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A Comparison Between the Effect of National Board Certified Teachers and Non-National Board Certified Teachers on Student Performance of Third Graders in the Pulaski County Special School District

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A COMPARISON BETWEEN THE EFFECT OF NATIONAL BOARD CERTIFIED
TEACHERS AND NON- NATIONAL BOARD CERTIFIED TEACHERS ON
STUDENT PERFORMANCE OF THIRD GRADERS IN THE PULASKI
COUNTY SPECIAL SCHOOL DISTRICT

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to the Graduate College
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DOCTOR OF EDUCATION

in School Leadership

in the Center for Leadership and Learning
of the College of Education

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Dedication

I dedicate this dissertation to the memory of my late grandmother, Geneva Perkins. She was truly my first teacher and her front porch was her classroom. Although she never saw the fulfillment of the seeds she sowed, she instilled in me the value of education and the importance of setting and attaining goals. Her influence on my life has been and will always be immense.

Abstract

Of the many studies related to the effectiveness of National Board Certified teachers, there were none found that related to Arkansas teachers. This research study investigated the impact that Nationally Board Certified teachers (NBCTs) had on the achievement of third graders in the Pulaski County Special District (PCSSD). Achievement was operationally defined as scores in the content areas of reading and mathematics as measured by the ACT Aspire standardized test. This study was designed to generate data related to the effectiveness of NBCTs in meeting the academic needs of all students. In addition, the purpose of this study was to determine if the instruction of NBCTs met the academic needs of African American students as a means of reducing the present achievement gap. Statistics from 2018 showed that Arkansas ranks 11th in the nation with 3,907 NBCTs and 726 candidates currently pursuing certification (National Board for Professional Teaching Standards, n.d.). Currently, NBCTs in Arkansas receive an annual bonus ranging from \$2,500 to \$10,000, depending on the socioeconomic status of their school district and school. In addition to the state's bonus, the PCSSD's board policy allows for an additional annual \$3,000 dollar bonus for board certified teachers. With over 200 board certified teachers in the PCSSD and twenty-eight in the process, this is a substantial cost to the district. A number of studies referenced in the literature review concluded that National Board Certification was connected to increased student achievement, and many noted National Board Certification was an indicator of quality teaching (Cantrell et al., 2008; Cavalluzzo, 2004; Goldhaber & Anthony, 2003; Harris & Sass, 2009; Vandevoort, Beardsley, & Berliner, 2004). There were also studies that refuted the impact of NBCT on student achievement (Cantrell, Fullerton, Kane, &

Staiger, 2008; Sanders, Ashton, & Wright, 2005). The results of the data analysis revealed third grade students of non-NBCTs scored significantly higher than third grade students of NBC teachers in both reading and math on the spring 2018 ACT Aspire assessment.

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List of Abbreviations

Full Name	Abbreviation
American College Testing	ACT
Arkansas Department of Education	ADE
Every Student Succeeds Act	ESSA
Collaborative Institutional Training Initiative	CITI
Constructed response	CR
Conditional Standard Errors of Measurement	CSEM
Institutional Review Board	IRB
Item Response Theory	IRT
Iowa Test of Basic Skills	ITBS
Little Rock School District	LRSD
Multiple choice	MC
National Board	NB
National Board Certified	NBC
National Board Certified Teacher	NBCT
National Board for Professional teaching Standards	NBPTS
No Child Left Behind	NCLB
National Education Association	NEA
National Assessment of Education Progress	NAEP
National Education Longitudinal Study	NELS
North Little Rock School District	NLRSD
Pulaski County Special School District	PCSSD

Scholastic Aptitude Test	SAT
Teacher enhanced	TE
University of Arkansas at Little Rock	UALR
University of Central Arkansas	UCA
Zone of Proximal Development	ZPD

CHAPTER 1: INTRODUCTION

Background of the Study

The National Board for Professional Teaching Standards (NBPTS) has become a growing educational reform movement since its inception in 1987. States across the country are investing millions in an effort to produce national board certified teachers. Based on the most recent data in 2018, the National Board for Professional Teaching Standards indicated that Arkansas ranked 11th in the nation with 3,907 National Board Certified teachers (NBCTs) and an additional 726 candidate pursuing National Board Certification (“National Board for Professional Teaching Standards [NBPTS] Arkansas,” 2018).

Over the last four years, trend data showed approximately one hundred teachers per year attained Board certification in Arkansas (Office of Educational Policy, 2017) . Currently, each cohort of National Board Certified teachers who entered and completed the certification process within the same sequence and time period, cost the state of Arkansas \$500,000 dollars annually, or \$5,000,000 dollars over ten years (Office of Educational Policy, 2017).

During Arkansas’ 91st General Assembly, Senate Bill 555 (2017) was modified to allow for the continued incentive bonus for National Board Certification. The bill allowed for a yearly incentive bonus of \$2,500 dollars each year a teacher is employed full-time as a classroom teacher in a non high poverty school for five years. Senate Bill 555 (2017) utilized a tiered bonus system to reward teachers for teaching in high poverty schools and/or high poverty districts.

By definition, high poverty schools are schools where more than 75 percent of the students are eligible for free, or reduced-price lunches ("Concentration of Public School Students," 2018).

NBCTs who are employed in a high poverty school or high poverty schools in a non-high poverty school district, will receive an annual bonus of \$5,000 dollars. If a teacher is employed at a school in a high poverty school, in a high poverty district, he/she will receive a yearly incentive of \$10,000 dollars (S. 555, 2017). The cost of the new bonus structure to the state of Arkansas is projected to rise from \$13.8 million dollars annually to \$16.5 million dollars in 2018 (Hardy, 2016). Over 40% of Arkansas' students who attend these schools often experience low performance and student growth (Office of Educational Policy, 2017). Low performance is characterized by failing to reach achievement targets as identified by summative assessments; in contrast, low growth is determined by failure to demonstrate skill attainment over time. These skills are also identified through summative assessments (Office of Educational Policy, 2017).

The use of NBCTs is increasingly becoming an agent of school reform by school districts (Koppich, Humprey, & Hough, 2006). Title II of Every Student Succeeds Act (ESSA) provides \$2.5 billion dollars to states and districts for professional learning and offers flexibility in the way they spend this money. Beginning the 2017 school year, states and school districts had the option of investing these funds into National Board Certification (Arkansas Department of Education, 2017).

Problem Statement

The Arkansas Educational Support and Accountability System ensures all children have access to high quality education and make progress in closing achievement

gaps (“Arkansas Department of Education Strategic Plan,” 2018). Of the five goals identified by Arkansas Department of Education Vision for Excellence in Education, Goal One: Speaks to students meeting and/or exceeding educational milestones, and Goal Two: Speaks to student growth (“Arkansas Department of Education Strategic Plan,” 2018). These goals aligned with the requirements as cited in ESSA, which requires states to develop accountability systems that measure proficiency and growth. Arkansas selected ACT Aspire assessments for grades third through tenth to assess content areas of English, reading, mathematics, and science. The accountability indicator is proficiency and growth as determined by student performance results on the ACT Aspire assessment. The most recent Act Aspire test data (2017-2018) for Pulaski County revealed the following:

- 61% of students met readiness benchmark for math;
- 72% of students met readiness benchmark for English;
- 39% of students met readiness benchmark for science;
- 40% of students met readiness benchmark for reading; and
- 36% of students met readiness benchmark for writing (Pulaski County Special School District, n.d.).

A comparison of black students and non-black students revealed a gap in both reading and mathematics. The Pulaski County Special School District (PCSSD)’s black students scored 27% in reading, as opposed to non-black students who scored 38%. In the area of mathematics, black students scored 48%, while non-black students scored 53% (Pulaski County Special School District, n.d.).

Pulaski County Special School District's board policy allowed for an annual three \$3,000 dollar bonus for NBCTs. With over 200 NBCTs and an additional 28 seeking certification in PCSSD, this is a substantial cost to the district (Pulaski County Special School District, n.d.)

In 2011, the PCSSD was taken over by the State Board of Education after the Division of Legislative Audit uncovered numerous financial and organizational issues. The PCSSD was placed in fiscal distress based on an additional indicator of a declining balance determined to jeopardize the integrity of the school district. This move resulted in Arkansas Department of Education assuming operations in PCSSD. As a result, the school board and the superintendent were removed (Lesnick, 2011). The Education Commissioner appointed a superintendent to the PCSSD who answered directly to the commissioner. In 2016, the PCSSD was released from fiscal distress. By the PCSSD being removed from the state's distress list, it allowed for the return of local control. A school board was elected to perform duties such as overseeing and adopting the budget and setting policy.

Due to the desegregation lawsuit filed in 1982, Little Rock School District et al. v. Pulaski County Special School District et al., the PCSSD is unique, as it is still monitored by the state of Arkansas. The lawsuit mandates equity in achievement of African American students. In the area of student achievement, the PCSSD has not been declared "unitary," or desegregated as determined by federal court to date. The federal court determined that the PCSSD had not sufficiently decreased the performance gap between white students and African-American students.

The latest desegregation settlement in 2013, the PCSSD was a party in the case. The school district received \$20,804,500 dollars in aid annually for four years from the state to be used towards achieving the goals outlined in the desegregation lawsuit. The last annual desegregation payout to PCSSD was made during the 2017-2018 school year and it was earmarked by the state for school facilities. The expectation of the court was to attain unitary status, but the state aid has been discontinued (“Notice of Proposed Settlement,” n.d.).

