study survey employed was a descriptive

questionnaire, which collected data about teachers' pedagogical knowledge, educational background, and years of experience, grade level configuration, and professional development hours.

### Validity and Reliability

Content validity is based on whether or not the survey tests and answers the research questions, which are representative of the content that the researcher intends to measure (Gall et al., 2003). The questions for the survey were developed by the National Center for Education Statistics. Reliability and validity in the Schools and Staffing Survey are not defined the way that those terms are used with psychological tests. There was no inter-rater reliability that could be performed on the Schools and Staffing Survey questionnaire; thus, it was not possible to calculate Cronbach's alpha results. Rather, the reliability was based upon the item response rates reported in the documentation for the 2007-2008 Schools and Staffing Survey report (NCES 2010-332, available at the present only to restricted-use licensees). In addition, new items were tested by cognitive laboratory methods prior to being fielded. That process often resulted in changes to the way that items were worded or formatted. The overall response rate represents the response rate to the survey, taking into consideration each stage of the survey. For teachers, the overall response rate was calculated as the product of the response rate to two stages: the Teacher Listing Form and the teacher questionnaire. The base-weighted overall response rate for public school teachers was 72.4%, for BIE school teachers it was 71.4%, and for private school teachers it was 65.9%. For the other surveys, the overall and unit response rates are the same because they have only one data collection stage.

The validity of the Schools and Staffing Survey was based upon its relatively high unit response rates, ranging from 87.8% for school districts to 72.2% for private school principals. The item response rates were reported for each item in the documentation report.

For this study, the content validity of the survey was determined by participants' comments about the survey, and by a panel of instructional supervisors in the Alabama Black Belt school districts. A Cronbach alpha was not generated for this instrument because a descriptive survey is not a summative rating scale. Fraenkel and Wallen (2000) and Borg and Gall (1989) noted that descriptive survey involves asking the same set of questions from a questionnaire from a large number of individuals either by mail or by telephone.

#### Data Collection

Data for this study were retrieved from two sources: local school districts' assessment departments for third through sixth grade level data report and the modified Public School Teacher Questionnaire (Schools and Staffing Survey 2007-2008; see Appendix A). Archival data from local school districts assessment departments provided grade level group reports for reading and math test scores for 2010-2011 for Grades 3-6. The archival data requested from the Alabama State Department of Education was not publically available. The lead investigator submitted a written request to the superintendent of the school districts (see Appendix B). Requested data from the local school districts assessment departments were formatted in Word format. These data reports did not contain names of students or teachers or other identifiers. The lead investigator and the dissertation chair were the only individuals who had access to the data. The data were stored in a locked file cabinet for a period of 1 year; afterwards, the lead investigator destroyed the data. The lead investigator collected all surveys and analyzed data.

Once the data is analyzed by correlating reading and math data to specific schools, the results were shared with school districts.

The following data were requested from local school districts' assessment departments: grade level group reports for Grades 3-6 with specific grade level scaled scores for reading and math for the 2010-2011 school year for the identified schools. The investigator requested permission from selected school superintendents to administer surveys to teachers who taught third through sixth grade at selected schools in the district(s) 2010-2011 (see Appendix B). Once permission letters were signed by superintendents and returned to the investigator, selected principals were mailed a letter (see Appendix D) requesting permission to administer surveys to third through sixth grade teachers who taught at their school during the 2010-2011 school year. A follow-up attempt was made by telephone, and email, if permission letters were not returned to the investigator. Once all permission letters were returned, teachers received an email containing a consent form (see Appendix F) and a survey. Teachers indicated implied consent prior to accessing the survey link by clicking a link at the bottom of the email. A waiver of written documentation of informed consent was requested by The University of Alabama IRB Department and signature lines for teachers were not placed on the informed consent form because clicking the link at the bottom of the email indicated implied consent. All teachers' surveys received a number code for third through sixth grade level teachers. The investigator and dissertation chair were the only people allowed access to the survey number codes. The coding system allowed the investigator to determine whether a particular survey had been completed at a specific school. A second correspondence was made by email to teachers after 7 days of disseminating the surveys, if teachers did not complete a survey electronically. A follow-up attempt was emailed only to teachers 7 days after the second attempt. The investigator kept data

collected from participants in a locked filing cabinet. All electronic files were transferred to and kept on a secure computer that was password protected. Only summarized data were presented at meetings or in publications. Data sources and privacy issues were discussed prior to data collection to ensure that all questions and concerns of participants were addressed.

At the conclusion of this study, data were stored in one of two ways. Data were stored either electronically or in hard copy form. Electronic data were password protected and hard copies were stored inside of a locked facility. Both sources of information were stored for a period of 1 year and then destroyed. Only the investigator and dissertation chair had access to the data, but the investigator collected all the surveys and analyzed the data. Once the data were analyzed by correlating reading and math data to specific schools, the results were shared with school districts.

### Data Analysis

Bivariate( Spearman)correlation, descriptive statistics, and multiple regression were used to analyze data to answer the three research questions (see Table 2) that dealt with the relationships between teacher's pedagogical knowledge, educational background (degree), years of experience, grade level configuration(assignment), professional development (independent variables see Table 3), and third through sixth grade students' reading/mathematics achievement (dependent variables; see Table 4) on the Alabama Reading and Math Test. The researcher's unit of analysis was group grade level data averages on the Alabama Reading and Math Test in Grades 3, 4, 5, and 6 for each Title I school. Data were requested from the Local Education Agencies (see Appendix C). The Alabama Reading and Mathematics Test data request consisted

of mean scaled group scores (continuous data ranging from 300 to 800) for Grades 3-6 at each school (see Table 4).

Table 2

*Research Questions and Analyses*

Research Questions	Survey Questions	Analysis Utilized
1. To what extent are teacher's characteristics related to Reading and Math achievement on the Alabama Reading and Math Test?	4, 6, 7, 8, 12,13,14 15, 16, 17, 18, 19, 20, 21, 22	Descriptive Statistics Spearman Correlation
2. To what extent do teacher's pedagogical knowledge, educational background, teachers' years of experience, grade level configuration and professional development hours predict student achievement on the Alabama Reading and Math test?	4, 6, 7, 8, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21,22	Multiple Regression
3. To what extent do teacher's pedagogical knowledge, educational background, teachers' years of experience, grade level configuration, and professional development hous predict student achievement on the Alabama Reading and Math Test?	4, 6, 7, 8, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22	Multiple Regression

Table 3

*Independent Variables*

Independent Variables	Codes and Subvariables
1. Content Pedagogy Knowledge (Reading and Math)	Reading (College Hours) (How many hours did you teach Reading?)
1. How many college hours (graduate/ undergraduate) have you taken in reading/math in the content area?	1. 1-3 hours 2. 4-6 hours 3. 7-9 hours 4. 10 or more hours
2. How many hours a week did you teach reading/math for the 2010-2011 school year?	Math (College Hours) (How many hours did you teach Reading?) 1. None 2. 1-3 hours 3. 4-6 hours 4. 7 or more hours  (How many hours did you teach Reading?) 1. 5-10 hours 2. 11-15 hours 3. 16-20 hours 4. 21 or more hours
2. Educational Background(Degree)	(How many hours did you teach Math?) 1. 1-3 hours 2. 4-6 hours 3. 7-9 hours 4. 10 or more hours  1. Associate 2. Bachelors 3. Masters 4. Educational Specialist
3. Grade Level Configuration(Assignment)	1. Third 2. Fourth 3. Fifth. 4. Sixth

*(table continues)*

Independent Variables	Codes and Subvariables
4. Years of Experience	Years worked as a full-time teacher
1. How many years have you worked as full-time elementary/middle year?	1. 1-3 years
2. How many years have you taught in the public school sector?	2. 4-6 years
	3. 7-10 years
	4. 11 or more years
	Years worked in the public school sector
	1. 1-3 years
	2. 4-6 years
	3. 7-10 years
	4. 11 or more years
5. Professional Development Hours (Reading and Math)	Monthly/Yearly Reading PD
1. How many professional development hours have received in the last 12 months?	1.1-3 hours
	2.4-6 hours
	3.7-9 hours
	4.10 or more or more hours
	5. No training
2. Did you receive monthly reading and math professional development training at your school?	ARI(Reading) Training Hours
	1.2 week training
	2.1 week training
3. Have you received ARI/ AMSTI training?	3.1, 2, or 3 day training/
	4.No training
	Math Monthly/ Yearly PD
	1.None
	2.1-3 hours
	3.4-6 hours
	4.7 or more hours
	AMSTI Training(Math)
	1.2 week training
	2.1 week training
	3.1, 2, 3 day training
	4.No training

Table 4

*Dependent Variables*

Variables	Data Types	Score Ranges	Source
Reading Scores	Continuous	300-800	ARMT
Math Scores	Continuous	300-800	ARMT

Risks and Safeguards against Risks

The chief risk was that some of the questions might cause participants to feel uncomfortable due to an in-depth exploration into the participant’s professional life and the potential for disclosure of sensitive information about students’ test scores. Due to the large quantity of data collected and the time consuming nature of survey study research, there was a risk of inconvenience to participants. There were no risks to students, parents, or the community because no names of school districts were mentioned in the summarized data. Only summarized data, with no identifying information, were reported in publications, at conferences, and at meetings.

Benefits

There were no direct benefits to participants other than possibly altruism. However, participants were able to review the findings of this study. From those findings, participants learned which teacher attributes impact reading and math achievement in the western region of Alabama (Black Belt Region). This knowledge base may assist school administrators in the hiring and retaining of teachers by providing the administrators with knowledge of which teacher attributes significantly impact reading and math achievement. Teachers who possess identified

teacher attributes may provide a positive influence on student achievement. The risks involved in this study were reasonable.

### Summary

The purpose of this study was to identify teacher characteristic variables related to student achievement in the rural school districts in Western and Western regions of the Alabama Black Belt. The researcher explained the design of the study in this chapter. The methodology utilized in this study was addressed by the researcher. The instrumentation, population, procedures, data analysis, and data collections were described in this chapter.

## CHAPTER 4

### FINDINGS AND PRESENTATION OF RESULTS

A substantial amount of research has been done on teacher quality, using student achievement as the outcome. There are only a few aspects of teacher quality research that support a statistical difference in student learning (Goe, 2007). The purpose of this study was to examine relationships among teacher quality and student achievement on the Alabama Reading and Math Test in selected Title I schools in the Alabama Black Belt. The research questions were as follows:

This chapter presents the analyses of data results and study results described individually. The research questions include descriptive statistical results followed by inferential statistical analyses.

#### Research Questions

1. To what extent are teachers' characteristics related to Reading and Math Achievement on the Alabama Reading and Math Test?
2. To what extent do teachers' pedagogical knowledge, educational background, years of experience, grade level configuration, and professional development hours predict students' reading achievement on the Alabama Reading and Test?
3. To what extent do teachers' content pedagogical knowledge, educational background, years of experience, grade level configuration, and professional development hours predict students' math achievement on the Alabama Reading and Test?

## Pilot Study

A pilot study was conducted in four Title I schools in a neighboring Alabama Black Belt school district. Of the 30 surveys, 20 were returned to the researcher. The teachers' grade levels were classified as third grade teachers, fourth grade teachers, and fifth grade teachers. This study employed a descriptive survey, which poses a series of questions to willing participants. Their responses are then summarized with percentages, frequency counts, or more sophisticated statistical indices and then inferences are drawn about a particular population from the responses of the sample (Maya, 2012). Content validity of the survey was determined by participants' comments about the survey, and by a panel of instructional supervisors in the Alabama Black Belt school districts.

## Site Location for Study

The site for gathering the data for this study was the Western and Midwestern regions of the Alabama Black Belt. Data retrieved from local education agencies confirmed 570 teachers were employed as third through sixth grade teachers in the Western and Midwestern region of the Alabama Black Belt. A total of 164 participants responded to the survey; however, only 149 teachers returned useable surveys, which resulted in a 53% return rate. Demographic data are presented in Table 5.

Third through sixth grade teachers included 49 third grade teachers, 29 fourth grade teachers, 36 fifth grade teachers, and 35 sixth grade teachers (see Table 5). The participant teachers were regular education teachers (93%) and special education teachers (7%). Of the teachers who responded, 69% (102) were defined as self-contained teachers, 11% (16) were classified as Language Arts teachers, 5% (8) were classified as basic school teachers, and 23%

(15) were classified as others. Descriptive statistics, as they related to teacher certification revealed that 91% (135) of the teachers were certified in the area of Elementary Education (Grades 1-6 or Grades K-6), 5% (8) of the teachers were certified in the area of Special Education, 3% (3) were certified in the area of early childhood, and .7% (1) of were certified in the area of reading education. All of the teachers (100%) were certified with a regular teacher certification. Of the teacher surveyed 40% (60) were bachelor degree teachers, 52%(78)were master degree teachers, %(11) were educational specialist teachers. Of the teachers surveyed, 14% (22) were 1-3 years experienced teachers, 17% (26) were 4-6 years experienced teachers, 13% (20) were 7-10 years experienced teachers, and 54% were 11 or more years experienced teachers. . Of the teachers surveyed, 15% (32) worked 1-3 years in the public sector, 15% (22) worked 4-6 years in the public sector ,13% (20) worked 7-10 years in the public sector, and 56% (84) worked 11 or more years in the public school sector.