This study focused on the impact NBCTs in the Pulaski County Special School District had on the achievement of their students; more specifically, the use of NBCTs as an effective and cost-efficient educational reform effort in the PCSSD. Many school districts including PCSSD attempted to improve student achievement through improved teacher quality (Laura & Stickler, 2008). The PCSSD turned to the National Board for Professional Teaching Standards as a means to improve teacher quality; thereby, increasing student achievement.

Regardless of other research studies being completed in other states, the impact of NBCTs on achievement in the state of Arkansas; specifically, the PCSSD has never been explored, nor has the question of the validity of the financial investment designated for annual bonuses been studied.

Hakel, Koeing, and Elliott (2008) report for the National Research Council reviewed 11 studies that compared the achievement test scores of students with NBCTs to students with non-NBCTs. The researchers concluded students taught by NBCTs made greater gains on achievement tests than students taught by non-NBCTs (Hakel et al., 2008).

A substantial number of research studies demonstrated the positive impact of NBCTs on achievement in at least one subject area, and greater impact with minority students (Cloffelter, Ladd, & Vigdor, 2007; Cowan & Goldwater, 2016, 2009). Cloffelter et al.'s (2007) findings indicated students of National Board Certified teachers outperform students of non-National Board Certified teacher on achievement tests. Their findings also revealed a greater impact on minority students. In Mississippi, 42.9% of third graders with a National Board Certified reading teacher scored proficient in literacy, as compared to 32.2% of third graders taught by a non-National Board Certified teacher.

A number of studies from several states researched the positive impact of National Board Certification on student performance and achievement (Cowan & Goldhaber, 2016). Berg (2003) found NBCTs are well trained, better for students, and their research-based practices increased the quality of learning experiences for children. Additional studies found a positive impact of NBCTs on student achievement (Goldhaber & Anthony, 2004; Humprey, Koppich, & Hough, 2005; Vandevoort, Beardsley, & Berliner, 2004).

Purpose of Study

The purpose of this study was to determine the impact of NBCTs in PCSSD on the academic achievement of third grade students in the content areas of reading and mathematics. In addition, the purpose of this study was to determine the impact of NBCTs on the academic achievement of third grade black students in the content areas of reading and mathematics; thereby reducing the present achievement gap of African American students that exist in PCSSD.

Of the many studies related to the effectiveness of National Board Certified teachers, there were no studies related to Arkansas teachers found in the previous literature. This study focused on the PCSSD's board certified teachers. The study sought to determine the effectiveness of PCSSD NBCTs in teaching reading and mathematics as measured by standardized assessments, specifically ACT Aspire.

Research Questions

In order to investigate the impact NBCTs in the PCSSD had on student achievement in the content areas of reading and mathematics and the achievement of black versus non-black students, the following four research questions guided the study:

1. What will be the difference between the ACT Aspire reading scale scores of students taught by NBCTs and those who are taught by non-NBCTs in Pulaski County Special School District?
2. What will be the difference between the ACT Aspire mathematics scale scores of students taught by NBCTs and those who are taught by non-NBCTs in Pulaski County Special School District?
3. What will be the difference between the ACT Aspire reading scale scores of black versus non-black students taught by NBCTs as opposed to those who are taught by non-NBCTs in Pulaski County Special School District?
4. What will be the difference between the ACT Aspire mathematics scale scores of black versus non-black students taught by NBCTs as opposed to those who are taught by non-NBCTs in Pulaski County Special School District?

Hypotheses

The research hypotheses for the research questions are discussed below:

H₁: There will be a statistically significant difference between third graders' ACT Aspire reading scores who were taught by NBCTs and third graders' reading scores who were taught by non- NBCTs.

H₂: There will be a statistically significant difference between third graders' ACT Aspire math scores who were taught by NBCTs and third graders' math scores who were taught by non- NBCTs.

H₃: There will be a statistically significant difference between African American third graders' ACT Aspire reading scores who were taught by NBCTs and African American third graders' reading scores who were taught by non-NBCTs.

H₄: There will be a statistically significant difference between African American third graders' ACT Aspire math scores who were taught by NBCTs and African American Third graders' math scores who were taught by non-NBCTs.

Assumptions

The research study assumptions are discussed below:

1. The sampling of National Board Certified teachers in Pulaski County Special School District attains results similar to all National Board Certified teachers in Pulaski County Special School District.
2. The student participants will be cluster sampled from available groups from the same school district, and should be considered in terms of educational background.
3. Achieving National Board Certification suggests a teacher is highly qualified.
4. All students involved in this study will take the same ACT Aspire exam in the areas of reading and mathematics.

5. The testing conditions (time of year, weather, temperature, time of day, testing environment, directions, etc.) will be the same for all students involved in this study.
6. In this study, the course objectives and outcomes will be consistent for all students involved in this study, as mandated by the curriculum of the school district and taught by the teacher participants.

Delimitations

The researcher chose to focus the study on one school district, PCSSD in the state of Arkansas. The participants included only a sampling of NBCTs and non-NBCTs who teach third grade in the Pulaski County Special School District. The study included three teacher participants who are National Board Certified, and three teachers who are non-National Board Certified.

Limitations

The research study limitations include:

1. In this study, the teachers were drawn from an available group. They were not a random sample.
2. There may be some variance in teaching experience and degree levels achieved amongst the participating teachers.
3. The students who participated were cluster sampled and defined as available groups. Therefore, no generalizations were considered beyond this target population.

Definitions of Terms

The definitions of terms used throughout the research study are listed below:

- *ACT Aspire*: Standards-based assessment system used to monitor progress toward college and career readiness from third grade through tenth grade. The summative assessment covers five content areas including: reading, English, mathematics, science, and writing.
- *Every Student Succeeds Act (ESSA)*: Accountability law for all public schools (“Every Student Succeeds Act Consolidated State Plan,” 2017).
- *Five Core Propositions of National Board Professional Teaching Standards (NBPTS)*: (a) Teachers are committed to students and their learning; (b) Teachers know the subjects they teach how to teach students the subjects they teach; (c) Teachers are responsible for managing and monitoring student learning; (d) Teachers think systematically about their practice and learn from experience; and (e) Teachers are members of learning committees (“Five Core Propositions,” 2019).
- *National Board (NB)*: The organization that awards certification to teachers who successfully complete the required certification process.
- *National Board Certification (NBC)*: An advanced, voluntary teaching credential that goes beyond a state issued teaching licensure.
- *National Board Certified Teacher (NBCT)*: A teacher who has achieved National Board Certification.
- *Non-National Board Certified Teacher (non-NBCT)*: A teacher who holds a standard state issued teaching license but has not achieved National Board Certification.

- *National Board for Professional Teaching Standards (NBPTS)*: An independent, non-profit organization working to advance skilled teaching for students.
- *Student Achievement*: The learning gains of students determined by state mandated or standardized achievement assessments.
- *Unitary Status*: This is attained when school systems have eliminated the effects of segregation and no longer require court supervision.

Significance of Study

The value of the findings in this study could have state as well as district implications. This research was conducted to provide a means of objectively assessing the impact of the state's and PCSSD's financial commitment to National Board Certification process.

Currently, the Act 1225 of 2017 requires the Arkansas Department of Education to fund half of each candidate's participation fee, and up to three days of leave (\$200 for substitute pay). Due to tiered stipends introduced in 2018, states increased stipends in high poverty districts based on poverty level. Under Senate Bill 555 (2017), nearly half of Arkansas school districts, and over 40% of schools met the criteria for high poverty. According to 2017 data, the State of Arkansas is invested approximately \$14,000,000 dollars annually in bonuses (Office of Educational Policy, 2017).

The PCSSD is composed of 23 schools, and 21 of those schools meet the criteria for high poverty (Pulaski County Special School District, n.d.). These statistics in the PCSSD alone identify the potential for increased funding to cover the increased annual bonus provided to National Board Certified teachers. PCSSD invested over \$700,000

dollars annually in bonuses to NBCTs, and the achievement of African American students was monitored by PCSSD and the State of Arkansas due to the desegregation lawsuit (Pulaski County Special School District, n.d.).

In 1984, Little Rock School District v. Pulaski County Special School District No. 1, was decided. The federal court found the PCSSD failed to establish an integrated school district and committed unconstitutional and racially discriminatory acts that resulted in segregation. The desegregation lawsuit, Little Rock School District et al. v. Pulaski County Special School District et al., was originally filed as an action by the Little School District (LRSD), in response to racial disparities from the PCSSD and North Little Rock School District (NLRSD). PCSSD, LRSD, and NLRSD were placed under court supervision after the courts determined that the school districts were unconstitutionally segregated in 1982. Evidence of segregation were found in twelve areas in the PCSSD (“The Office of Desegregation Monitoring Records,” 2016):

- Assignment of students,
- Advancement placement, gifted and talented, honors,
- Student assignments,
- Discipline
- Multicultural education,
- School facilities,
- Scholarships
- School resources,
- Special education,
- Staff,

- Monitoring, and
- Student achievement

In 1982 twelve areas were identified as “segregated.” As of 2019, four areas are still considered “segregated.” The four areas still under court supervision are facilities, discipline, monitoring, and student achievement. As part of the settlement, the state agreed to subsidize the PCSSD’s efforts to desegregate; however, the funding ended in 2017 (“The Office of Desegregation Records,” 2016).

Since the formation of the National Board, researchers have conducted studies to examine the relationship between National Board Certification and student achievement (Boyd & Reese, 2006; Cantrell, Fullerton, Kane, & Staiger, 2008; Cavalluzzo, 2004; Goldhaber & Anthony, 2004; Harris & Sass, 2009a; Sanders, Ashton, & Wright, 2005; Vandervoort et al., 2004). Many studies indicated that NCBTs outperform non-NBCTs. Goldhaber and Anthony (2007) examined third and fifth grade students’ reading and mathematics scores of NCBCT’s against non-NBCTs in North Carolina. For three years, the researchers found students of NBCTs significantly outscored the students of the non-NBCTs.

Vandervoort et al. (2004) used the Stanford Achievement test ninth edition. It was a norm-referenced test used to examine gain score differences between NBCTs and non-NBCTs in Arizona. The researchers included all NBCTs in third through sixth grades for different annual cohorts. The gain scores were adjusted by co-varying the prior year’s test score from the current year score in reading, mathematics, and language. The study revealed a large majority of comparisons across all the grades favored the NBCTs (with an overall effect size = .12).

A study conducted by researchers at Mississippi State University revealed students in kindergarten and third grade taught by NBCTs significantly outscored students of non-NBCTs on literacy assessment ("Elevating Teachers, Empowering Teachers," 2017). A study by Cowan and Goldhaber (2015) determined NBCTs were more effective than non-NBCTs with similar experience (years taught and degrees attained). The findings of the study revealed students of NBCTs demonstrated an additional 1.5 months of learning, as compared to students of non-NBCTs teachers.

Other studies refuted the impact of NBCT on student achievement. A three-year study by Cantrell et al. (2008) was conducted in the Los Angeles Unified Public Schools that focused on elementary students' reading and math assessments. The research results found no statistically significant difference between NBCTs and non-NBCTs. In a study requested by the National Board for Professional Teaching Standards, similar results were found in two Charlotte-Mecklenburg and Wake School Districts in North Carolina. This study found no positive relationship between the scores of fifth to eighth grade students in both reading and mathematics who were taught by NBCTs (Sanders et al., 2005).

Although research studies tilted to the effectiveness of NBCTs, there was a body of research that contradicted those findings (Sanders et al., 2005; Cantrell & Hughes, 2008; Sanders et al., 2005). This study contributed to the body of knowledge related to the impact of NBCTs on student achievement and possible cost-efficient agents of education reform. The findings could also be beneficial to school administrators in the recruiting, hiring, and teacher assignment process, especially for school administrators in high poverty areas.

Regardless of studies completed in other states, the impact of NBCTs on achievement in the state of Arkansas, specifically the PCSSD, has never been explored; nor has the question of the validity of the financial investment designated for annual bonuses been studied. The Pulaski County Special School District (PCSSD) was selected for this study to inform state desegregation monitors, district administrators, and school administrators of the effects National Board Certified teachers have on overall student achievement, as well as the achievement of African American students.

This study was relevant to PCSSD for the following reasons: (a) student achievement (as it relates to African American students) had not been granted unitary status in the desegregation lawsuit. The achievement gap of African American students has not decreased compared to the achievement of non-African American students; (b) the PCSSD provides an annual bonus to National Board Certified teachers; and (c) the value of National Board Certified teachers as an instructional strategy has not been evaluated in PCSSD.

CHAPTER 2: REVIEW OF THE LITERATURE

The purpose of the literature review is to summarize landmark and current research as it relates to the effectiveness of NBCTs as measured by standardized assessments. The literature review focuses on teacher effectiveness, the history of National Board Certification, the certification process, and the effects of teacher quality.

The Search of Teacher Quality

Progressive education, ideas, and practices utilized to make school more effective can be traced as far back to the sixteenth century. In 1631, Johann Comenius, a Czech pedagogical scholar, published a Latin textbook titled, *The Gates of Languages Unlocked* (Peterson, 2004). Comenius recommended educators teach in the native language of students as a framework of reference to bring meaning to unfamiliar words, and he also encouraged teachers to begin with simple lessons for students to master prior to moving on to more complex material. Comenius also believed in the value of illustrations, specific examples, and simple vocabulary to teach concepts. The teachings of Comenius laid the groundwork for the use of audiovisual aids and media as a teaching tool. He set the stage for the concept of mastery teaching (Peterson, 2004).

The pursuit of teacher quality in the United States (U. S.) can be traced back to educational reformists Horace Mann and Reverend Samuel Hall. Samuel Hall established the first Normal School in America in Vermont in 1823. The curriculum included moral philosophy, mental philosophy, and general criticism. He is credited with writing the first American book on how to teach. Samuel Hall was probably the first teacher to require student compositions, and perhaps the earliest to use blackboards in the classroom ("Samuel Hall," n.d.).

Horace Mann was a visionary in the field of education who advocated advanced training and careful selection as strategies that would improve the quality of teaching (Darling-Hammond, 2010). In the late 1830s, Mann proposed a system of free, universal and non-sectarian schooling known as the Common School, which was the precursor to today's public school. In addition to teaching basic arithmetic and literacy skills, the new schools would instill a common political and social philosophy of republican principals (PBS, n.d.).

The public school education movement to educate all children held a dual purpose. The first was to instruct children with religious teachings. In 1647, Massachusetts passed a law titled, *Deluder Satan Act*, which required towns of a certain size hire a schoolmaster to teach local children. The second motivation for providing public education was for social, economic, democratic, and national reasons. At this point, common or public schools were typically in session a few months of the year, they were poorly attended, and were basically taught by whoever was available (PBS n.d.).

The beginning of the Common School had an impact on teachers as well as the teaching profession. The Common School movement led to an increase in the number of schools across the United States, and the demand for better-educated teachers grew (PBS, .d.). It also led to the formalization of teacher training. In 1832, Massachusetts began its first normal school or teacher college, a school with the purpose of training teachers ("The Albany Normal School," n.d.). Normal schools were expected to set the standard or norm for teaching. These schools were initially one or two-year schools that prepared potential teachers to teach elementary students. During this time, requirements to enter into the teacher profession included persuading a local school board of their character,

and some districts required that teacher candidates pass a general knowledge test (Ravitch, 2003).

Henry Barnard, who assisted Horace Mann in the normal school movement, contributed to the rapid spread of normal schools in the United States in the later part of the 19th century. The normal schools had a strong emphasis on child development and teacher preparation ("Teacher Training," 1994).

In 1834, Pennsylvania required teacher candidates to pass a reading, writing, and arithmetic test. By 1867, most states required teachers to pass a test of basic skills as well as U. S. history, geography, spelling, and grammar tests to acquire a state certificate (Ravitch, 2003). Potential teachers who desired to teach high school students were generally trained in a university setting (Ravitch, 2003). Overtime, these schools took on various forms. In some instances, major cities setup their own normal schools, while some high schools had normal departments within their schools, and some counties established their own normal schools. This type of training provided a laboratory for prospective teachers to practice newly acquired skills ("Teaching timeline," n.d.).

During the late 19th century, the Progressive Education Movement began, which was an American educational reform effort. The teachings of Jean Jacques Rousseau, Johan Pestalozzi, John Dewey, Maria Montessori, and Friedrich Froebel emerged during this time. One of the main goals of the reform movement was to educate the whole child (Devendorf, n.d.).

Education at this time was influenced by the teaching methods of Prussian schools developed by Johann Pestalozzi. In 1801, Johann Pestalozzi published, *How Gertrude Teaches Her Children*, which explained Pestalozzi's educational method. Pestalozzi felt

children should not be given answers but attain answers themselves. Pestalozzi believed in educating the whole child; therefore, he stressed reasoning and self-activity (Soetard, 1994). Pestalozzi contended children should learn through activity, explore their own interests, and draw their own conclusions. In regards to teachers, Pestalozzi thought teachers should take into account the development of the child, and a hands-on teaching approach should be taken (Gazibara, 2013). Pestalozzi's ideas stood in contrast with the methods being used in the United States at that time. In the United States, the most widely used teaching method was rote memorization (Soetard, 1994).

Friedrich Froebel, known as the father of kindergarten, was influenced by Pestalozzi's educational theory. Froebel believed the role of the teacher was not to drill children, but to encourage self-expression through play and group activities (Baidya, Mondal, & Saha, 2015). For Froebel, play facilitated children's process of cultural recapitulation, imitation of adult vocational activities, and socialization. Froebel was convinced that kindergarten's primary focus should be on play—the process by which he believed children expressed their innermost thoughts, needs, and desires (Baidya, Mondal, & Saha, 2015).

In the early 1930s, Lev Vygotsky argued, “Learning is a necessary and universal aspect of the process of developing culturally organized, specifically human psychological function” (as cited in McLeod, 2014, para. 3). His belief was social learning comes before development. According to Vygotsky, learning takes place through the skillful interaction or instructions provided by the teacher (as cited in McLeod, 2014). This learning is then internalized and used to regulate performance.

Vygotsky developed the Zone of Proximal Development (ZPD), which relates to the difference between what a child can learn independently, and what a child can learn from a skilled teacher or partner. The ZPD refers to the area where instruction should be given. Vygotsky also viewed collaboration with peers as an effective method for developing skills and strategies. He proposed teachers use cooperative learning as an instructional strategy (as cited in McLeod, 2014).

Additional classroom applications credited to Vygotsky include “*reciprocal teaching*,” this strategy is used to improve students’ ability to learn from text (McAllum, 2014). This strategy encourages students and teachers to work together in learning key skills including: summarizing, questioning, clarifying, and predicting. The goal is to gradually reduce the role of the teacher overtime.