Table 5

*Summary of Participant Demographic Data*

Participants	Frequency	Percentage	Valid Percentage	Cumulative Percentage
<b>Grade</b>				
Third	49	32.9	32.9	32.9
Fourth	29	19.5	19.5	52.3
Fifth	36	24.2	24.2	76.5
Sixth	35	23.5	23.5	100.0
Total	149	100.0	100.0	
<b>Classification</b>				
Regular education teacher	138	92.6	92.6	92.6
Special education teacher	11	7.4	7.4	100.0
Total	149	100.0	100.0	
<b>Classroom</b>				
Self-contained classroom	102	68.5	68.5	68.5
Language arts classroom	16	10.7	10.7	79.2
Basic social classroom	8	5.4	5.4	84.6
Other	23	15.4	15.4	100.0
Total	149	100.0	100.0	
<b>Certification</b>				
Early Childhood Education(K-3)	5	3.4	3.4	3.4
Elementary Education(Grades1-6 or Grades 1-8)	135	90.6	90.6	94.0
Special Education	8	5.4	5.4	99.3
Reading Education	1	0.7	0.7	100.0
Total	149	100.0	100.0	
<b>Degree</b>				
Bachelors	60	40.3	40.3	40.3
Masters	78	52.3	52.3	92.6
Specialist	11	7.4	7.4	100.0
Total	149	100.0	100.0	
<b>Years as a full time teacher</b>				
1-3 years	22	14.8	14.8	14.8
4-6 years	26	17.4	17.4	32.2
7-10 years	20	13.4	13.4	45.6
11 or more years	81	54.4	54.5	100.0
Total	149	100.0	100.0	
<b>Years in public school sector</b>				
1-3 years	23	15.4	15.2	15.4
4-6 years	22	14.8	14.8	30.2
7-10 years	20	13.4	13.4	43.6
11 or more years	84	56.4	56.4	100.0
Total	100	100.0	100.0	

Teachers' responses regarding professional development hours in reading and math in the last 12 months are presented in Table 6. These were as follows: 50% (74) of the teachers received 10 or more hours of training in the area of reading in the last month, 50% (72) of the teachers received 1-9 hours of training, and 2% (3) of the teachers received no training. Teacher responses regarding professional development hours in math in the last 12 months were as follows: 21% (32) received 7 or more hours of training in the area of math, 23% (34) received 4-6 hours of training, 36% (54) received 1-3 hours of training, and 19% (29) received no training. Of the teachers surveyed, 32% (47) received 1-3 hours of training in the area of reading in the last month, 27% (40) received 4-6 hours of training in the last month, 7% (10) received 7-9 hours of training in the last month, 22% (32) received 10 or more hours of training in the last month, and 13% (20) received no training. Of the teachers surveyed, 42% (63) received 1-3 hours of training in the area of math in the last month, 15% (22) received 4-6 hours of training in the area of math in the last month, 6% (9) received 7-9 hours of training in the area of math in the last month, and 6% (9) received no training in the area of math in the last month. Descriptive statistics data for professional development hours in reading and math are displayed in Table 6.

Table 6

*Summary of Descriptive Statistics for Professional Development Hours in Reading and Math*

Participants	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Hours of professional development in reading in last 12 months				
1-3 hours	18	12.1	12.1	12.1
4-6 hours	38	25.5	25.5	37.6
7-9 hours	16	10.7	10.7	48.3
10 or more hours	74	49.7	49.7	98.0
None	3	2.0	2.0	100.0
Total	149	100.0	100.0	
Hours of professional development in math in last 12 months				
None	29	19.5	19.5	19.5
1-3 hours	54	36.2	36.2	55.7
4-6 hours	34	22.8	22.8	78.5
7 or more hours	32	21.5	21.5	100.0
Total	149	100.0	100.0	
Hours of monthly professional development in reading at the school				
1-3 hours	47	31.5	31.5	31.5
4-6 hours	40	26.8	26.8	58.4
7-9 hours	10	6.7	6.7	65.1
10 or more hours	32	21.5	21.5	86.6
No training	20	13.4	13.4	100.0
Total	149	100.0	100.0	
Hours of yearly professional development in math at the school				
None	55	36.9	36.9	36.9
1-3 hours	63	42.3	42.3	79.2
4- 6 hours	22	14.8	14.8	94.0
7 or more hours	9	6.0	6.0	100.0
Total	149	100.0	100.0	

Teachers were surveyed to determine the amount of professional development hours they received in the Alabama Reading Initiative and the Alabama Math and Science Technology Initiative (see Table 7). Of the teachers surveyed, 50% (74) received 2 weeks of training in the Alabama Reading Initiative; 16% (24) received 1 week of training; 20 (29%) received 1, 2, or 3

days of training; and 14% (21) received no training. Of the teachers surveyed, 66% (98) received 2 weeks of training in the Alabama Math and Science Technology Initiative; 12% (18) received 1 week of training; 7% (10) teachers received 1, 2,3 days of training; and 16% (23) received no training.

Table 7

*Descriptive Statistics for Teachers' Professional Training in the Alabama Reading Initiative and the Alabama Math and Science Technology Initiative and Professional Development Implementation*

Amount of Training	Frequency	Percentage	Valid Percentage	Cumulative Percentage
<b>Alabama Reading Initiative</b>				
None	1	49.7	49.7	50.3
2 week training	74	16.1	16.1	66.4
1 week training	24	19.5	19.5	85.9
1, 2, or 3 day training	29	14.1	14.1	100.0
No training	21	100.0	100.0	
Total	149			
<b>Alabama Math and Science Technology Initiative</b>				
2 week training	98	65.8	65.8	65.8
1 week training	18	12.1	12.1	77.9
1, 2, or 3 day training	10	6.7	6.7	84.6
No training	23	15.4	15.4	100.0
Total	149	100.0	100.0	
<b>Professional Development Implementation</b>				
None	2	1.3	1.3	1.3
1-6 hours	31	20.8	20.8	22.1
7-10 hours	31	20.8	20.8	43.0
11 or more hours	85	57.0	57.0	100.0
Total	149	100.0	100.0	

Professional development hours are presented in Table 6. Of the teachers surveyed, 57% (85) participated in 11 or more hours of training implementing the professional development activities, 21% (31) participated in 7-10 hours implementing professional development activities, 21% (31) participated in 1-6 hours implementing professional development activities, and 1% (2) had no hours of implementing professional development activities.

### Research Question 1

In order to properly answer the question, “To what extent are teachers’ characteristics related to Reading and Math Achievement on the Alabama Reading and Math Test?” Bivariate (Spearman) correlation analysis was performed to examine relationship among the variables. Accordingly, the strength and direction of relationships between two variables were explored by using the Spearman’s rho correlation coefficient. Five teachers’ characteristics were analyzed as independent variables: pedagogical knowledge, educational background, years of experience, grade level assignment, and professional development hours. The variable teacher’s content pedagogy knowledge divided into two subvariables: college hours taken, and hours teaching reading or math. The variable educational background was one subvariable: highest degree earned. The variable years of experience was divided into two subvariables: number of years taught full-time and number of years taught in the public school sector. The variable grade-level assignment was categorized as grade level taught. The variable professional development hours was divided into monthly professional development hours, professional development hours every 12 month, Alabama Reading Initiative, and Alabama Math and Science Technology Initiative professional development hours.

*Correlational Analysis for Teacher’s Pedagogy in Reading*

The independent variable, teacher’s pedagogical knowledge, was divided into two subvariables: how many college hours or method courses were taken and number of hours teaching reading. According to data displayed in Table 8 the dependent variable reading score on the Alabama Reading and Math Test was not statistically related to the following variables: number of hours teaching reading ( $r(147) = .113 ; p = .170$ ), and college hours taken ( $r(147) = .045, p = .584$ ). In other words, teacher’s pedagogy is not statistically correlated to student reading achievement on the ARMT. The final results of the statistical test are displayed in Table 8.

Table 8

*Correlational Analysis: Pedagogy in Reading*

			Rscore	Reading hours taught	College hours taken
Spearman’s rho	Reading score	Correlation Coefficient	1.000	.113	.045
		Sig. (2-tailed)	.	.170	.584
		N	149	149	149
	Number of hours teaching reading	Correlation Coefficient	.113	1.000	.015
		Sig. (2-tailed)	.170	.	.853
		N	149	149	149
	College or method hours taken	Correlation Coefficient	.045	.015	1.000
		Sig. (2-tailed)	.584	.853	.
		N	149	149	149

*Note.* Dependent variable: reading.

*Correlational Analysis for Educational Background (Degree) in Reading*

The independent variable, educational background, was one variable: highest degree earned. According to the data displayed in Table 9, the dependent variable, reading scores on the Alabama Reading and Math Test, were not statistically related to the following variable ( $r(147) =$

-.040,  $p = .627$ ). In other words, educational background is not statistically correlated to student reading achievement on the ARMT .The final results of the statistical test are displayed in Table 9.

Table 9

*Correlational Analysis: Educational Background in Reading*

		Rscore	Highest degree?
Spearman's rho	Reading score	Correlation Coefficient	1.000
		Sig. (2-tailed)	.627
		N	149
	Highest degree?	Correlation Coefficient	-.040
		Sig. (2-tailed)	.627
		N	149

*Note.* Dependent variable: Reading.

*Correlational Analysis: Years of Experience in Reading*

The independent variable, years of experience in reading, was divided into two subvariables: how many years worked full-time and how many years worked in the public school sector. According to data displayed in Table 10, the dependent variable, reading score, on the Alabama Reading Test was not statistically correlated to how many years a teacher worked full-time ( $r(147) = -.071, p = .391$ ) or how many years a teacher worked in the public school sector ( $r(147) = -.111, p = .177$ ). The final results of the statistical test are displayed in Table 10. In other words, teacher's years of experience, are not statistically related to student reading achievement on the ARMT.

Table 10

*Correlational Analysis: Years of Experience in Reading*

			Rscore	Years worked as fulltime teacher	Years taught in public sector
Spearman's rho	Reading score	Correlation Coefficient	1.000	-.071	-.111
		Sig. (2-tailed)	.	.391	.177
		N	149	149	148
	Years worked as fulltime teacher	Correlation Coefficient	-.071	1.000	.940**
		Sig. (2-tailed)	.391	.	.000
		N	149	149	148
	Years taught in public sector	Correlation Coefficient	-.111	.940**	1.000
		Sig. (2-tailed)	.177	.000	.
		N	148	148	148

*Note.* Dependent variable: Reading.

*Correlational Analysis: Grade Level Configuration (Assignment) in Reading*

The independent variable, grade level assignment, was divided into one variable: grade level taught. According to data displayed in Table 11, the dependent variable, grade level assignment, was statistically related to the following variable: Alabama Reading and Math Test ( $r(147) = .589, p = .000$ ). In other words, the teacher's grade level assignment is statistically correlated to student reading achievement on the ARMT. The final results of the test are displayed Table 11.

Table 11

*Correlation Analysis: Grade Level Configuration (Assignment) in Reading*

			Rscore	Grade level taught
Spearman's rho	Reading score	Correlation Coefficient	1.000	.589**
		Sig. (2-tailed)	.	.000
		N	149	149
	Grade Level taught	Correlation Coefficient	.589**	1.000
		Sig. (2-tailed)	.000	.
		N	149	149

Note: Dependent variable: Reading

*Correlational Analysis: Professional Development Hours in Reading*

The independent variable, professional development, was divided into three subvariables: professional development hours received in 12, monthly reading professional development, and Alabama Reading Initiative training. According to the data displayed in Table 12, the dependent variable reading score on the Alabama Reading and Math Test was not statistically related to the following variables: professional development hours in the last 12 months ( $r(147) = .109, p = .186$ ) and monthly reading professional development training ( $r(147) = .096, p = .242$ ); but, it was significantly related to Alabama Reading Initiative training ( $r(147) = -.207, p = .011$ ), and was negatively significant. In other words, teachers who received compressed training days (less days of training), have higher student reading achievement on the ARMT. The final results of the statistical test are displayed in Table 12.