Jean Piaget was the first psychologist to make a methodical study of cognitive development. In the late 1930s, Piaget argued that children went through stages of cognitive development. As children entered each stage, thoughts become more sophisticated (Ahmad, Hussian, Batool, Sittar, & Malik, 2016). Although Piaget (2016), did not claim a particular stage occurred at a particular age, he did claim the stages occurred in order, and indicated an age range in which the average child would reach each stage:

- Sensorimotor (Birth-2 years): The ability to form a mental representation.
- Preoperational (2-7 years): Children are able to use symbols.
- Concrete operational (7-11 years): Marks the beginning of logical thought.
- Formal operational (11 years and older): Abstract thinking is developed.

Piaget's theory is based on maturation and stages, and readiness is important. Children should not be taught certain concepts until they have reached the appropriate stage of development. Piaget's theory can also be credited by focusing on the process of learning, active learning strategies, using collaboration as a learning tool, and evaluating the level of a child's development when determining appropriate learning tasks (McLeod, 2018).

In the 1960s, Jerome Bruner developed a theory of cognitive growth. He believed learning outcomes did not only include concepts and problem-solving procedures taught by others, but also the ability for children to create problems and determine solve procedures on their own (Ediger, 2012). Unlike Piaget who believed in age related stages of development, Bruner's stages were more integrated. According to McLeod (2008), Bruner's research on the cognitive development of children were characterized by his proposal of three modes of representation:

- Enactive is representation of knowledge through actions,
- Iconic is the visual summarization of images, and
- Symbolic is the use of images and words to describe experiences.

The modes of representation explained the way information and/or knowledge are stored in memory. Bruner's theory of cognitive development contributed to his beliefs regarding learning and education (McLeod, 2008).

Bruner's book, *The Process of Education* was a landmark text that had a direct impact on policy formation in the United States, which influenced teachers and scholars. His view was a child at any age is capable of understanding complex information. He also stressed the importance of information being structured, so that complex ideas should be taught at a more simplified level first. The teaching of concepts should

gradually increase in difficulty. Bruner's role of the teacher was that as a facilitator of the learning process. The teacher was to develop lessons that allowed students to discover relationships between information (Harden & Stamper, 1999). Bruner's beliefs on learning and education included the following:

- Curriculum should promote the development of problem solving skills.
- Curriculum should spiral to allow for the mastery of more complex skills.
- Concepts should be organized and learning should take place through discovery (Harden & Stamper, 1999).

The United States progressive education movement began around 1870. This movement reflected on the philosophy and teaching of many theorists and reformers. The influence on school reform and teaching methodologies such as project-based learning, hands-on learning, whole language, and cooperative learning can all be traced backed to the progressive education movement (Pecore & Bruce, 2013).

A century later, the National Committee on Educational Excellence released the report, *A Nation at Risk: The Imperative for Education Reform* (Gardner, 1983). The committee concluded that knowing more than basic writing, reading, and mathematic skills were necessary to remain a competitor in the world market. Educational reformers surmised that future workers would be required to do more than rote activities; they would be expected to collaborate and problem solve (National Commission on Teaching and America's Future, 2003). The report referenced the state of education as a rising tide of mediocrity. In an *Open Letter to the American People*, the National Commission on Excellence in Education said, "If an unfriendly foreign power had attempted to impose on America the mediocre educational performance that exists today, we might well have

viewed it as an act of war. As it stands, we have allowed this to happen ourselves” (Fiske, 1983, para. 2).

This report was an educational wake-up call that laid the foundation for *A Nation Prepared: Teachers for the Twenty-First Century* in 1986. This groundbreaking report justified the nation’s need for a strong teaching force. It warned “America’s ability to compete in world markets is eroding” (Spring, 2010, para. 3). According to the report, education will not improve until the most qualified people are attracted into teaching and given the training necessary to carry out their jobs with the highest degree of professional skill (Labaree, 1990).

A response of the *A Nation Prepared: Teachers for the Twenty-First Century* was the Carnegie Corporation funding the Carnegie Forum on Education. The Task Force on Teaching as a Profession was created. The task force was charged with examining teaching as a profession and to present its findings as well as policy recommendations in a report to the American people (Carnegie Forum on Education and the Economy, 1986).

The primary goals of the Teaching as a Profession Task Force were to remind Americans of future economic challenges, reinforce education as fundamental to the growth of the economy, and reaffirm the teaching profession as the best hope for establishing new standards of excellence (Carnegie Forum on Education and the Economy, 1986). *A Nation Prepared: Teachers for the Twenty-First Century* outlined the plan that recommended the creation of the National Board of Professional Teaching Standards (“NCEE,” 2018).

In 1985, Albert Shanker, American Federation of Teachers president, first introduced the idea for the National Board. The Board primarily consisted of teachers,

businesses, higher education, state and local agencies. They would award advanced certification for teachers based on the attainment of high standards for what teachers need to know and be able to do. National Board certification would be different from state licensure or certification. A state's license limited teachers to teach within the licensing state and indicated the minimum requirements for licensure were attained. National Certification would be voluntary and based on a more rigorous set of standards based on a set of criteria. In 1987, the recommendation became a reality with the creation of the National Board for Professional Teaching Standards ("Carnegie Results," 2003).

The Importance of Teacher Quality

In 1966, the landmark investigation led by the Office of Education was *The Coleman Report*. The report argued that schools do not matter, but families and peers can affect the learning process (Coleman, 1968).

Hanushek's (2002) research indicated quality differences in teachers' impact on student performance, and teacher quality is key in improving schools. He concluded teacher quality is by far the most important factor in raising student achievement, and that teacher quality is not closely related to such factors as teacher salaries, educational background, or experience. In considering teacher policies, test scores should be one metric by which the quality of teachers should be measured. Hanushek's methodology underlined the value-added assessment model of teacher effectiveness. The value-added assessment model uses statistical analysis of student achievement data to evaluate teacher performance (Hanushek, 2002).

The Tennessee Value-Added Assessment System found differential teacher effectiveness was a strong determinant of differences in student learning (Hanushek,

Kain, O'Brien, & Rivkin, 2005). The Tennessee Value-Added Research (Wright, Horn, & Sanders, 1997), focused on students whose teachers produced high achievement as opposed to those teachers whose students produced low achievement scores. Wright, et al. (1997) found those third grade students who were placed with high performing teachers three years in a row scored on average at the 96th percentile on Tennessee's state mathematics assessment at the end of their fifth grade year. Other third grade students, with comparable achievement histories, who were placed with low performing teachers three years in a row scored at the 44th percentile on the same state mathematics test. The researchers concluded the following:

The results of this study well document that the most important factor-affecting student learning is the teacher. In addition, the results show wide variation in effectiveness among teachers. The immediate and clear implication of this finding is that seemingly more can be done to improve education by improving the effectiveness of teachers than by any other single factor. Effective teachers appear to be effective with students of all achievement levels, regardless of the level of heterogeneity in their classrooms. (Wright, Horn, & Sanders, 1997b, para.4).

A study in Dallas, Texas (Sanders & Rivers, 1996) revealed similar results. When first grade students were placed with high performing teachers three years in a row their average performance on the math section of the Iowa Test of Basic Skills increased from the 63rd percentile to the 87th percentile. Their peers, who were not placed with high-performing teachers, experienced a performance decrease from the 58th percentile to the 40th percentile. In these studies, teacher effectiveness outweighed the effects of differences in class size and heterogeneity (Sanders & Rivers, 1996).

A strong belief among policymakers, public funding agencies, and private funding agencies is test scores are directly related to quality teaching (Kupermintz, Shepard, & Linn, 2001). The U.S. Department of Education stated teacher quality may be directly aligned to increase student achievement gaps, and the teacher is key to improving student achievement and closing the achievement gaps (Goe and Stickler, 2008). In the last quarter century, more than 25 states have passed legislation to improve teacher recruitment, education, certification, or professional development (Darling-Hammond, 1997).

Several studies explored the characteristics related to teacher quality and how those characteristics impact teacher effectiveness (Ding & Sherman, 2006; Goldhaber & Anthony, 2004; Harris & Sass, 2009b). The focus of these studies generated some debate regarding teacher quality.

Goldhaber and Brewer (1997) sampled data from National Educational Longitudinal Study of 1988 (NELS:88). The sample consisted of 5,113 mathematics students, 4,347 science students, 6,196 English students, and 2,943 history students, all of which were tenth graders. Data generated from a national survey of about 24,000 eighth grade students who were tested in the spring of 1988 and about 18,000 were retested two years later as tenth graders were used for the study. The NELS:88 data was used because it was nationally representative and contained a comprehensive set of educational variables. Goldhaber and Brewer concluded that a teacher's advanced degree is not commonly related to increased student learning from eighth to tenth grade, but having an advanced degree in math and science for math and science teachers seemed to positively impact student achievement. Due to mathematics and science degrees found not to

influence student outcomes in English and history, the researchers believed that these results suggested subject-specific training rather than teacher ability that leads to these findings. This is important because it suggested that student achievement in technical subjects could be improved by requiring advanced training.

Goe and Strickler (2008) investigated teacher quality by focusing on four categories: (a) teacher qualifications, (b) teacher characteristics, (c) teacher practices, and (d) teacher effectiveness. Goe and Strickler arrived at their conclusions on teacher effectiveness based on their meta-analysis of twenty-two studies. A sampling of high quality studies cited by Goe and Strickler include the following:

Milanowski (2004) analyzed the relationship between teacher evaluation scores and student achievement. The results indicated a positive link between teacher performance, as measured by Danielson's teacher evaluation system, and student achievement. (as cited in Goe, 2007).