Table 12

*Correlational Analysis: Professional Development Hours in Reading*

			Rscore	Reading PD Hours in 12 months	Reading Monthly PD hours	ARI training
Spearman's rho	Reading score	Correlation Coefficient	1.000	.109	.096	-.207*
		Sig. (2-tailed)	.	.186	.242	.011
		N	149	149	149	149
	PD Hours in 12 months	Correlation Coefficient	.109	1.000	.138	.033
		Sig. (2-tailed)	.186	.	.094	.686
		N	149	149	149	149
	Monthly PD	Correlation Coefficient	.096	.138	1.000	.009
		Sig. (2-tailed)	.242	.094	.	.910
		N	149	149	149	149
	ARI training	Correlation Coefficient	-.207*	.033	.009	1.000
		Sig. (2-tailed)	.011	.686	.910	.
		N	149	149	149	149

*Note.* Dependent variable: Reading.

*Correlational Analysis: Teacher's Pedagogy in Math*

The independent variable, teacher's pedagogical knowledge was divided into two variables: college or method hours taken and the number of hours teaching math. According to the data displayed in Table 13, the dependent variable, math score on the Alabama Reading and Math Test, was not statistically related to the following variables: college hours taken ( $r(147) = .093, p = .261$ ), and the number of hours teaching math ( $r(147) = .009, p = .913$ ). In other words, teacher's pedagogical knowledge was not statistically related to student math achievement on the ARMT. The final results of the statistical test are displayed in Table 13.

Table 13

*Correlational Analysis: Teacher’s Pedagogical Knowledge in Math*

			Mscore	College hours	Math hours taught
Spearman’s rho	Math score	Correlation Coefficient	1.000	.093	.009
		Sig. (2-tailed)		.261	.913
		N	149	149	149
	College hours	Correlation Coefficient	.093	1.000	.211**
		Sig. (2-tailed)	.261		.010
		N	149	149	149
	Number of hours teaching math	Correlation Coefficient	.009	.211**	1.000
		Sig. (2-tailed)	.913	.010	
		N	149	149	149

Note: Dependent variable: Math

*Correlational Analysis: Educational Background in Math*

The independent variable, educational background in math, was divided into one variable: highest degree earned. According to the data displayed in Table 14, the dependent variable, math achievement, on the Alabama Reading and Math Test was not statistically related to the following variables: highest degree earned ( $r = (147) -.048, p = .559$ ). In other words, teacher’s educational background is not statistically related to student math achievement on the ARMT.

Table 14

*Correlational Analysis: Educational Background in Math*

			Mscore	Highest degree
Spearman's rho	Math score	Correlation Coefficient	1.000	-.048
		Sig. (2-tailed)	.	.559
		N	149	149
	Highest degree	Correlation Coefficient	-.048	1.000
		Sig. (2-tailed)	.559	.
		N	149	149

*Note.* Dependent variable: Math.

*Correlational Analysis: Years of Experience in Math*

The independent variable, years of experience, was divided into two subvariables: years taught in the public school sector and years worked as a full-time teacher. According to data displayed in Table 15, the dependent variable, math achievement on the Alabama Reading and Math Test was not statistically related to years taught in the public school sector ( $r(147) = -.135, p = .103$ ) and years worked as a full-time teacher ( $r(147) = -.121, p = .141$ ). In other words, teacher's years of experience is not statistically related to student math achievement on the ARMT. The final results of the statistical test are displayed in Table 15.

Table 15

*Correlational Analysis: Years of Experience in Math*

			Mscore	Years in public school	Years as a fulltime teacher
Spearman's rho	Math score	Correlation Coefficient	1.000	-.135	-.121
		Sig. (2-tailed)	.	.103	.141
		N	149	148	149
	Years in public school	Correlation Coefficient	-.135	1.000	.940**
		Sig. (2-tailed)	.103	.	.000
		N	148	148	148
	Years as a fulltime teacher	Correlation Coefficient	-.121	.940**	1.000
		Sig. (2-tailed)	.141	.000	.
		N	149	148	149

Note. Dependent variable: Math.

*Correlational Analysis: Grade Level Configuration (Assignment) in Math*

The independent variable, grade level assignment, was divided into one variable: grade level taught. According to data displayed in Table 16, the dependent variable, math achievement on the Alabama Reading and Math Test, was statistically related ( $r(147) = .638, p = .000$ ) to grade level. In other words, teacher's grade level configuration is statistically correlated to student math achievement on the ARMT. The final results of the statistical test are displayed in Table 16.

Table 16

*Correlational Analysis: Grade Level Configuration (Assignment) in Math*

Correlations				
			Mscore	Grade level taught
Spearman's rho	Math score	Correlation Coefficient	1.000	.638**
		Sig. (2-tailed)	.	.000
		N	149	149
	Grade level taught	Correlation Coefficient	.638**	1.000
		Sig. (2-tailed)	.000	.
		N	149	149

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Note: Dependent Variable: Math

*Correlational Analysis: Professional Development Hours in Math*

The independent variable, professional development was divided into three subvariables: professional development hours received in 12 months, monthly math professional development, and Alabama Math and Science Technology Initiative training- AMSTI. According to the data displayed in Table 17, the dependent variable, math score on the Alabama Reading and Math Test, was not statistically related to the following variables: professional development hours in the last 12 months ( $r(147) = .101, p = .219$ ), monthly reading professional development training ( $r(147) = .012, p = .889$ ), and Alabama Math and Science Initiative training ( $r(147) = -.070, p = .397$ ) was not significantly related to math achievement on the Alabama Reading and Math Test. In other words, the fewer AMSTI training days were not correlated to higher student math achievement on the ARMT. The final results of the statistical test are displayed in Table 17.

Table 17

*Correlational Analysis: Professional Development in Math*

			Mscore	AMSTI training	Math PD hours in 12 months	Monthly Math PD hours
Spearman's rho	Math score	Correlation Coefficient	1.000	-.070	.101	.012
		Sig. (2-tailed)	.	.397	.219	.889
		N	149	149	149	149
	AMSTI Training	Correlation Coefficient	-.070	1.000	-.170*	-.248**
		Sig. (2-tailed)	.397	.	.039	.002
		N	149	149	149	149
	Math PD hours in 12 months	Correlation Coefficient	.101	-.170*	1.000	.560**
		Sig. (2-tailed)	.219	.039	.	.000
		N	149	149	149	149
	Monthly Math PD hours	Correlation Coefficient	.012	-.248**	.560**	1.000
		Sig. (2-tailed)	.889	.002	.000	.
		N	149	149	149	149

Note: Dependent variable: Math

### Multiple Regression

In order to test the research questions, two statistical tools were used: correlation and multiple regression. The statistical procedure was identified according to the nature of the teacher quality and student achievement variables (categorical, ordinal, or continuous) and the specific purpose in each case (exploring differences between groups or exploring potential relationships). The multiple regression was performed to assess the ability of the independent variables, educational background, grade level configuration, pedagogical knowledge, years of experience, and professional development hours, to predict student reading and math achievement on the Alabama Reading and Math Test.

Results for each hypothesis were examined in two phases. First, a preliminary analysis was conducted to ensure no violation of the assumptions of normality, linearity, and multicollinearity. Second, the most representative values of each statistical procedure were assessed in order to accept or reject individually each null hypothesis.

### *Research Question 2*

To what extent do teacher's pedagogical knowledge, educational background, years of experience, grade level configuration (assignment) and professional development hours predict student reading achievement on the Alabama Reading and Math Test?

The stepwise multiple regression analysis output revealed the following results: at step 1, one predictor variable grade level configuration(assignment) was found significantly related to student achievement in reading on the Alabama Reading and Math Test and produced (  $R^2=.336$ .  $F(1, 147)= 76.04$ ,  $p=.000$ ; ( $\beta = .584$ ;  $t = 8.70$ ;  $p =.000$ ) for grade level assignment. In other words, teacher's grade level assignment is the primary significant predictor of reading achievement on the Alabama Reading and Math Test.

In the second model, at step 2, two predictor variables remained statistically significant and produced: ( $R^2=.360$ .  $F(2, 146)= 42.59$ ,  $p=.000$ ; ( $\beta = .588$ ;  $t = 8.93$ ;  $p =.000$ ) for grade level assignment: ( $\beta = -.166$ ;  $t = -2.52$ ;  $p < .013$ ) for Alabama Reading Initiative training . In other word, Alabama Reading Initiative Training is the second significant predictor of reading achievement on the Alabama Reading and Math Test.

In the third model, at step 3, three predictor variables were found statistically significant and produced( $R^2=.394$   $F(,3,145)= 33.03$ ,  $p=.000$ , ( $\beta = .591$ ,  $t = 9.23$ ;  $p =.000$ ), for grade level assignment: and ( $\beta = .254$ ;  $t = -3.60$   $p =.000$ ) for ARI training ,(  $\beta = -.213$ ;  $t = -3.02$ ;  $p =.003$ ) for

how many years taught in the public school . The statistical test results are displayed in Table 18.

In other words, the number of years taught in the public school sector is the third significant predictor of reading achievement on the Alabama Reading and Math.

Table 18

*Regression Analysis: The Predictor (Reading) of Student Achievement*

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Adjusted R Square
		B	Std. Error	Beta			
1	(Constant)	607.829	3.068		198.140	.000	.336
	What grade level did you teach the 2010-2011 school year?	10.140	1.163	.584	8.720	.000	
2	(Constant)	613.474	3.754		163.413	.000	.360
	What grade level did you teach the 2010-2011 school year?	10.204	1.142	.588	8.931	.000	
	Have you received ARI- Alabama Reading Initiative training?	-2.907	1.153	-.166	-2.521	.013	

*(table continues)*

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Adjusted R Square
		B	Std. Error	Beta			
3	(Constant)	627.649	5.941		105.641	.000	.394
	What grade level did you teach the 2010-2011 school year?	10.266	1.112	.591	9.231	.000	
	Have you received ARI- Alabama Reading Initiative training?	-4.446	1.232	-.254	-3.609	.000	
	How many years have you taught in the public school sector?(not including this year)	-3.653	1.208	-.213	-3.025	.003	

a. Dependent Variable: Reading score

### Research Question 3

To what extent do teacher's pedagogical knowledge, educational background, years of experience, grade level configuration (assignment) and professional development hours predict student math achievement on the Alabama Reading and Math Test?

The stepwise multiple regression analysis output revealed the following results at step 1. One predictor variable was found significantly related to student achievement in math on the Alabama Reading and Math Test and produced ( $R^2=.340$ .  $F(1, 148) = 77.82$ ,  $p=.000$ ; ( $\beta = .588$ ,  $t = 8.79$ ,  $p = .000$ ) for grade level assignment. In other words, grade level assignment is the primary significant predictor of math achievement on the Alabama Reading and Math Test.

In the second model, at step 2, two predictor variables remained statistically significant and produced ( $R^2=.365$ .  $F(2, 147)= 43.78$ ,  $p=.000$  ;( $\beta = .604$ ,  $t = 9.15$ ,  $p = .000$ ) for grade level

assignment, and ( $\beta = -.166, t = 2.52, p = .013$ ) for Alabama Math and Science Technology Initiative training. In other word, AMSTI training is the second significant predictor of math achievement on the Alabama Reading and Math Test.

In the third model, at step 3, three predictor variables were found to be statistically significant and produced: grade level configuration (assignment) ( $R^2 = .390$   $F(3, 146) = 32.80, p = .000$ ; ( $\beta = .618, t = 9.57, p = .000$ ), Alabama Math and Science Technology Initiative training ( $\beta = -.197, t = -3.02, p = .003$ ), and how many years the teacher taught full-time in the public school sector ( $\beta = -.190, t = -2.92, p = .004$ ). In other words, grade configuration, Alabama Math and Science Test Training, and how many years worked as a full-time in the public school sector are significant predictor of student achievement on the Alabama Reading and Math Test. The statistical test results are displayed in Table 19. In other words, years worked as full-teacher in the public school sector is the third significant predictor of math achievement on the Alabama Reading and Math Test.

Table 19

*Regression Analysis: The Predictor of (Math) Student Achievement*

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Adjusted R
		B	Std. Error	Beta			Square
1	(Constant)	609.808	3.471		175.684	.000	
	What grade level did you teach the 2010-2011 school year?	11.542	1.314	.588	8.785	.000	.340
2	(Constant)	614.851	3.954		155.496	.000	
	What grade level did you teach the 2010-2011 school year?	11.855	1.296	.604	9.145	.000	
	Have you received AMSTI- Alabama Math Science Technology Initiative?	-3.371	1.339	-.166	-2.518	.013	.365
3	(Constant)	626.898	5.652		110.921	.000	
	What grade level did you teach the 2010-2011 school year?	12.138	1.268	.618	9.574	.000	
	Have you received AMSTI- Alabama Math Science Technology Initiative?	-4.000	1.323	-.197	-3.023	.003	
	How many years have you worked as a full-time elementary/middle school teacher?	-3.786	1.299	-.190	-2.915	.004	.390

a. Dependent Variable: Mscore

## Findings Summary

In order to assess the purpose of this study, three research questions were examined and analyzed. For this study, 10 specific observable teachers' characteristics were identified: highest degree earned, college hours taken in reading and math, hours of reading or math taught, number of years taught full-time, number of years taught full-time in the public school sector, grade level assignment, professional development hours at the school level monthly, professional development hours for 12 months, Alabama Reading Initiative, and Alabama Math and Science Technology Initiative training.

Each teacher characteristic was individually tested by performing either the Spearman correlation or the multiple regression analysis. The appropriate statistical test was selected for each hypothesis according to the data type (ordinal, categorical, continuous) and the analyses purposes (compare differences between groups or explore potential relationships).

According to the stepwise multiple regression analysis, two independent variables were statistically significant to reading and math achievement: grade level assignment and Alabama Reading Initiative training. These results were consistent with the stepwise multiple regression analysis, which predicted grade level assignment and Alabama Reading Initiative training as a constant predictor of student achievement on the Alabama Reading and Math Test. The findings also concluded that years worked as a full-time teacher is statistically significant to reading achievement on the Alabama Reading and Math Test.

The stepwise multiple regression analysis revealed, as it relates to math achievement on the Alabama Reading and Math Test, that grade level assignment, Alabama

Math and Science Technology Initiative training, and years worked as a full-time teacher are significant predictors to math achievement on the Alabama Reading and Math Test.

## CHAPTER 5

### DISCUSSION, CONCLUSIONS, AND IMPLICATIONS OF THE RESEARCH

The federal mission of teacher-quality standards came with the passage of the federal No Child Left Behind Act of 2001 (NCLB). The law required every teacher of a core academic subject defined in the law to be “highly qualified.” To meet NCLB requirements, a teacher must be certified and have demonstrated proficiency in his or her subject matter by having majored in the subject in college; passed a subject-knowledge test; obtained advanced certification in the subject; or judged by an alternate, state-determined method. The highly-qualified teacher rules have generally been criticized for having few effects overall on teacher practices (Keller, 2007).

Education policies continue to undergo a shift as views about teacher quality change. Through federal competitions, such as the \$4.35 million Race to the Top program, and state legislation, policies have shifted away from investing in credentials and other input-based measures, toward policies designed to build teachers’ skill levels through observations linked to teaching standards (Education Week, 2011).

By recognizing connections between quality teaching and student achievement, this study sought answers to three research questions:

#### Research Questions

1. To what extent are teachers’ characteristics related to Reading and Math Achievement on the Alabama Reading and Math Test?

2. To what extent do teachers' pedagogical knowledge, educational background, years of experience, grade level configuration, and professional development hours predict students' reading achievement on the Alabama Reading and Test?

3. To what extent do teachers' content pedagogy knowledge, educational background, years of experience, grade level configuration, and professional development hours predict students' math achievement on the Alabama Reading Test?

Two statistical procedures, bivariate (Spearman) correlation analysis, multiple regression were applied to assess the variables under investigation. Five teachers' characteristics were analyzed as independent variables: pedagogical knowledge, educational background, (defined as teacher's degree), years of experience, grade level assignment, and professional development hours. Two variables were analyzed as dependent variables: reading achievement on the Alabama Reading and Math Test, and math achievement on the Alabama Reading and Math Test. Based on this study, three identified variables were found statistically significant among 10 observable teachers' quality characteristics: highest degree earned, college hours taken in reading and math, hours of reading or math taught, number of years taught full-time, number of years taught full-time in the public school sector, grade level assignment, professional development hours at the school level monthly, professional development hours for 12 months, Alabama Reading Initiative, and Alabama Math and Science Technology Initiative training as student achievement on the Alabama Reading and Math Test. Of the 10 independent variables, 2 independent variables were statistically significant to reading achievement on the Alabama Reading and Math Test: grade level configuration and Alabama Reading Initiative training hours, and three independent variables were predictors of student achievement on the Alabama

Reading and Math Test: grade level configuration, Alabama Reading Initiative training and the number of years taught fulltime in the public school sector.

For math achievement, three independent variables were predictors of student achievement: grade level configuration, Alabama Math and Science Technology Initiative training, and the number of years full-time in the public school sector.

### Discussion of Findings

This section discusses the main findings of this study, which are considered in the context of the literature that was reviewed for this study. The main findings related to the correlations, and multiple regression analyses for the variables examined and summarized in this section.

Ten observable teacher characteristics were individually tested to assess a potential relationship with student achievement on the Alabama Reading and Math Test. The multiple regression was applied, according to the type of variable. Conclusions for each sub-variable are described in the following paragraphs.

### Findings Related to Research Question 1

In order to properly answer the question, “To what extent are teachers’ characteristics related to Reading and Math Achievement on the Alabama Reading and Math Test?”, the independent variable, teacher’s pedagogical knowledge, was divided into two subvariables: how many college hours or method courses were taken and how many hours of teaching reading and assessed by a bivariate Spearman correlation statistically related to the following variables: hours teaching \and college hours taken. In other words, teachers’ content pedagogy knowledge is not statistically correlated to student reading achievement on the ARMT.

The dependent variable, math score on the Alabama Reading and Math Test, was not statistically related to the following variables: college hours taken, and the number of hours teaching math. In other words, teacher's pedagogical knowledge is not statistically related to student math achievement on the ARMT.

According to the statistical outputs, students who received reading and math instruction in greater numbers of hours had no significant relationship compared to students who received reading and math instruction in fewer numbers of hours. Based on these results, it is reasonable to conclude that teachers' hours spent teaching reading and math are not predictors of student achievement. Perhaps teachers may too much time re-teaching skills that new skills are introduced as frequently. Rice (2003) study supported the finding of this study because teacher preparation studies/programs has little impact on student achievement.

Darling-Hammond (2000) reported that studies on the connection between content knowledge and student achievement have been mixed. She found that content knowledge alone has not been shown to account for increased student achievement; pedagogy plays a significant role as well. The relationship between content knowledge and student learning is approximated by a curvilinear relationship.

#### *Findings Related to Teachers' Educational Background*

The independent variable, educational background, was divided into one variable: highest degree earned was assessed by a bivariate Spearman correlation. The dependent variable, reading scores on the Alabama Reading and Math Test, were not statistically related to the following variable. In other words, teacher's educational background is not statistically related to student reading achievement on the ARMT. The dependent variable, math achievement, on the Alabama

Reading and Math Test was not statistically related to the following variables: highest degree earned. In other words, teacher's educational background is not statistically related to student math achievement on the ARMT.

Teachers who received a higher degree had no significant relationship to student achievement in comparison to teachers who earned a lesser degree. Based on these results, it is reasonable to conclude that teachers' educational background is not a significant predictor of student achievement. Rice (2003) concluded that "more refined measures of what teachers know and can do (e.g., subject-specific credentials, special coursework taken) are better predictors of teacher and student performance than are more conventional measures (e.g., highest degree earned, undifferentiated course credits earned)" (p. 50). The results of this study supported the finding of Aaronson, Barrow, and Sander (2007), which that 90 percent of the variance in teacher effects on student learning was not explained by teacher characteristics such as: highest level of education, experience, credentials, and selectivity of the college that the teachers attended.

#### *Findings Related to Teachers' Years of Experience*

The independent variable, years of experience, was divided into two subvariables: years taught in the public school sector and years worked as a full-time teacher and assessed by bivariate Spearman correlation. The dependent variable, reading score, on the Alabama Reading Test was not statistically correlated to how many years a teacher worked full-time or how many years a teacher worked in the public school sector. In other words, teacher's years of experience, are not statistically related to student reading achievement on the ARMT.

The dependent variable, math achievement on the Alabama Reading and Math Test was not statistically related to years taught in the public school sector and years worked as a full-time

teacher. In other words, teacher's years of experience is not statistically related to student math achievement on the ARMT.

The results of this study supported the finding of Murnane and Phillips (1981) found that experience had a significant positive effect on elementary student achievement among teachers during their first seven years of teaching. Rice (2003) confirmed that teacher's years of experience are more relevant to student achievement at the high school level than at the earlier grade levels.

Carr (2006) suggested public schools' teacher quality (i.e., highly qualified teacher status) was significant in 18 of 21 models but teacher experience and advanced degrees did not significantly contribute to student achievement (when controlling for highly qualified status). Teacher variables made no statistically significant contribution in charter schools. Although the teacher quality effects in public schools were statistically significant, they were not large. The finding of Rice (2003) study confirmed that only a small percentage of teacher qualifications contribute to student achievement based on the test scores.

#### *Findings Related to Teachers' Grade Level Configuration (Assignment)*

The variable, grade level configuration, was tested by bivariate (Spearman) correlation and the results revealed grade level configuration is statistically related to student achievement on the Alabama Reading and Math Test. In other words, teacher's grade level influences student achievement on the Alabama Reading and Math Test.

The independent variable, grade level assignment, was one variable: grade level taught. The dependent variable, grade level assignment, was statistically related to the following variable: Alabama Reading and Math Test. In other words, teacher's grade level influences

student reading achievement on the Alabama Reading and Math Test. The dependent variable, math achievement on the Alabama Reading and Math Test, was statistically related (to grade level. In other words, teacher's grade level configuration is statistically correlated to student math achievement on the ARMT. The final results of the statistical test are displayed in Table 16.

Based on statistical data analysis, this study found that students taught by teachers in different grade levels had significantly higher scores on the Alabama Reading and Math Test in reading and mathematics. These results supported the finding Byrnes and Ruby (2007), who compared the achievement of students in middle schools to students in K-8 schools in Philadelphia, using a sample of 41,000 eighth grade students' across five cohorts from 95 schools. Their analysis used multilevel modeling to account for student, cohort, and school variation, and it controlled for population demographics and school characteristics. The researchers found that the older K-8 schools did perform significantly better than the city's middle schools, as expected, but these differences were related to differences in student and teacher populations, average grade size, and school transition rates. As one would expect, the newer K-8 schools did not achieve the same advantage, despite having smaller grade sizes and lower transition rates, due to the more disadvantaged student and teacher populations. After controlling for school transition and average grade size, there were no discernible differences between K-8 and middle schools in terms of academic achievement, according to this study.

#### *Findings Related to Teachers' Professional Development Hours*

The independent variable, professional development, was divided into three subvariables: professional development hours received in 12, monthly reading professional development, and

Alabama Reading Initiative training was assessed by bivariate Spearman correlation. The dependent variable reading score on the Alabama Reading and Math Test was not statistically related to the following variables: professional development hours in the last 12 months and monthly reading professional development training; but, it was significantly related to Alabama Reading Initiative training and was negatively significant. In other words, teachers who received compressed training days (less days of training), have higher the student reading achievement on the ARMT.

The dependent variable, math scores on the Alabama Reading and Math Test, was not statistically related to the following variables: professional development hours in the last 12 months monthly reading professional development training and Alabama Math and Science Technology Initiative. In other words, the fewer AMSTI training days were not correlated to higher student math achievement on the ARMT. The final results of the statistical test are displayed in Table 17.

Students taught by teachers who received more monthly professional development hours had no significant impact on the Alabama Reading and Math Test scores compared to students who were taught by teachers who received fewer hours of monthly professional development. It is rational to conclude that the monthly professional development hours are not significantly related to student achievement.

This study found that students taught by teachers who received fewer hours of Alabama Reading Initiative training had higher levels of reading achievement compared to students taught by teachers who received more hours of Alabama Reading Initiative training. Contrary, this study found that students taught by teachers who received more hours of training compared to students who received fewer hours of Alabama Math and Science Technology Initiative training

was not a significant predictor of student achievement. It is rational to conclude that the Alabama Reading Initiative training is negatively related to the student achievement. This study supported the findings of (Good, Grouws, & Ebmeter, 1983; Carpenter, 1989; Saxe, Gearhardt, & Nasir, 2001; McCutchen, 2001), who linked professional development with enhanced student learning. These four well-designed studies involved randomly assigning teachers to focused, subject-matter specific professional development, most of which was sustained over time. Three programs focused on mathematics and one on reading instruction. In all four studies, students whose teachers experienced quality professional development showed statistically significant learning gains on content achievement tests.

### Findings Related to Research Questions 2 and 3

A multiple regression analysis was applied to assess the relative importance of the most significant predictors previously identified.