A Texas study completed by Rivkin, Hanushek, and Kain (2005) investigated the effect teachers have on student achievement. The researchers found that while observable teacher characteristics have a significant impact on student achievement gains, those unobservable characteristics lead to greater teacher effectiveness (as cited in Goe, 2007).

Betts, Zau, and Rice (2003) used teachers' qualifications as teacher quality variables, including experience, level of education, credentials, and subject matter knowledge. They found the connections among these qualifications and student achievement varied significantly across grades and subjects. The researchers concluded, students of emergency credential teacher or a less experienced teacher as compared to a

fully credentialed teacher with at least 10 years of teaching experience achieved higher gains in both mathematics and reading (as cited in Goe, 2007).

To determine whether teacher certification made a difference in student outcomes between certified and non-certified teachers, Darling-Hammond, Holtzman, Gatlin, and Heilig (2005) studied over 4,000 fourth and fifth grade teachers in Houston over a span of four years. They concluded that uncertified teachers, including Teach for America teachers, had negative effects on student achievement gains. However, the Researchers also concluded that Teach for America teachers who attained full teacher certification were about as effective as other fully certified teachers (as cited in Goe, 2007).

Goldhaber and Brewer (1999) examined teacher certification status and subject major and their relationships to student achievement using data from the National Educational Longitudinal Study of 1988. They found that teachers who hold a degree in mathematics or mathematics education have positive effects on student test scores. Additionally, the researchers found students of teachers who hold any type of mathematics-outperformed students whose teachers had no certification or who were certified in a subject other than mathematics. (as cited in Goe, 2007).

Jacob and Lefgren (2005) compared subjective principal evaluations of 202 teachers. They concluded principals' evaluations of teachers predict future student achievement significantly better than teacher experience or education. The researchers also noted principals are quite successful in identifying teachers who produce the largest and smallest achievement gains but are not as astute in identifying teachers who fall in the middle (as cited in Goe, 2007).

Goe and Strickler's (2008) synthesis of research suggested teacher quality cannot be determined by paper qualifications such as how well they performed on a test, but it is what teachers know and do that contributes to teacher quality.

Vandervoort et al. (2004) analyzed four years of Stanford Achievement Test (SAT) reading, math, and language arts data in third through sixth grades from 35 classrooms of NBC teachers and their non-NBC counterparts in 14 Arizona schools. The results revealed, in almost 75% of the comparisons made, students taught by NBC teachers outperformed students in classrooms of non-NBC teachers. The gains for students with NBC teachers averaged over one month greater than the students of non-NBC teachers. "Students of NBCTs averaged 2.45 points in higher gains in scaled scores on the Stanford 9 achievement test per year than students of non NBCTs" (Vandervoort et al., 2004, p. 34). The results of this study provided justification for policies that supported the National Board Certification process as a method to improve teacher quality and demonstrated that NBC teachers have a more favorable impact on student achievement than non-NBC teachers (Vandervoort et al., 2004). The National Board for Professional Teaching Standards attempted to bring clarity to the question of what makes quality teachers.

National Board for Professional Teaching Standards

The National Board for Professional Teaching Standards (NBPTS) was referenced as the *gold standard* in teacher certification ("Exceptional Needs Standards," 2016). The NBPTS is an independent, non-profit organization working to advance skilled teaching for students. The mission of NBPTS is to improve teacher quality and student learning by:

- Maintaining high and rigorous standards for what accomplished teachers should know and do;
- Providing a national voluntary system certifying teachers who meet these standards;
- Advocating related education reforms to integrate National Board Certification in American education and to capitalize on the expertise of National Board Certified Teachers. (“Mission and History,” 2019)

In 1991, the National Board issued its initial policy statement titled, *Toward High and Rigorous Standards for the Teaching Profession: Initial Policies and Perspectives of the National Board for Professional Teaching Standards*. This statement identified five core propositions that described what teachers should know and be able to do to positively impact student learning. The Five Core Propositions identified by the board were:

- Teachers are committed to students and their learning.
- Teachers know the subjects they teach and how to teach students the subjects they teach.
- Teachers are responsible for managing and monitoring student learning.
- Teachers think systematically about their practice and learn from experience.
- Teachers are members of learning communities. (“National Board Standards,” 2019).

Using the five core propositions as a foundation, the National Board focused on developing standards for each certification field.

The first core proposition supports the belief that effective teachers are committed to their students and their learning. The needs of the whole child are addressed through instructional practices and utilized based on individual student needs. “The teacher practices equity in instruction by recognizing individual differences through learning styles, cultural differences, as well as differences in family structures” (Schulman, 2016, para. 1). This proposition is concerned with developing character, motivation, and civic responsibility (Schulman, 2016).

The second core proposition states, NBCTs have mastery over the subjects they teach and how to teach students those subjects (Schulman, 2016). This proposition explains NBCTs have the skills and mastery required to recognize and address learning gaps in the students they teach. NBCTs employ diverse instructional strategies necessary to teach for deep understanding and application (Schulman, 2016).

The third core proposition focuses on teaching. NBCTs use a variety of instructional techniques to keep students focused, motivated, and engaged in the learning (Schulman, 2016). Learning is continuously monitored and teaching adjustments are made when necessary. NBCTs use multiple measures for assessing student progress and they effectively report student performance to parents (Schulman, 2016).

The fourth core proposition supports the idea of being a life-long learner (Schulman, 2016). NBCTs continue to read, question, and attempt new strategies and/or methods. These teachers stay abreast of current research and instructional practices. A key characteristic of this core proposition is self-reflection. NBCTs analyze their practices, expand their craft knowledge, and incorporate newly acquired skills and findings with the goal of improving instruction (Schulman, 2016).

The fifth core proposition purports the need for professional collaboration to advance student learning (Schulman, 2016). NBCTs build partnerships with families, businesses, and community leaders to improve student achievement. These teachers engage with other professionals to enhance curriculum development, educational policies, curriculum development, and staff development. NBCTs are expected to participate in monitoring school progress as well as the allocation of resources necessary to meet local and state educational goals (Schulman, 2016).

These core propositions are identified as necessary for meeting the goal of accomplished teaching. These core propositions provide the framework for the Board certification journey. The National Board Certification recognizes teachers who met the standards through a performance-based, peer reviewed series of assessment components. According to a congressional mandated report, “Advanced certification through the National Board for Professional Teaching Standards is an effective way to identify highly skilled teachers” (The National Research Council, 2009, para.1). Humprey et al. (2005) called National Board Certification the centerpiece of a national effort to boost the profile of high quality teaching.

Pathway to National Board Certification

National Board candidates must have a bachelor’s degree, three years of teaching experience, and a state issued teaching license. Initially, teachers go through a standards-based evidence process demonstrating the positive impact they have on student learning in order to achieve National Board Certification. This is evidenced through the understanding of students, content knowledge, pedagogical practice, ongoing reflection, and participation in learning communities (“Teacher Career Continuum,” 2019).

In 2001, the assessment process was streamlined. The four classroom-based entries were cut to three and the two documented accomplishments entries were combined into one. In addition, the 90-minute assessment exercises (six hours total) were shortened to six 30-minute exercises (three hours total) with a stronger focus on content (Berry, 2007). Currently, there are 24 areas for Board certification. The areas include generalist and subject areas certifications that range from early childhood through young adulthood. Completing the process requires a 200 to 500-hour commitment from participants (Humprey et al., 2005). The process of achieving National Board Certified has been described as painstaking and challenging (Park & Oliver, 2008).

Candidates are required to take a content knowledge exam, submit a teaching portfolio inclusive of work samples, videotapes, and reflective analysis of their teaching. The reflective analysis assess why their students meet, or do not meet standards. Candidates must also document their educational accomplishments and offer evidence of how their efforts improve student learning. Finally, candidates demonstrate student learning that encompasses four components. The four components are inclusive of (a) content knowledge assessed through computer based assessment, (b) differentiation of instruction, (c) teaching practice and learning environment, and (d) effective and reflective practitioner ("Guide to National Board Certification," 2017).

Portfolios are submitted to the National Board and scored by a panel of 12 Nationally Board Certified teachers who have already demonstrated knowledge and understanding of NBPTS ("Guide to National Board Certification," 2017). The passing rate for the first attempt at Board Certification is 40%, and that figure rises to 70% by the third attempt (Berliner, 1986). Candidates who are not successful after the first attempt

may bank their scores for up to three years. After three years of unsuccessful attempts, the candidate must start the process over.

Candidate Support in Arkansas

Through Act 1060 of 2001, Arkansas's legislature authorizes and funds the Arkansas Department of Education (ADE) to provide support programs for public school teachers, media specialists, and school counselors pursuing National Board Certification. In addition several universities provide support for National Board Certification.

The University of Central Arkansas (UCA) is a *National Board for Professional Teaching Standards Candidate Support Site* for teachers supported by ADE (UCA Support Site, 2019). The primary goal of the support site is to coach and provide support for candidates throughout the National Board Certification process. UCA also offers a three-hour, pre-candidacy graduate course ("UCA National Board," 2019).

Harding University is also an ADE approved support site. Harding's support courses can be taken as a part of their approved Master's programs. Harding's first course highlights the NBPTS five core propositions including NBPTS certificate specific standards, mission of NBPTS, and attributes of exemplary teachers. The second course focuses on NBPTS and the five core propositions including knowledge, skills, dispositions and commitment of National Board teachers ("Harding National Board Statistics," n.d.).

The University of Arkansas at Little Rock (UALR) offers a five-week online graduate course, Pre-Candidacy for National Board for Professional Teaching Standards. The university also offers application writing workshops and National Board candidate

support meetings. UALR is one of many *Jump Start* sites approved by National Education Association (NEA). *Jump Start* provides early support to those who have registered as candidates with the National Board and have selected their certificate area. *Jump Start* is the first piece in a continuum of professional learning, and one that ideally includes yearlong candidate support. *Jump Start* is candidate-centered, builds a professional learning community, and focuses on the skills, knowledge, dispositions, and strategies needed to be successful in the National Board Certification process (“NEA’s National Board Jump Start,” n.d.).

Evolution of Arkansas’ Board Certified Teacher Incentives

Over the last eleven years, Arkansas experienced an evolution of incentives associated with National Board Certification. In 1997, Act 1225 of 1997 was passed during the regular session of the 81st General Assembly. Representative Choate and Senator Argue sponsored the first act providing financial incentives for National Board Certification. Act 1225 of 1997 required the Department of Education to pay half of the National Board participation fee and up to three days of approved leave (\$200 for substitute teacher pay) for teachers participating in the program. Teachers who received money for participation were expected to complete the certification process, or teach in an Arkansas school for two continuous years. If the expectations were not met, participants were required to repay a portion of the participation fee paid by the state (An Act to Provide Financial Incentives for National Board Certification of Teachers; and For Other Purposes, 1997).

During Arkansas’s regular session of the 82nd General Assembly in 1999, ACT 1225 of 1997 was amended to further enhance the incentives given to encourage teacher

participation in NBPTS certification. ACT 58 of 1999 added up to three days of approved paid leave (for substitute teacher pay) for teachers participating in the NTBS program, and an annual bonus of \$2,000 for every year of the lifetime of the National Board certificate. ACT 58 of 1999 required teachers to have at least three years of teaching experience in Arkansas public schools. If the expectations were not met, participants were required to repay a portion of the participation fee paid by the state (An ACT Amending Arkansas Code Annotated 6-17-413 to Encourage Teachers to Participate in and Complete the National Board for Professional Teaching Standards (NBTS) Certification Process by Authorizing the Department of Education to Pay Full Tuition and Incentive Bonuses; and for Other Purposes, 1999).

In 2009, the 87th General Assembly, Act 1449 of 2009 sponsored by Representative Roebuck, and Senator Jeffress further expanded eligibility for NBPTS bonuses. Act 1449 of 2009 allowed teachers, employed in an accredited teacher preparation program at a state-sponsored college of higher education and possessing National Board certificate, to be eligible for the annual \$5,000 bonus. However, there is a provision in the Act 1449 of 2009, which explained that these funds were granted if funds were available after disbursing bonuses to public school teachers and administrators (An Act to Ensure Individual with National Board for Professional Teaching Standards Certification are Eligible for Payments while They Contribute to the Success of the Arkansas Public School System; and for Other Purposes, 2009).

Incentives provided for NTBS participation continued to evolve with Act 2010 of 2001, which increased the annual bonus to \$3,000 and allowed school administrators (principals and assistant principals), who had been National Board Certified to receive

the annual bonus. During the 84th General Assembly in 2003, Arkansas Code 6-17-413 was amended once again. Act 1803 of 2004 increased the annual bonus to \$4,000 in 2004 and \$5,000 for 2005 and beyond (Office of Educational Policy, 2017).

Senator G. Jeffress sponsored Act 1326 of 2009. This Act required members of the Arkansas Retirement System to withhold employee contributions from the incentive bonus and send the employee contributions to the retirement system for credit as part of the member's salary (An Act to Include the National Board Certification Bonuses as Salary for the Purposes of Retirement Benefits Under the Arkansas Teacher Retirement System, and for Other Purposes, 2009).

The most recent changes occurred during the 91st General Assembly in 2017. Senator Alan Clark sponsored Senate Bill 555 (2017), which became Act 937 of 2017. Act 937 of 2017 introduced a tiered approach to NBC bonuses. Bonuses under this Act were differentiated based on poverty status. The goal was to provide more of an incentive for NBC to work with the students most-in-need of effective instruction. This change only applies to teachers receiving Board certification after January 2018. Teachers who are currently NBC will not be affected by the change; they will continue to receive the annual bonus of \$5,000 per year for the remainder of the ten-year time period. Teachers working in high-poverty schools have the option to receive bonuses based on the tiered system.

Arkansas' Funding for National Board Certified Teachers

Arkansas is one of twenty-one states across the country investing millions in an effort to produce NBCTs. Since the first cohort of NBCTs in 1994, incentives have been offered to promote board certification (Harris & Sass, 2009). About 112,000 of the

nation's 3.5 million teachers were board certified (Will, 2017). Arkansas began supporting NBCTs in 1997 with the passing of ACT 1225 of 1997. The Act 1225 of 1997 required the Arkansas Department of Education to pay half the participation fee and provide up to three days of substitute pay for teachers going through the certification process (Office of Educational Policy, 2017). Since the inception of ACT 1225 of 1997, it has evolved to provide additional support for candidates and NBCTs.

Teachers employed in a high poverty school, in a non-high poverty school district receive an annual bonus of five thousand dollars (\$5,000) for five years. Teachers in high-poverty schools, in high-poverty school districts would receive an annual bonus of ten thousand dollars (\$10,000) for a period of 10 years (S. 555, 2017). Nearly half of Arkansas' school districts, and over 40% of schools met the criteria for "high-poverty" under Senate Bill 555 (2017). Over 40% of Arkansas' students attend these schools that often experience low performance and student growth (Office of Educational Policy, 2017). Currently, 30% of Arkansas' NBC teachers work in high-poverty schools (Office of Educational Policy, 2017)

Over 90% of the Arkansas NBCs received certification after 2005 when the incentive increased to five thousand (\$5,000) annually (Office of Educational Policy, 2017). As of 2018, each cohort cost the state five hundred thousand dollars (\$500,000) annually, or five million dollars (\$5,000,000) over 10 years. Under the new structure of Senate Bill 555 (2017), each cohort would cost the Arkansas \$3,362,500, over \$1.6 million less than under the current bonus structure.

National Board Certified Teachers in Arkansas

The most recent data retrieved from the National Board for Professional Teaching Standards indicated Arkansas ranked 11th in the nation with 3,907 National Board Certified teachers, and an additional 726 candidates pursuing National Board Certification in 2018. Over the last four years, trend data showed approximately one hundred teachers a year attain Board certification.

Of all states, Arkansas has one of the highest percentages of National Board Certified teachers with 7% of the public school teaching force. Regionally, NBC teachers are more likely to work in the Northwest and Central regions of the state. More than 8% of the teachers in these regions are Board certified, while only 3% of teachers in the southern regions are Board-certified (Office of Educational Policy, 2017). The majority of NBC teachers in Arkansas work with students who are not economically disadvantaged (70% of students are eligible for free/reduced lunch). The Office of Educational Policy broke down the percentage of Arkansas Board Certified teachers by district and school poverty:

- 57% of NBC teachers work in non-high poverty district and school,
- 23% of NBC teachers work in high-poverty district and school,
- 9% of NBC teachers work in high-poverty district, non-high-poverty school, and
- 8% of NBC teachers work in non-high poverty district, high-poverty school.

(Office of Educational Policy, 2017)

Data revealed NBC teachers were far more likely to work with the most-advantaged students: 22% of NBC served students in the most advantaged 10% of Arkansas districts,

while only 2% of NBC teachers worked in the poorest 10% of districts (Office of Educational Policy, 2017).

As of 2018, the Pulaski County Special School District employed over 200 hundred NBC teachers. The school district is not considered high poverty, and the majority of the NBC teachers in PCSSD do not work in high poverty schools.

Accountability for Academic Achievement

Mandatory annual assessments in mathematics and literacy are a result of the No Child Left Behind Act (NCLB) of 2001. NCLB was a renovation of the 1965 Elementary and Secondary Act, which required standardized testing for students in grades third through eighth, and one time in high school (Office for Education Policy, 2015).

Standardized testing is used for assessing achievement; and more recently, the measuring of academic growth is very common. Among the most recognized assessments used from elementary through secondary schools are the Iowa Test of Basic Skills (ITBS), Stanford Achievement Tests (SAT), National Assessment of Educational Progress (NAEP), and the ACT Aspire. These tests have been used to: (a) assess student performance, (b) assess school performance, (c) inform curriculum and instruction decisions, and (d) predict future success of students (“Report Card,” 2016).

President Obama signed the Every Student Succeeds Act (ESSA) into law in 2015. Under ESSA, states were allowed to decide on educational plans under the framework of the federal government. The law requires states to test students’ third-eighth grades annually in reading and once in high school. States are also required to test students in science once in elementary school, once in middle school, and once in high school (Arkansas Department of Education, 2017).

ESSA affords states the freedom to select their own state test or a nationally recognized test such as the SAT or ACT. States are also required to measure the number of students on grade level for both reading and math, and how many students are demonstrating growth. Each state must set goals for increasing the percentage of students who reach state standards in reading and math. States must also rate schools based on how they perform on goals and indicators such as student achievement and growth (Arkansas Department of Education, 2017). Arkansas law requires that all public school students participate in statewide educational assessments. The Arkansas State Board of Education adopted the ACT Aspire summative assessment for students in third through twelfth grades. Students are assessed in English, math, science, and reading (Arkansas Department of Education, n.d.).