#### *Predicting Reading Achievement on the Alabama Reading and Math Test*

The stepwise multiple regression analysis output revealed the following results: at step 1, one predictor variable, grade level configuration (assignment), was found significantly related to student achievement in reading on the Alabama Reading and Math Test for grade level assignment. In other words, teacher's grade level assignment is the primary significant predictor of reading achievement on the Alabama Reading and Math Test.

In the second model, at step 2, two predictor variables remained statistically significant predictors: grade level assignment and Alabama Reading Initiative training. In other words,

Alabama Reading Initiative Training is the second significant predictor of reading achievement on the Alabama Reading and Math Test.

In the third model, at step 3, three predictor variables were found statistically significant: grade level assignment, Alabama Reading Initiative training, and how many years taught in the public school sector. In other words, the number of years taught in the public school sector is the third significant predictor of reading achievement on the Alabama Reading and Math Test. In other words, the results of this study revealed that teachers' grade level assignment, Alabama Reading Initiative Training, and the number of year taught in the public school are all significant predictors of reading achievement in the Alabama Black Belt. The following independent variables were non-predictors of reading achievement on the Alabama Reading and Math Test: teachers' educational background and pedagogical knowledge.

#### *Predicting Math Achievement on the Alabama Reading and Math Test*

The stepwise multiple regression analysis output revealed the following results at step 1. One predictor variable was found significantly related to student achievement in math on the Alabama Reading and Math Test: grade level assignment. In other words, grade level assignment is the primary significant predictor of math achievement on the Alabama Reading and Math Test.

In the second model, at step 2, two predictor variables remained statistically significant: grade level assignment, and Alabama Math and Science Technology Initiative training. In other word, AMSTI training is the second significant predictor of math achievement on the Alabama Reading and Math Test.

In the third model, at step 3, three predictor variables were found to be statistically significant and produced grade level configuration assignment, Alabama Math and Science

Technology Initiative training, and how many years the teacher taught full-time in the public school sector. In other words, grade configuration, Alabama Math and Science Test Training, and how many years worked full-time in the public school sector are significant predictors of student achievement on the Alabama Reading and Math Test. In other words, years worked as a full-time teacher in the public school sector is the third significant predictor of math achievement on the Alabama Reading and Math Test. The following independent variables were non-predictors of math achievement on the Alabama Reading and Math Test: teachers' educational background and pedagogical knowledge.

## Conclusions

### *Conclusions Related to Teachers' Pedagogical Knowledge*

According to data results, teachers' content pedagogy knowledge was not significantly related to student achievement on the Alabama Reading and Math Test. The variable, how many college hours taken in reading and math, was not statistically related to student achievement. The results of this study confirmed the findings of other studies such as Darling-Hammond (2000), which reported that studies on the connection between content knowledge and student achievement have been mixed. Darling-Hammond found that content knowledge alone has not been shown to account for increased student achievement; pedagogy plays a significant role as well. The relationship between content knowledge and student learning is approximated by a curvilinear relationship. Shulman (1986) merged what had been these two discrete areas of professional knowledge by creating a third category of professional knowledge, pedagogical content knowledge. By merging content with pedagogy, Shulman analyzed knowledge and

pedagogy to a higher level where the teacher skillfully determines what to teach (content knowledge) and how to teach (pedagogy).

However, this study contradicted the findings of Ball and Bass (2000, 2003), who revealed that teachers' mathematical knowledge for teaching positively predicted student gains in mathematics achievement during the first and third grades as well as positively affecting student gains in the first grade suggested that teachers' content knowledge plays a role even in the teaching of elementary mathematics content knowledge for teaching, not just teachers' computational facility or course-taking. In addition, Goldhaber and Brewer's (1997, 1998) analyses of the 1988 National Educational Longitudinal Study also revealed that high school students assigned to teachers who held master's degrees in mathematics made greater gains in mathematics achievement than students whose teachers did not have advanced degrees or who held advanced degrees in other subjects. Similarly, high school teachers with bachelor's degrees in science were also more effective at increasing student achievement in science than teachers who taught science but either had no degree or a bachelor's degree in a non-science subject.

#### *Conclusions Related to Teachers' Educational Background*

The statistical analysis demonstrated that educational background was not significantly related to student achievement on the Alabama Reading and Math Test. The variable, highest degree earned, was found to not be related to the student achievement. Teachers' highest degree earned was found to not be statistically related to the reading or math on the Alabama Reading and Math Test.

These findings corroborated other research conclusions such as Stephens' (2003) findings, which found that teachers' certification status is not significantly related to student

achievement. Conversely, the results contradicted the findings of Kellman (1997), Fetler (1999), Darling-Hammond (2000), Laczko-Kerr (2002), and Alexander (2004), who found that the teachers' certification status were strongly related to student achievement.

#### *Conclusions Related to Teachers' Years of Experience*

Statistical test results revealed that teachers' years of experience is one of the predictors of student achievement. Variables such as number of years worked as a full-time teacher is a predictor in reading and math achievement on the Alabama Reading and Math Test. These results confirmed other authors' findings. Hanushek (1997) found that teachers' experience as an independent variable predicted student achievement. Ferguson (1991) revealed that teachers with 9 or more years of experience were associated with higher student scores. Contrary to the other findings, Carr (2006) suggested that public schools' teacher quality (i.e., highly qualified teacher status) was significant in 18 of 21 models but teacher experience and advanced degrees did not significantly contribute to student achievement (when controlling for highly qualified status).

#### *Conclusions Related to Teachers' Grade Level Configuration (Assignment)*

Statistical test results revealed that teachers' grade level configuration is significantly related to student achievement on the Alabama Reading and Math Test. A variable such as grade level assignment is significantly related to the student achievement. These results confirmed other authors' findings, such Hough (2005), who cited a study of 500 schools that participated in a national study examining the relationship between grade span configurations and student achievement. The results were that K-8 "elemiddle schools" were consistently producing more desirable results than schools with other configurations. Conflicting findings are found in studies

such as McKenzie et al. (2006), which examined grade configuration as an environmental contextual factor that could potentially affect academic success. The researchers examined data from 35,000 Arkansas students in the fourth, sixth, and eighth grades (at each grade level each year for a total of 105,000 students per year) from spring 2001 to spring 2005. They found that grade configuration was not a statistically significant predictor of student academic success as measured by the state's criterion-referenced annual yearly progress exams.

### *Conclusions Related to Teachers' Professional Development Hours and Student Achievement*

Statistical test results revealed that teachers' professional development hours are significantly related to student achievement on the Alabama Reading and Math Test. The independent variables: Alabama Reading Initiative (reading) and Alabama Math Science Technology Initiative (math) training are strong predictors of student achievement on the Alabama Reading and Math Test.

These results confirmed other authors' findings, such as Hanushek et al (1996), Gibson (2004) and Heitman (2006), which found that professional development activities can affect positively on student achievement. Other authors like Milanosky (2004) and Kimball (2005) also agreed that some professional development activities such as teachers' training and teacher evaluation scores are significantly related to the student's level of achievement.

### *Critical Analysis of Findings and Conclusions*

This study attempted to examine potential relationships between some observable teacher quality characteristics and student achievement. Three research questions were statistically tested:

1. To what extent are teachers' characteristics related to Reading and Math Achievement on the Alabama Reading and Math Test?

2. To what extent do teachers' pedagogical knowledge, educational background, years of experience, grade level configuration, and professional development hours predict students' reading achievement on the Alabama Reading and Test?

3. To what extent do teachers' content pedagogy knowledge, educational background, years of experience, grade level configuration, and professional development hours predict students' math achievement on the Alabama Reading Test?

In conclusion, the results of the present study are statistically consistent. The study results can be generalized for Title I schools, but the results must be restricted to Title I schools in the Western and Midwestern region of the Alabama Black Belt Region of Alabama.

#### Implications for Practice

Some indicators of quality, such as education, certification, and subject-matter knowledge, are components in the definition of highly qualified teachers in the No Child Left Behind Act. For example, starting in fall 2002, the act required all newly hired elementary and secondary school teachers in Title I schools to hold at least a bachelor's degree and to have full state certification or licensure. In addition, new elementary school teachers must pass tests in subject-matter knowledge and teaching skills in mathematics, reading, writing, and other areas of the basic elementary school curriculum. New middle and high school teachers either must pass a rigorous state test in each academic subject they teach or have the equivalent of an undergraduate major, graduate degree, or advanced certification in their fields (No Child Left Behind Act 2001).

First, the findings of this study indicated that teachers' grade level configuration, Alabama Reading Initiative and Alabama Math Science Technology Initiative, and number of years worked as a full-time teacher in the public school sector were positively significant predictors of student achievement on the Alabama Reading and Math Test.

As a result of this study, school leaders and policymakers may want to examine teachers' grade level configuration matters not only to identify good teachers, but also to decide how school districts need to distribute effective teachers across districts and schools. Furthermore, it may be an added component to consider for teacher evaluation and compensation purposes.

Second, one primary findings from this study showed a negative significance in teacher's Alabama Reading Initiative, as it relates to reading achievement on the Alabama Reading and Mathematics Test. The data analysis revealed that the higher the level of student achievement, the fewer number of hours of Alabama Reading Initiative training for the teachers. Normally, the compressed training for ARI is only 2 to 3 days and the week training lasts about 5 days. Typically, teachers are exhausted by the end of a week-long training session and their attention spans or short.

Based on these results, it seems clear that teachers who attended fewer days of ARI training had higher levels of student achievement in reading on the Alabama Reading and Math Test. These findings would be particularly beneficial for professional development coordinators and Alabama Reading Initiative staff members to know that compressed training (fewer days of training) was significantly related to student achievement.

Third, this research found that teachers' professional development hours may have implications for practice. Because this study demonstrated that teachers' participation in

professional development hours are significant predictors of student achievement in reading and math, it would be essential to guide policies to assess teachers' performance.

Based on these findings, Alabama Reading Initiative instructional practices may be considered as best practices. It would be advantageous for Alabama Reading Initiative personnel to continue to encourage school districts to mandate that teachers implement practices learned through Alabama Reading Initiative and Alabama Math Science Technology Initiative professional development.

For this study, upper grade teachers generated a higher reading and math mean score on the Alabama Reading and Mathematics Test. School administrators in the Western and Midwestern regions of Alabama may want to examine upper grade teacher instructional practices and provide lower grade teachers an opportunity to receive mentoring from upper grade teachers. In addition, mentoring sessions may provide the teachers an opportunity to communicate, collaborate, and reflect on best instructional reading and math practices.

In conclusion, it would be useful for school administrators to continue to examine teacher quality characteristics to determine, which teacher quality characteristics influence student achievement. Because the State of Alabama requires annual evaluations to measure teachers' effectiveness in classrooms, the findings of this research may assist school leaders and policymakers in examining and developing policies in the areas of teacher accountability, school improvement, and teacher retention.

#### Implications Regarding Theoretical Background

This study relied on Darling-Hammond's (2002) research on how teacher quality predicts student achievement. The conceptual framework for this study was based on the work of

Darling-Hammond (2000). Darling-Hammond (2000) argued that teacher quality characteristics examined in relationship to student achievement are content knowledge, teacher certification, teaching experience, pedagogical knowledge, and professional development (see Figure 1).

Darling-Hammond's (2000) study indicated that the measures of teacher preparation and certification are the strongest correlations with student achievement in reading and mathematics. Darling-Hammond's (2000) study concluded that mandated qualifications, skills, and practices of teachers have instigated debate within the profession by questioning which teacher quality characteristics are predictive of student achievement. A number of recent studies have shown a significant correlation between teacher experiences and the effectiveness of teachers, as measured by student achievement (Darling-Hammond, 2000; Hanushek, 1996; Wenglinsky, 2000) The main findings of this study suggested that some desirable teacher quality characteristics (quality inputs) can impact student achievement (quality outputs). Data provided by this study demonstrated that specific teacher characteristics such as grade level configuration, Alabama Reading Initiative and Alabama Math Science Technology Initiative, and number of professional development hours are significant predictors of student achievement. A clear report of data analyses revealed that grade level configuration, Alabama Reading Initiative and Alabama Math Science Technology Initiative, and number of years as a full-time teacher in the public sector may be considered as significant factors to enhance the student outcomes in Title I schools. Although this study does not support exhaustive conclusions regarding the Teacher Quality Model in education field, it provides insight into future research to more fully examine quality issues such as improving students' learning, empowering teachers, supporting teamwork, or even developing school leadership (Sallis, 2003).

## Implications for Future Research

This study demonstrated that there is a link between some teacher quality characteristics (grade level configuration, Alabama Reading Initiative and Alabama Math Science Technology Initiative training, and the number of years worked as a full-time teacher in the public school sector) and student achievement on the Alabama Reading and Math Test. In conclusion, results and suggested issues may be analyzed more in-depth. Based on this study's results, further investigations might seek to analyze other variables associated with student achievement on the Alabama Reading and Math Test. Variables such as grade level configuration at the middle school level, might be area to explore to determine whether the same results can be obtained in a different context. Additionally, other variables such as teacher efficacy, teacher practices, race, and gender should be examined to determine whether a relationship is significant.

## Limitations

Although the main findings of the present study were consistently developed, there are some limitations in this study that must be taken into account.

First, sample and data collection processes included a relatively small number of schools, in comparison to the number of variables involved in the statistical analysis. This study surveyed 149 teachers from Title I schools in rural school districts. It involved the statistical analysis of 10 potential predictors. Although this study accomplished the statistical power's requirements, it would be desirable to include more teachers and schools in a way that it would allow the researcher to reach more significant conclusions.

Second, generalization of the present study's findings can be restricted because this research is based on 1 year of data only. As a correlational research, this study used a teacher

survey distribution at one point in time to gather information regarding teacher characteristics; accordingly, some important multilevel and longitudinal information could not be fully captured by the present study's analysis.

Third, the standardized Alabama Reading and Math Test as a learning outcome might be considered not enough to properly reflect the teacher performance and/or the student achievement level. Because schools are immersed in a complex reality, standardized test results cannot reproduce totally the teaching work in school or the students' learning outcomes.

Fourth, there are some specified variables that must be identified in order to analyze further investigations, which include teachers' characteristics such as attitude, race, gender, self-efficacy, and perceptions and instructional practices, planning interaction with students, and classroom management (Goe, 2007).

Fifth, while the statistical tools used in this study (correlation analysis and multiple regression analysis,) may ascertain and predict relationships, these models cannot determine an absolute cause-effect relationship between variables. Consequently, in the absence of a controlled experimental design with a control group, the ability of this research study to determine causation is limited.

Sixth, as the students' achievement in public schools is not always homogeneous (it usually varies from low-to-high learning outcomes in one classroom), the class performance average, as it was used in the present study, might not adequately reflect student achievement.

Finally, variables such as class size, school leadership, or pedagogical resources that can influence the relationship between teachers' performance and student achievement could be taken into account as potential variables that might affect the present study's conclusions.

## Significance of the Study

The results of this study may add further research to the body of literature on teacher quality education by exploring the relationships between teacher quality characteristics and student achievement. Because this study found that teachers' grade level configuration and Alabama Reading Initiative training are statistically significant to student reading and math achievement on the (Alabama Reading and Mathematics Test), and Alabama Reading Initiative Training is negatively significant to reading achievement and Alabama Math Science and Technology Initiative training is negatively significant to math achievement, this study may aid policymakers in understanding the importance of teacher quality and compressed professional development in Title I schools.

In addition, grade level configuration, Alabama Reading Initiative and Alabama Math Science Technology Initiative training, and the number of years worked as a full-time teacher in the public school sector are predictors of student achievement on the Alabama Reading and Math Test. Additionally, information gathered from this study may benefit superintendents and board members in hiring practices and assist in assigning teachers to grade levels based on professional development training.

This study's results suggested some teacher quality characteristics serve as predictors of student achievement in the Alabama Black Belt region.

## Concluding Remarks

This study examined how specific observable teacher characteristics are related to student achievement. As a result of this study, some relationships were identified between some teacher characteristics and student achievement.

Final data results(stepwise multiple regression) revealed that some observable teacher quality characteristics such as: teachers' grade level configuration, Alabama Reading Initiative and Alabama Math Science Technology Initiative training hours, and the number the years a teacher worked as a full-time teacher in the public school sector are predictors of student achievement.

Because this study's results provided consistent information that may be used in further investigations in similar topics, its findings and conclusions may be incorporated in the existing knowledge base of teaching quality to assist researchers in understanding how to analyze scientifically related issues.

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APPENDIX A  
SCHOOL AND STAFFING SURVEY

## **Schools and Staffing Survey**

### **TEACHER QUESTIONNAIRE**

This is an anonymous survey. You **SHOULD NOT** put your name on this survey. The purpose of this survey is to gather information about Title I school teachers' certification, professional development, degree, and years of experience. Teachers have a major impact on student learning; therefore, it is imperative to determine what variables affect student learning. As a teacher, please respond to the following statements.

1. **How do you classify your position at your school? Mark only one answer. If you did not teach grades 3<sup>rd</sup>-6<sup>th</sup> grades, THEN PLEASE DO NOT COMPLETE THIS SURVEY.**
  - a. Regular Education Teacher
  - b. Itinerant Teacher or Special Education Teacher- you provide instruction to more than one school
  - c. Long-term Substitute (taking the place of a regular education teacher)
  - d. Student Teacher
  
2. **Are you at the same school that you taught at the 2010-2011?**
  - a. Yes
  - b. No
  
3. **What school did you teach at the 2010-2011 school year?**
  1. Bruce K. Craig
  2. Five Points Elementary
  3. J. E. Terry Elementary
  4. Brantley Elementary
  5. Shiloh Elementary
  6. Valley Grande Elementary

7. Byrd Elementary
8. Knox Elementary
9. School of Discovery
10. Payne Elementary
11. Cedar Park Elementary
12. Central Elementary
13. Fort Deposit Elementary
14. Hayneville Middle
15. Lowndes Middle
16. ABC Elementary
17. JE Hobbs Elementary
18. FS Ervin Elementary
19. Amelia L. Johnson High
20. John Essex High School
21. Marengo County High School
22. Sweet Water High School
23. Greensboro Elementary
24. Greensboro Middle
25. Moundville Elementary
26. Albert Turner Elementary
27. Uniontown Elementary
28. Aliceville Elementary
29. Jackson Steele Elementary

**4. What grade level did you teach the 2010-2011 school year?**

1. Third
2. Fourth
3. Fifth
4. Sixth

**5. How much time did you work as a teacher at your school for the 2010-2011 school year?**

- a. Full-time
- b.  $\frac{3}{4}$  of the day
- c.  $\frac{1}{2}$  of the day
- d.  $\frac{1}{4}$  of the day

**6. How many years have you worked as a full-time elementary/middle teacher (not including this year)?**

- a. 1-3 years
- b. 4-6 years
- c. 7-10 years
- d. 11 or more years

**7. How many years have you taught in the public school sector (not including this year)?**

- a. 1-3 years
- b. 4-6 years
- c. 7-10 years
- d. 11 or more year

**8. How many years have you taught in the private school sector (not including this year)?**

- a. 1-3 years
- b. 4-6 years
- c. 7-10 years
- d. 11 or more years

**9. How many students did you have in your classroom for the 2010-2011 school year?**

- a. 10-15 students
- b. 15-20 students
- c. 21-25 students
- d. 26 or more students

**10. How many special needs did you have in your regular education classroom for the 2010-2011 school year?**

- a. 0-5 students
- b. 6-10 students
- c. 11-15 students
- d. 16-20 students

**11. How did you classify your class organization for the 2010-2011 school year?**

- a. Self- contained classroom
- b. Language Arts classroom
- c. Basic Social Studies classroom
- d. Other

**12. How many hours a week do you teach reading for the 2010-2011 school year?**

- a. 5-10 hours
- b. 11-15 hours
- c. 16-20 hours
- d. 21 or more hours

**13. How many college hours (graduate/undergraduate) hours have you taken in Reading in the content area?**

- a. 1-3 hours
- b. 4-6 hours
- c. 7-9 hours
- d. 10 or more

**14. How many professional development hours have you received in the last 12 month, as it relates to reading?**

- a. 1-3 hours
- b. 4-6 hours
- c. 7-9 hours
- d. 10 or more hours

**15. Have you received ARI- Alabama Reading Initiative training?**

- a. 2 week training
- b. 1 week training
- c. 1, 2 or 3 day training
- d. No training

**16. Do you have monthly reading professional development training at your school, if so, how many hours of training?**

- a. 1-3 hours
- b. 4-6 hours
- c. 7-9 hours
- d. 10 or more hours

**17. How many hours per week do you teach math the 2010-2011 school year?**

- a. 1-3 hours
- b. 4-6 hours
- c. 7-9 hours
- d. 10 or more hours

**18. How many college hours (undergraduate/graduate) hours have you taken in math?**

- a. None
- b. 1-3 hours
- c. 4-6 hours
- d. 7 or more hours

**19. Have you received AMSTI- Alabama Math and Science Technology Initiative training?**

- a. 2 week training
- b. 1 week training
- c. 1, 2, or 3 day training
- d. No training

**20. How many professional development hours have you received in math over the past 12 months?**

- a. 1-3 hours
- b. 4-6 hours
- c. 7-9 hours
- d. 10 or more hours

**21. Did you receive math professional development training at your school the 2010-2011 school year, if so, how many hours per month?**

- a. None
- b. 1-3 hours
- c. 4-6 hours
- d. 7 or more hours

**22. What is your degree status?**

- a. Bachelors
- b. Masters
- c. Specialist
- d. Doctorate

**23. What is your area of certification-if more than one area, then please check more than one response?**

- a. Early Childhood Education (grades K-3)
- b. Elementary Education (grades 1-6 or grades 1-8\_
- c. Special Education
- d. Reading Education

**24. What type of certificate do you hold?**

- a. Regular Certification
- b. Probationary Certification
- c. Emergency Certification
- d. No certificate

**25. What grade levels are you're endorsed to teach?**

- a. K-3
- b. K-8
- c. 1-6
- d. 1-8

**26. Do you have and additional certification in the following?**

- a. Reading
- b. Math
- c. Science
- d. English

**27. Over the past 3 years, how many hours have you spent implementing the activities in your classroom from your professional development training?**

- a. 8 hours
- b. 9-16 hours
- c. 17-32 hours
- d. 33 hours

APPENDIX B  
LETTER TO SUPERINTENDENT

Letter to Superintendent

Dear Superintendent:

My name is Sharon Streeter and I am a doctoral student at the University of Alabama. I am presently working on my dissertation in the Educational Leadership Department under the direction of Dr. Daisy Arredondo-Rucinski. I am conducting research on the relationships among teacher quality characteristics and student achievement in the western region of Alabama. By conducting this research, I will be able to determine the impact teacher quality has on student achievement.

I am requesting permission to administer surveys in your school district **pending IRB approval**. By granting me permission to conduct research in your district, you will have agreed to allow me to administer surveys to teachers who taught grades third through sixth grade levels during the 2010-2011 school year. The teachers will be asked to complete the 28 item survey electronically and the teachers will be able to complete the survey and the teachers will be able to complete the survey in the privacy of their homes or another convenient location and they may skip any questions they prefer not to answer. Enclosed are copies of a permission letter that will be sent to selected principals and an informed consent form which will be distributed to teachers in your school district. By granting permission to participate in this study, you are assisting me in determining which teacher quality variables impact student achievement. Your decision for your school district to participate in this study will be kept confidential. There will not be any penalty for not participating in this study. All surveys are anonymous and respondents' answers will be kept confidential. The results of this study may be published, but your school district's name will not be mentioned. The **confidentiality** of your school district and school personnel will be protected through coding and the names of the individual schools involved in the research study will not be identified in any reporting or publication of the study's findings. After the study is completed and the researcher has defended the study, all records will be destroyed by the researcher.

Sincerely,

Sharon D. Streeter

Doctoral Student

If you understand the statements above and freely consent to allow teachers within your school system to participate in this study please sign, date, and return this form in the enclosed envelope. You will be given a copy of this form for your records. If you have questions, concerns, or complaints about the rights of participants in this research study, you may contact Ms. Tanta Myles, the Research Compliance Officer at UA, at 205-348-8461 or toll-free at 1-877-820-3066.

---

(Signature)

---

(School System)

---

(Date)

APPENDIX C

LETTER TO SUPERINTENDENTS REQUESTING DATA

March 2, 2012

Dear Superintendent(s):

Thank you for permitting me to administer surveys in your school district. As part of my dissertation research requirement, I will be meeting with your school district's Assessment Coordinator and collecting grade level scaled scores for reading and math for grades third through fifth (**an example of the group report is attached to this letter**). The group report does not contain identifiable information regarding teachers or students in your school district. The grade level scaled scores will be correlated to teacher quality characteristics identified in the teacher's survey. If there are objections, please inform me via email or telephone by Monday, March 19<sup>th</sup>. Thanks again for allowing me to conduct this study in your school district.