In the age of accountability, states rely on high-stakes testing as a tool for evaluating student achievement and growth. Darling-Hammond (1999) provided a list of policies states have implemented to increase the quality of their teaching workforce. Darling-Hammond (1999) found a positive correlation between the increase of teacher quality and student achievement when analyzing standardized test scores.

National Board Certification Impact

A number of studies from several states researched the positive impact of NBC on student performance and achievement (Cantrell et al., 2008; Cavalluzzo, 2004; Goldhaber & Anthony, 2007; Harris & Sass, 2009a; Vandevoort et al., 2004). Berg (2003) found that NBCTs were well trained, better for students, and their research-based practices increased the quality of learning experiences for children. Clotfelter et al.'s (2007) findings revealed students of NBCTs outperformed students of non-NBCTs on

achievement tests. Their findings also demonstrated a greater effect on minority students. Additional studies found a positive impact of NBC teachers on student achievement (Goldhaber & Anthony, 2007; Humprey et al., 2005; Vandevoot et al., 2004).

A large study completed by Cavalluzzo (2004) examined almost 108,000 student records from Miami-Dade County Public Schools, a large urban school district. His research focused on ninth and tenth grade mathematics. The researchers found students who had a NBC teacher made the greatest gains, surpassing gains of non-NBC teachers who had failed or were never involved in the certification process (Cavalluzzo, 2004).

After analyzing four years of data from 35 classrooms, Vandervoort et al. (2004) reported students of Board Certified teachers performed much higher than a matched sample of students taught by non-National Board Certified teachers. In three fourths of the 48 comparisons, the students of National Board Certified teachers outperformed the students of non-NBCTs. Vandevoot et al. (2004) concluded that National Board Certified teachers were able to complete approximately 25 more school days of instruction in the 180-day school year than non NBC teachers.

Goldhaber and Anthony (2007) analyzed 600,000 student observations and 32,000 teacher observations in North Carolina. Over a three-year period the researchers studied the effect of NBCTs on student achievement. The study controlled gender, ethnicity, free and/or reduced lunch status, limited English proficiency and disability status. Goldhaber and Anthony's (2007) findings indicated larger gains for reading achievement in the NBCTs group than the non-NBCTs group.

Clotfelter et al. (2007) also revealed greater achievement of minority and low-income students. Additionally, students of NBCTs demonstrated stronger writing

abilities, deeper comprehension, and were more capable of abstract thinking in comparison to students who were not taught by NBCTs (Gordan, Colby, & Wung, 2005).

A study of the literature on the effect NBCTs had on student achievement rendered mixed results. Although most of the reviewed literature indicated positive relationships between NBC and student achievement, some studies revealed mixed results among different student populations and grade levels. Table 1 displays a summary of reviewed studies.

Table 1

Review of Studies on NBCTs and Student Achievement

Study	Year	State	Area(s)	Findings
Cowan & Goldwater	2016	Washington	Math & Reading	NBPTS-certified teachers 0.01-0.05 student standard deviations more effective than non-NBCTs.
Vandevoort et al.	2004	Arizona	Reading, Math, & Language Arts (grades 3-6)	Students of NBCTs surpassed students in classrooms of non-NBCTs in three-quarters of comparisons. One third were statistically significant.
Harris & Sass	2009	Florida	Not identified	Student test scores from both low and high stakes tests of NBCTs demonstrated a positive effect on achievement in a few cases.
Goldhaber & Anthony	2007	Tennessee	Reading & Math	Results not statistically significant. NBCTs were more effective in reading than math.

Study	Year	State	Area(s)	Findings
“The Impact of National Board”	2017	Mississippi	Kindergarten	Kindergarten students taught by NBCTs are 31% more likely to demonstrate proficiency on reading readiness assessments than non-NBCTs.
Cantrell et al.	2003-2005	California	2nd-5th graders	No significantly difference between the math and language arts test scores of students assigned to NBCTs.
Sanders et al.	2005	North Carolina	4th-8th graders	Students of NBCTs did not have better rates of academic progress.
Goldhaber & Anthony	2004	North Carolina	3rd-5th graders Reading and Math	Students of NBCTs significantly outperformed students of non-NBCTs on the state assessment for the three years data was collected.
Clotfelter et al.	2007	Florida	Elementary reading & math	NBCTs more effective than non-NBCTs
Boyd & Reese	2004	Tennessee	3rd-12th grade reading	No statistically significant differences between NBCTs and non-NBCTs.

Note. Review of NBCT’s Studies

The Critics

Multiple studies provided evidence that the National Board for Professional Teaching Standards (NBPTS) reached the goal of identifying accomplished teachers through Board certification, and these teachers were having a positive impact on student achievement (Berliner, 1986; Cavalluzzo, 2004; Goldhaber & Anthony, 2007; Humprey

et al., 2005). Other studies did not conclusively link achievement to NBCTs. Stephens (2003) compared over 800 student achievement scores in North Carolina, and found 87% of the comparisons did not demonstrate a statistically significant difference between NBCTs and their counterparts. A second study completed by Stephens (2003) analyzed 154 students of NBCTs and 660 students of non-NBCTs. Variables controlled by Stephens included teachers' level of experience and the poverty level of the school. Of these comparisons, 87% resulted in no significant difference in achievement between the two groups of students (Stephens 2003).

The only study to receive the seal of approval from the U. S. Department of Education's *What Works Clearinghouse* was completed by Cantrell and Hughes (2008). The study was completed in California in the Los Angeles Unified School District. The National Board Certified teachers were matched with similar teachers at the same grade level in the same school who were not National Board Certified. Math and language arts standardized test score results indicated no significant difference between the test scores of National Board Certified teachers and non-National Board Certified teachers. Students of teachers who had obtained National Board Certification had significantly lower test scores than students of the non-National Board Certified teachers (Cantrell & Hughes, 2008).

Summary

Educational reform in the United States can be traced back to the 19th century with Horace Mann who advocated advanced teacher training. The 21st century's educational reform efforts continued with *A Nation at Risk* (1985), *A Nation Prepared* (1986) and presently the Every Student Succeeds Act (ESSA). A common premise of

each reform effort is the push for teacher quality. During in the late 1980s and early 1990s, North Carolina and Connecticut undertook aggressive efforts to improve teacher quality. The efforts were followed by Arkansas, West Virginia, and Kentucky. Reform efforts included recognizing teachers who attained National Board Certification status. Research continued to indicate that teacher quality was the most significant factor in predicting student outcomes (Goldhaber, 2002).

However, the research failed to reach consensus on the evidence of what makes a quality teacher. The literature review revealed a growing body of studies that indicated NBCTs had a positive effect on student achievement (Goldhaber & Anthony, 2007; Humprey et al., 2005; Vandevoort et al. 2004), with an even greater impact on the achievement of minority students. A 2007 study completed by Goldhaber and Anthony (2007) found that elementary students who had NBCTs showed significantly higher reading and math achievement scores than students who did not have NBCT certification. A more recent study found that NBCTs in middle school had a greater impact on students' math and reading achievement than non-NBCTs with similar teaching experience (Cowan & Goldhaber, 2016).

Those who were critical of the NBC process contended that it is primarily an insider's organization because the NBPTS monitors and certifies (Starnes, 2013). Due to the lack of independence, the process is called into question by some. Others argue that the certification process is more of an evaluation of a teacher's ability to write about his or her teaching, and the process of certification is subjective (Richards, 2004).

There were some individuals who asserted that teacher unions control the certification process and use it as leverage to control teaching and teachers. Researchers

also criticized studies due to methodology, sample size, and resulting conclusions (Cavalluzzo, 2004; Hakel et al., 2008; Vandervoort et al. 2004). Although the bulk of research does support effectiveness of NBCTs, other factors such as teacher quality, experience, grade level, groups of teachers, and even assessment type have called many results into question (“National Board Certification: Impact,” 2010).

CHAPTER 3: METHODOLOGY

Participants

The Pulaski County Special School district (PCSSD) was the school district chosen for this study. The PCSSD is one of four school districts in central Arkansas, and the sixth-largest school district in the state. This district was selected for the unique characteristics of being a defendant in the thirty-five-year-old desegregation lawsuit, recently being released by the state from the designation of fiscal distress, and its inability to decrease the achievement gap between black and non-black students. Additionally, the ease of obtaining necessary data, the size of the school district, and the number of NBC teachers employed contributed to the study selection.

The target research sample was National Board Certified teachers who taught third grade in the PCSSD. Three National Board Certified third grade teachers were selected and cross-matched with three non-National Board Certified teachers with similar years of teaching experience in the PCSSD. With the selection of three NBC teachers and three non-National Board Certified teachers, the researcher's study analyzed results of 122 students.

Research Design

This causal-comparative study sought to determine the effect National Board Certified teachers had on the reading and math scores of third graders. The scores were generated by the ACT Aspire exam. A comparison of these two scores were made between the students taught by National Board Certified teachers and students taught by non-National Board Certified teachers. This study sought to determine the effect of National Board Certified teachers on the reading and math scores of African American

third graders. As previously discussed, the reading and math scores of third grade African American students were compared between those students taught by National Board Certified teachers, and those students taught by non-National Board Certified teachers.

Archival ACT Aspire data was collected. ACT Aspire reading and mathematics scores of students taught by National Board Certified teachers and scores of students who were taught by non-National Board Certified teachers were collected from the PCSSD. ACT Aspire data were collected from the 2018 spring assessment administration period. The researcher focused the study on third grade because these students were taught in self-contained classrooms and had the same teacher of record for both mathematics and reading.