Sincerely,

Sharon D. Streeter  
334-201-0381(cell)  
sstreeter@dallask12.org  
UA Doctoral Student

APPENDIX D  
LETTER TO SCHOOL PRINCIPAL

Letter to Principal

Dear Principal:

My name is Sharon Streeter and I am a doctoral student at the University of Alabama. I am presently working on my dissertation in the Educational Leadership Department under the direction of Dr. Daisy Arredondo-Rucinski. I am conducting research on the relationships among teacher quality characteristics and student achievement in the western region of Alabama. By conducting this research, I will be able to determine the impact teacher quality has on student achievement.

I am requesting permission to administer surveys in your school **pending IRB approval**. By granting me permission to conduct research in your school, you will have agreed to allow me to administer surveys to teachers who taught grades third through sixth grade levels during the 2010-2011 school years. The teachers will be asked to complete the 26 item survey electronically and the teachers will be able to complete the survey and the teachers will be able to complete the survey in the privacy of their homes or another convenient location and they may skip any questions they prefer not to answer. Enclosed are copies of a permission letter that will be sent to selected principals and an informed consent form which will be distributed to teachers in your school district. By granting permission to participate in this study, you are assisting me in determining which teacher quality variables impact student achievement. Your decision for your school district to participate in this study will be kept confidential. There will not be any penalty for not participating in this study. All surveys are anonymous and respondents' answers will be kept confidential. The results of this study may be published, but your school's name will not be mentioned. The **confidentiality** of your school and school personnel will be protected through coding and the names of the individual schools involved in the research study will not be identified in any reporting or publication of the study's findings. After the study is completed and the researcher has defended the study, all records will be destroyed by the researcher.

Sincerely,

Sharon D. Streeter

Doctoral Student

If you understand the statements above and freely consent to allow teachers within your school system to participate in this study please sign, date, and return this form in the enclosed envelope. You will be given a copy of this form for your records. If you have questions, concerns, or complaints about the rights of participants in this research study, you may contact Ms. Tanta Myles, the Research Compliance Officer at UA, at 205-348-8461 or toll-free at 1-877-820-3066.

---

(Signature)

---

(School System)

---

(Date)

APPENDIX E  
INDIVIDUAL CONSENT FOR A RESEARCH STUDY

## UNIVERSITY OF ALABAMA

### Individual's Consent for a Research Study

Teachers:

You are being asked to participate in a research study. The research project is entitled: **Relationships among teacher quality characteristics and math and reading achievement in Title I schools in the western region of Alabama.** Sharon D. Streeter, who is a doctoral student at the University of Alabama, is conducting this study. Dr. Daisy Arredondo-Rucinski, who is a professor of Educational Leadership, Policy, and Technology Studies in the College of Education, is supervising Sharon Streeter.

#### **What is this study about?**

The purpose of this study will be to examine relationships existing among teacher quality characteristics and reading and math achievement on the Alabama Reading and Math Test (ARMT) in Title I schools in the western/Midwestern region of Alabama.

#### **Why is this study important--What good will the results do?**

This knowledge is important because this research will may provide school districts knowledge of teacher characteristics that have a significant impact on student achievement. The survey will be completed electronically (online) and the responses will be compared to grade-level data provided by the Alabama State Department of Education.

#### **Why have I been asked to take part in this study?**

You have been asked to be in this study because you were a third through sixth grade teacher in the Western and Midwestern regions of the Alabama Black Belt during the 2010-2011 school.

#### **How many people besides me will be in this study?**

This is a small study consisting of third through sixth teachers, who taught in the Western region of Alabama in the 2010-2011 school years. The study will consist of approximately 377 teachers and 57 schools.

#### **What will I be asked to do in this study?**

If you agree to participate in this study, you will complete 1 survey. The questions on the survey address questions, which relate to your experiences as a teacher. The information in this survey is confidential. Only the lead investigator and the dissertation chair will have access to the data.

#### **How much time will I spend being in this study?**

This study will take about 20 minutes of your time.

#### **Will being in this study cost me anything?**

There will be no cost to you except for your time in completing the questionnaire.

#### **Will I be compensated for being in this study?**

There will be no compensation for being in this study.

**What are the risks (dangers or harm) to me if I am in this study?** There are known risks or discomforts associated with your participation in this study.

**What are the benefits of being in this study?**  
There will be no direct benefit for participation in this study.

**How will my privacy be protected?**  
All information reported on this questionnaire will be private. Teachers' name or personnel information will not appear on this survey and the researcher will not be able to generate names for the survey. Teachers may complete the survey electronically within the privacy of their homes or another convenient location. They may skip any questions that they prefer not to answer.

**How will my confidentiality be protected?**  
All information you provide will be confidential. The lead investigator will collect all surveys and analyze data. Data will be stored in locked a filing cabinet. Once the data is analyzed, the results will be shared with school districts; afterwards, the data will be destroyed by lead investigator.

**What are the alternatives to being in this study? Do I have other choices?**  
The alternative to participation is not to participate.

**What are my rights as a participant?**  
Taking part in this study is voluntary—it is your free choice. As a teacher, your decision to participate or not participate will have no effect on the teacher's job or relations with the school or school district. Leaving the study will not result in any penalty or loss of any benefits you would otherwise receive.

**Who do I call if I have questions or problems?**  
If you have any questions, please contact Sharon Streeter at 334-201-0381 or her faculty advisor, Dr. Arredondo-Rucinski at [darredo@bamaed.ua.edu](mailto:darredo@bamaed.ua.edu)  
If you have additional questions, concerns, or complaints about your rights as a participant in this research study, you may contact Ms. Tanta Myles, the Research Compliance Officer at UA, at 205-348-8461 or toll-free at 1-877-820-3066. You may also ask questions, make suggestions, or file complaints and concerns through the IRB Outreach website at [http://osp.ua.edu/site/PRCO\\_Welcome.html](http://osp.ua.edu/site/PRCO_Welcome.html) or email us at [participantoutreach@bama.ua.edu](mailto:participantoutreach@bama.ua.edu).  
After you participate, you are encouraged to complete the survey for research participants that is online at the outreach website or you may ask the investigator for a copy of it and mail it to the University Office for Research Compliance, Box 870127, 358 Rose Administration Building, Tuscaloosa, AL 35487-0127.

I have read this consent form. The study has been explained to me. I understand what I will be asked to do. I freely agree to take part in it. I will receive a copy of this consent form to keep.

**YOUR PARTICIPATION IS COMPLETELY VOLUNTARY. You are free not to participate or to stop participating before submitting this survey and your decision to**

**participate or not participate will have no effect on the your job of relations with the school or school district.**

APPENDIX F  
EMAIL INVITATION

March 9, 2012

Dear Teacher(s),

My name is Sharon Streeter and I am a doctoral student at the University of Alabama. I am presently working on my dissertation in the Educational Leadership Department under the direction of Dr. Daisy Arredondo-Rucinski. I am conducting research on the relationships among teacher quality characteristics and student achievement in the western region of Alabama. By conducting this research, I will be able to determine the impact teacher quality has on student achievement.

You will receive a survey from me the week of March 19<sup>th</sup>, 2012. The email will be entitled "Teacher Quality Survey". If your school does have a specific email address, then I will email the survey to your principal. I have asked your principals to forward the email to you. By clicking a link at the bottom of this email, you are indicating implied consent prior to accessing the survey link. You are being asked to participate in this survey study because you were a third through sixth-grade teacher at one of the identified schools the 2010-2011 school year. You may complete the survey in the privacy of your home or another convenient location. In addition, you may skip any questions that you prefer not to answer. All surveys are anonymous and respondents' answers will be kept confidential. The results of this study may be published, but your school district's name or school's name will not be mentioned. The confidentiality of your school district and school personnel will be protected through coding. After the study is completed and the researcher has defended the study, all records will be destroyed by the researcher.

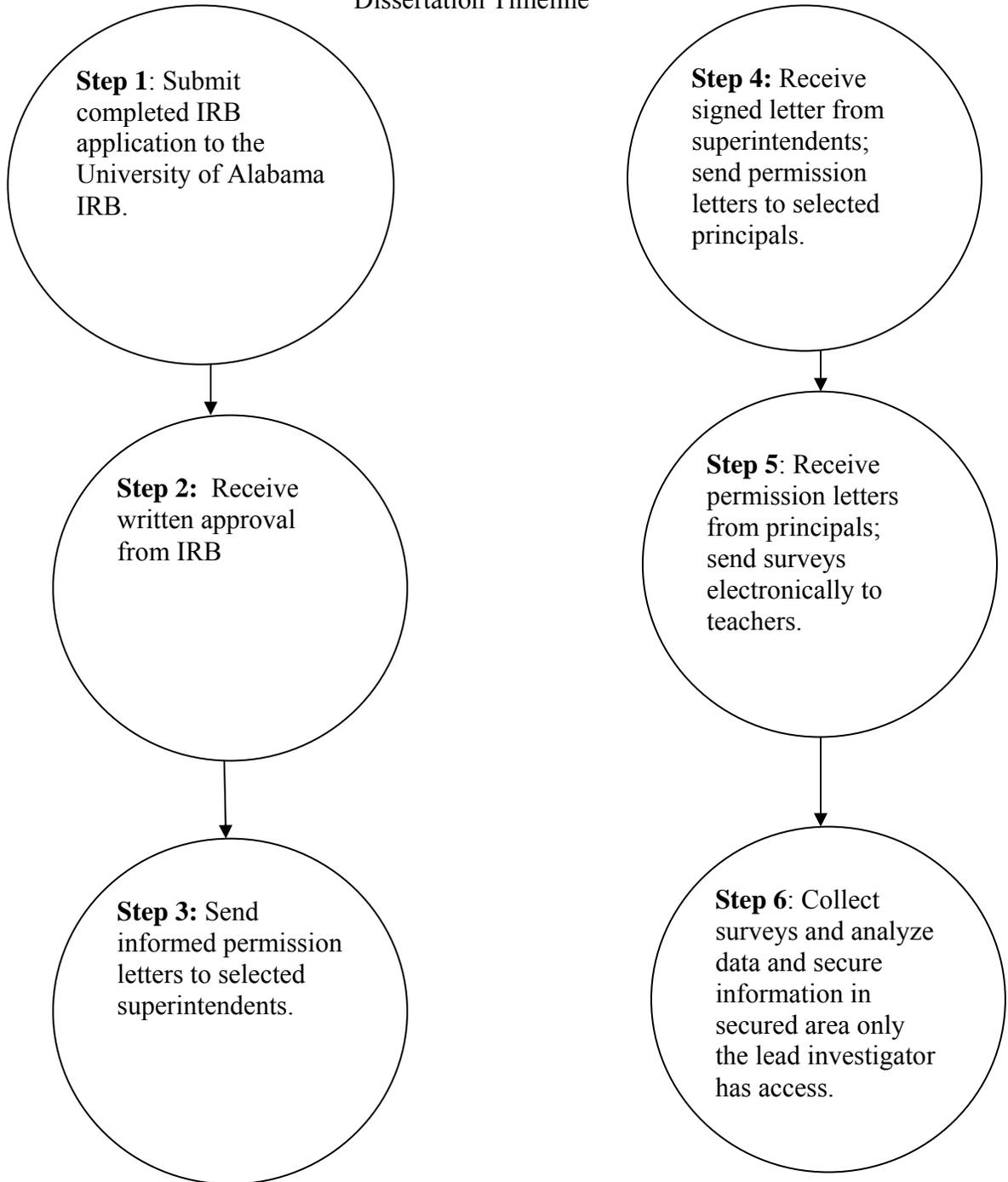
If you have any questions, please contact Sharon Streeter at 334-201-0381 or her faculty advisor, Dr. Arredondo-Rucinski at [darredo@bamaed.ua.edu](mailto:darredo@bamaed.ua.edu)

Sincerely,

Sharon D. Streeter  
UA Doctoral Student

APPENDIX G  
TIMELINE OF DATA COLLECTION

## Dissertation Timeline



APPENDIX H  
IRB APPROVAL LETTER

12-OR-054

UNIVERSITY OF ALABAMA INSTITUTIONAL REVIEW BOARD FOR THE PROTECTION OF HUMAN SUBJECTS  
REQUEST FOR APPROVAL OF RESEARCH INVOLVING HUMAN SUBJECTS

I. Identifying information

	Principal Investigator	Second Investigator	Third Investigator
Name:	Sharon D. Streeter	Dr. Daisy Arredondo- Rucinski	
Department:	ELPTS	ELPTS	
College:	Education	Education	
University:	University of Alabama	University of Alabama	
Address:	476 Heartsfield Drive Montgomery, AL 36117		
	334-201-0381	205-348-7856	
FAX:			
E-mail:	sstreeter@dallask12.org	darredo@bama.ua.edu	

Title of Research Project: **Relationships among teacher quality characteristics and student achievement in the western region of Alabama**

Date Printed: Funding Source: N/ A

Type of Proposal:  New  Revision  Renewal  Completed  Exempt

Attach a renewal application

Attach a continuing review of studies form

Please enter the original IRB # at the top of the page

UA faculty or staff member signature: [Redacted]

II. NOTIFICATION OF IRB ACTION (to be completed by IRB):

Type of Review:  Full board  Expedited

IRB Action:

Rejected Date: \_\_\_\_\_  
 Tabled Pending Revisions Date: \_\_\_\_\_  
 Approved Pending Revisions Date: \_\_\_\_\_

Approved—this proposal complies with University and federal regulations for the protection of human subjects.

Approval is effective until the following date: 2/13/2013

Items approved:  Research protocol: dated  
 Informed consent: dated  
 Recruitment materials: dated

Approval signature: [Redacted]

Date: 2/14/2012

UNIVERSITY OF ALABAMA

Individual's Consent for a Research Study

Teachers:

You are being asked to participate in a research study. The research project is entitled: **Relationships among teacher quality characteristics and math and reading achievement in Title I schools in the western region of Alabama**. Sharon D. Streeter, who is a doctoral student at the University of Alabama, is conducting this study. Dr. Daisy Arredondo-Rucinski, who is a professor of Educational Leadership, Policy, and Technology Studies in the College of Education, is supervising Sharon Streeter.

**What is this study about?**

The purpose of this study will be to examine relationships existing among teacher quality characteristics and reading and math achievement on the Alabama Reading and Math Test (ARMT) in Title I schools in the western region of Alabama.

**Why is this study important--What good will the results do?**

This knowledge is important because this research will may provide school districts knowledge of teacher characteristics that have a significant impact on student achievement. The survey will be completed electronically (online) and the responses will be compared to grade-level data provided by the Alabama State Department of Education.

**Why have I been asked to take part in this study?**

You have been asked to be in this study because you were a third through sixth grade teacher in the Dallas, Selma City, Perry, Marengo, Wilcox, Marengo, Lowndes, Hale, Pickens, Sumter, Crenshaw, Choctaw, Bullock, and Greene during the 2010-2011 school.

**How many people besides me will be in this study?**

This is a small study consisting of third through sixth teachers, who taught in the Western region of Alabama in the 2010-2011 school year. The study will consist of approximately 377 teachers and 54 schools.

**What will I be asked to do in this study?**

If you agree to participate in this study, you will complete 1 survey. The questions on the survey address questions, which relate to your experiences as a teacher. The information in this survey is confidential. Only the lead investigator and the dissertation chair will have access to the data.

**How much time will I spend being in this study?**

This study will take about 20 minutes of your time.

**Will being in this study cost me anything?**

There will be no cost to you except for your time in completing the questionnaire.

**Will I be compensated for being in this study?**

There will be no compensation for being in this study.

**What are the risks (dangers or harm) to me if I am in this study?** There are known risks or discomforts

associated with your participation in this study.

**What are the benefits of being in this study?**

There will be no direct benefit for participation in this study.

**How will my privacy be protected?**

All information reported on this questionnaire will be private. Teachers' name or personnel information will not appear on this survey and the researcher will not be able to generate names for the survey. Teachers may complete the survey electronically within the privacy of their homes or another convenient location. They may skip any questions that they prefer not to answer.

**How will my confidentiality be protected?**

All information you provide will be confidential. The lead investigator will collect all surveys and analyze data. Data will be stored in locked a filing cabinet. Once the data is analyzed, the results will be shared with school districts; afterwards, the data will be destroyed by lead investigator.

**What are the alternatives to being in this study? Do I have other choices?**

The alternative to participation is not to participate.

**What are my rights as a participant?**

Taking part in this study is voluntary—it is your free choice. As a teacher, your decision to participate or not participate will have no effect on the teacher's job or relations with the school or school district. Leaving the study will not result in any penalty or loss of any benefits you would otherwise receive.

**Who do I call if I have questions or problems?**

If you have any questions, please contact Sharon Streeter at 334-201-0381 or her faculty advisor, Dr. Arredondo-Rucinski at [darredo@bamaed.ua.edu](mailto:darredo@bamaed.ua.edu)

If you have additional questions, concerns, or complaints about your rights as a participant in this research study, you may contact Ms. Tanta Myles, the Research Compliance Officer at UA, at 205-348-8461 or toll-free at 1-877-820-3066. You may also ask questions, make suggestions, or file complaints and concerns through the IRB Outreach website at [http://osp.ua.edu/site/PRCO\\_Welcome.html](http://osp.ua.edu/site/PRCO_Welcome.html) or email us at [participantoutreach@bama.ua.edu](mailto:participantoutreach@bama.ua.edu). After you participate, you are encouraged to complete the survey for research participants that is online at the outreach website or you may ask the investigator for a copy of it and mail it to the University Office for Research Compliance, Box 870127, 358 Rose Administration Building, Tuscaloosa, AL 35487-0127.

I have read this consent form. The study has been explained to me. I understand what I will be asked to do. I freely agree to take part in it. I will receive a copy of this consent form to keep.

**YOUR PARTICIPATION IS COMPLETELY VOLUNTARY. You are free not to participate or to stop participating before submitting this survey and your decision to participate or not participate will have no effect on the your job of relations with the school or school district.**

Office for Research  
Institutional Review Board for the  
Protection of Human Subjects

April 3, 2012

THE UNIVERSITY OF  
**ALABAMA**  
R E S E A R C H

Sharon D. Streeter  
476 Heartsfield Drive  
Montgomery, AL 36117

Re: IRB # 12-OR-054 (Revision) "Relationships among Teacher Quality Characteristics and Student Achievement in the Western Region of Alabama (Primarily the Black Belt Region)"

Dear Ms. Streeter:

The University of Alabama Institutional Review Board has reviewed the revision to your previously approved expedited protocol. The board has approved the change in your protocol.

Please remember that your approval period expires one year from the date of your original approval, February 14, 2012, not the date of this revision approval.

Should you need to submit any further correspondence regarding this proposal, please include the assigned IRB application number. Changes in this study cannot be initiated without IRB approval, except when necessary to eliminate apparent immediate hazards to participants.

Good luck with your research.

Sincerely,

[Redacted Signature]

Carriantato T. Myles, MSM, CIM  
Director & Research Compliance Officer  
Office for Research Compliance  
The University of Alabama



358 Rose Administration Building  
Box 870127  
Tuscaloosa, Alabama 35487-0127  
(205) 348-8461  
FAX (205) 348-7189  
TOLL FREE (877) 820-3066

12-OR-054

UNIVERSITY OF ALABAMA INSTITUTIONAL REVIEW BOARD FOR THE PROTECTION OF HUMAN SUBJECTS  
REQUEST FOR APPROVAL OF RESEARCH INVOLVING HUMAN SUBJECTS

I. Identifying information

	Principal Investigator	Second Investigator	Third Investigator
Name:	Sharon D. Streeter	Dr. Daisy Arredondo- Rucinski	
Department:	ELPTS	ELPTS	
College:	Education	Education	
University:	University of Alabama	University of Alabama	
Address:	476 Heartsfield Drive Montgomery, AL 36117		
	334-201-0381	205-348-7856	
FAX:			
E-mail:	sstreeter@dallask12.org	darredo@bama.ua.edu	

Title of Research Project: Relationships among teacher quality characteristics and student achievement in the western region of Alabama

Date Printed: Funding Source: N/A

Type of Proposal:  New  Revision  Renewal  Completed  Exempt

<p>Attach a renewal application</p> <p>Attach a continuing review of studies form</p> <p>Please enter the original IRB # at the top of the page</p>
---

UA faculty or staff member signature: \_\_\_\_\_

II. NOTIFICATION OF IRB ACTION (to be completed by IRB):

Type of Review:  Full board  Expedited

IRB Action:

Rejected Date: \_\_\_\_\_

Tabled Pending Revisions Date: \_\_\_\_\_

Approved Pending Revisions Date: \_\_\_\_\_

Approved—this proposal complies with University and federal regulations for the protection of human subjects.

Approval is effective until the following date: 2-13-13

Items approved:

<input type="checkbox"/>	Research protocol:	dated
<input type="checkbox"/>	Informed consent:	dated
<input type="checkbox"/>	Recruitment materials:	dated
<input type="checkbox"/>	Other:	dated

Approval signature:  Date: 4/3/2012

UNIVERSITY OF ALABAMA

Individual's Consent for a Research Study

Teachers:

You are being asked to participate in a research study. The research project is entitled: **Relationships among teacher quality characteristics and math and reading achievement in Title I schools in the western region of Alabama.** Sharon D. Streeter, who is a doctoral student at the University of Alabama, is conducting this study. Dr. Daisy Arredondo-Rucinski, who is a professor of Educational Leadership, Policy, and Technology Studies in the College of Education, is supervising Sharon Streeter.

**What is this study about?**

The purpose of this study will be to examine relationships existing among teacher quality characteristics and reading and math achievement on the Alabama Reading and Math Test (ARMT) in Title I schools in the western/Midwestern region of Alabama.

**Why is this study important--What good will the results do?**

This knowledge is important because this research will may provide school districts knowledge of teacher characteristics that have a significant impact on student achievement. The survey will be completed electronically (online) and the responses will be compared to grade-level data provided by the Alabama State Department of Education.

**Why have I been asked to take part in this study?**

You have been asked to be in this study because you were a third through sixth grade teacher in the Dallas, Selma City, Perry, Marengo, Wilcox, Marëngo, Lowndes, Hale, Pickens, Butler, Phenix City, Choctaw, Bullock, and Greene during the 2010-2011 school.

**How many people besides me will be in this study?**

This is a small study consisting of third through sixth teachers, who taught in the Western region of Alabama in the 2010-2011 school year. The study will consist of approximately 377 teachers and 57 schools.

**What will I be asked to do in this study?**

If you agree to participate in this study, you will complete 1 survey. The questions on the survey address questions, which relate to your experiences as a teacher. The information in this survey is confidential. Only the lead investigator and the dissertation chair will have access to the data.

**How much time will I spend being in this study?**

This study will take about 20 minutes of your time.

**Will being in this study cost me anything?**

There will be no cost to you except for your time in completing the questionnaire.

**Will I be compensated for being in this study?**

There will be no compensation for being in this study.

**What are the risks (dangers or harm) to me if I am in this study?** There are known risks or discomforts

associated with your participation in this study.

**What are the benefits of being in this study?**

There will be no direct benefit for participation in this study.

**How will my privacy be protected?**

All information reported on this questionnaire will be private. Teachers' name or personnel information will not appear on this survey and the researcher will not be able to generate names for the survey. Teachers may complete the survey electronically within the privacy of their homes or another convenient location. They may skip any questions that they prefer not to answer.

**How will my confidentiality be protected?**

All information you provide will be confidential. The lead investigator will collect all surveys and analyze data. Data will be stored in locked a filing cabinet. Once the data is analyzed, the results will be shared with school districts; afterwards, the data will be destroyed by lead investigator.

**What are the alternatives to being in this study? Do I have other choices?**

The alternative to participation is not to participate.

**What are my rights as a participant?**

Taking part in this study is voluntary—it is your free choice. As a teacher, your decision to participate or not participate will have no effect on the teacher's job or relations with the school or school district. Leaving the study will not result in any penalty or loss of any benefits you would otherwise receive.

**Who do I call if I have questions or problems?**

If you have any questions, please contact Sharon Streeter at 334-201-0381 or her faculty advisor, Dr. Arredondo-Rucinski at [darredo@bamaed.ua.edu](mailto:darredo@bamaed.ua.edu)

If you have additional questions, concerns, or complaints about your rights as a participant in this research study, you may contact Ms. Tanta Myles, the Research Compliance Officer at UA, at 205-348-8461 or toll-free at 1-877-820-3066. You may also ask questions, make suggestions, or file complaints and concerns through the IRB Outreach website at [http://osp.ua.edu/site/PRCO\\_Welcome.html](http://osp.ua.edu/site/PRCO_Welcome.html) or email us at [participantoutreach@bama.ua.edu](mailto:participantoutreach@bama.ua.edu). After you participate, you are encouraged to complete the survey for research participants that is online at the outreach website or you may ask the investigator for a copy of it and mail it to the University Office for Research Compliance, Box 870127, 358 Rose Administration Building, Tuscaloosa, AL 35487-0127.

I have read this consent form. The study has been explained to me. I understand what I will be asked to do. I freely agree to take part in it. I will receive a copy of this consent form to keep.

**YOUR PARTICIPATION IS COMPLETELY VOLUNTARY. You are free not to participate or to stop participating before submitting this survey and your decision to participate or not participate will have no effect on the your job of relations with the school or school district.**