Additional teacher data were collected including years taught, degree levels, race, and gender of the teacher. Due to the PCSSD still being under court ordered desegregation, all races were reported as “black” or “non-black.” For this study, the race of each student and teacher was reported in the same manner.

Independent *t*-tests were employed to analyze the mean scores between the National Board Certified groups, and the non-National Board Certified groups to determine if there were statistically significant differences between the two groups. For this study, statistical significance was established at an alpha level of $p < .05$ cast against a two-tailed test to accept or reject the research hypotheses. To distinguish between NBC teacher and non-NBC teachers, NBC teachers were coded a one (1) for identification purposes; those teachers who are non-NBC were coded with a zero (0).

This study focused on third grade teachers in the PCSSD. ACT Aspire data were archived in the Learning Services at the Pulaski County Special School District. The superintendent of the PCSSD released the data needed to complete the study upon request.

Instrumentation

Arkansas law requires all public school students to participate in a statewide educational assessment. The Arkansas State Board of Education adopted the ACT Aspire summative assessment. The first administration of this assessment was in the spring of 2016. This assessment is used for all students in grades third through tenth.

ACT Aspire is a summative assessment covering five content areas of reading, English, mathematics, science, and writing. The purpose of the ACT Aspire is to measure student achievement and progress toward college and career readiness. This test can be delivered as a paper-pencil assessment or via computer administration.

ACT Aspire utilizes multiple choice items (MC) that require the examinee to select a single response; constructed response tasks (CR) that require examinees to generate their own response; and technology enhanced (TE) items and tasks designed to incorporate computer interfaces that ask questions and pose scenarios that are not possible with the paper-based assessment (ACT Aspire, 2017).

The ACT Aspire scale was developed under the framework of the unidimensional Item Response Theory (IRT) models, which involves statistical models that can be used to obtain an estimate of scale score reliabilities and conditional standard errors of measurement (CSEMs) (ACT Aspire, 2017).

Reliability coefficients were estimates of the consistency of test scores. The coefficients typically ranged from zero to one, with values near one indicating greater consistency, and those near zero indicating little or no consistency. The standard error of measurement (*SEM*) is closely related to test reliability. The *SEM* summarized the amount of error or inconsistency in scores on a test (ACT Aspire, 2017). Derived from the spring 2014 operational data, the scale score reliabilities and standard error of measurement (*SEM*) for mathematics and reading at the third grade level are as follows:

- Mathematics: (reliability = .80); (*SEM* = 1.82)
- Reading: (reliability = .85); (*SEM* = 2.04)

Scale score reliabilities are useful because they are an estimate of the precision of the scores reported to students.

Validity support for ACT Aspire is organized into six areas including content-oriented evidence, cognitive processes, internal structure, relationships to other constructs, relationships with criteria, and consequences (ACT Aspire, 2017). The ACT Aspire is relatively new; therefore, the body of evidence is still being established.

Data Collection and Analysis

The researcher obtained permission from the Arkansas Tech University (ATU) Institutional Review Board (IRB) to collect archived student and teacher data. Permission from the PCSSD's Board of Education was requested and granted to gain permission to conduct the study and release the archived data. The PCSSD's Human Resources provided a potential list of National Board Certified teachers along with the grades they taught to use for the study.

The PCSSD's Human Resource office provided a list of (with names redacted) third grade National Board Certified teachers. The additional demographic data provided included the race of each teacher (reported as black or non-black), number of years teaching experience (reported in ranges), degrees attained (reported in steps), and year of National Board Certification. A second list was provided which included non-National Board Certified third grade teachers with similar demographics such as number of years teaching experience and degrees attained.

Staff members from the PCSSD's Learning Services and Director of Special Programs provided 2018 Act Aspire reading and math scores for the students of National Board Certified teachers and the students of non- National Board Certified teachers. Along with the scores of each student, the race (reported as black or non-black) of each student were also collected.

National Board Certified teachers were matched with similar non-National Board Certified teachers for comparison. Teachers were matched by educational degrees attained and their years of teaching experience.

Once the data were collected for students and teachers for organizational purposes, they were grouped as follows:

1. Third grade reading NBC teacher, third grade reading non-NBC teacher,
2. Third grade mathematics NBC teacher, third grade mathematics non-NBC teacher,
3. Third grade black students' reading NBC teacher, third grade non-black students' reading non-NBC teacher,

4. Third grade black students' mathematics NBC teacher, third grade non-black students' mathematics non-NBC teacher

The organized data was coded as indicated below for teachers:

1. NBC teachers were coded "1" and non-NBC teachers were coded "0".
2. The number of years of teaching experience was coded for each teacher.
3. The number of years the teacher held NBC status was coded "1"; number of years for non-NBC teachers was coded "0".
4. Race for each teacher was coded "1" for black and "0" for non-black.

Student data was coded as indicated below:

1. Race for each student was be coded "1" for black and "0" for non-black.
2. Act Aspire Reading result (scaled score)
3. Act Aspire Mathematics result (scaled score)

Participant Demographics

Teacher demographic data were provided from the PCSSD. After the National Board Certified teacher group was identified, the non-National Board Certified group was selected. The non-National Board Certified group was selected by matching the following characteristics: similar degree levels (reported as range), teaching assignment (third grade), and similar years of teaching experience (reported as step).

Three National Board Certified teachers were identified from a list of thirty-six primary (kindergarten-third grade) teachers were certified as early or middle childhood generalist. Thirty-three of the teachers were eliminated because they did not teach third grade during the 2018 Act Aspire test administration period.

Table 2 presents the demographic data of three teachers who represented the National Board Certified group in this study:

Table 2

National Board Certified Demographics

Teacher	Range	Step	Certification / Year
NBCT- A	Masters	17+	Generalist / 2010
NBCT- B	Masters	8	Generalist / 2017
NBCT- C	Masters	17+	Generalist / 2009

Note. PCSSD National Board Certified teacher demographic information

Table 3 presents the demographic data of three teachers who made up the non-National Board Certified group in this study:

Table 3

Non-National Board Certified Demographics

Teacher	Range	Step
Non-NBCT A	Masters	17+
Non-NBCT B	Masters	13
Non-NBCT C	Masters	17+

Note. PCSSD non-National Board Certified teacher demographic information

Ethical Considerations

The researcher completed the required CITI program certification, which is required for conducting research. Additionally, the researcher was granted approval from the Arkansas Tech University Institutional Review Board to complete the study. The Institutional Review Board provides protection to the welfare and rights of human subjects involved in research studies. The study involved archived data that posed

minimal risk. All information was confidential through a coding system. Data were reported and received without student names. No teacher names were used in the study. NBC participants were listed as teacher A, B, and C; and non-NBC teachers were referred to as non-NBCT A, B, and C.

CHAPTER 4: FINDINGS

The purpose of this study was to evaluate the effectiveness of National Board Certified teachers in the Pulaski Country Special School District as it related to the academic achievement of third grade students. Additionally, the impact of National Board Certified Teachers on the academic achievement of African American Students was evaluated.

For this study, academic achievement was defined as reading scores and math scores of third graders generated from the ACT Aspire Standardized Test. The following research questions were investigated:

Question #1: What will be the difference between the ACT Aspire reading scale scores of third grade students taught by NBCTs and those third grade students who are taught by non-NBCTs in Pulaski Country Special School district?

Question #3: What will be the difference between the ACT Aspire mathematics scale scores of third grade students taught by NBCTs and those third grade students who were taught by non-NBCTs in Pulaski Country Special School District?

Two matching research hypotheses were also tested:

H₁: There will be a statistically significant difference between third graders' ACT Aspire reading scores who were taught by NBCTs and those third graders' reading scores who were taught by non NBCTs.

H₂: There will be a statistically significant difference between third graders' ACT math scores who were taught by NBCTs and third graders' math scores who were taught by non NBCTs.

Archived data generated from the 122 students who took the ACT Aspire test during the 2018 spring assessment administration period were collected. Of the third-grade students, 64 were taught by non-NBC teachers and 58 third grade students were taught by NBC teachers. For the purposes of statistical analysis, an Independent *t*-test was conducted to determine if the differences between the two groups of teachers on the two measures were statistically significant. An alpha level of $p < .05$ was established to accept or reject the research hypotheses. This analysis is presented in Table 4.

Table 4

A Comparison Between National Board Teachers' and Non-National Board Teachers' Third Grade Students' Math and Reading Scores

ACT Aspire Scaled Scores	NBC Teachers ($n = 58$)		Non-NBC Teachers ($n = 64$)		<i>t</i> -value	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Reading Scores	412.74	5.85	415.31	5.93	2.408	.018*
Math Scores	412.76	5.11	415.17	5.25	2.567	.011*

* $p < .05$ (two-tailed test).

Based on the data, the students taught by non-NBC teachers generated statistically significantly higher reading scores ($M = 415.31$), than the NBC teachers' students' reading scores ($M = 412.74$) at an alpha level of $p < .05$. The data also indicated the students taught by the non-NBC teachers generated statistically significantly higher math scores ($M = 415.17$), than the NBC teachers' students' math scores ($M = 412.76$) at an alpha level of $p < .05$. The two research hypotheses were accepted, and the two research questions were addressed.

The other two research questions were also tested with an Independent *t*-test.

Question #2: What will be the difference between ACT Aspire reading scale scores of third grade black students taught by NBCTs and non-black third grade students taught by Non NBCTs?

Question #4: What will be the difference between the ACT Aspire mathematics scale scores of black students taught by NBCTs and black third graders' mathematics scores who were taught by non-NBC teachers?

Two matching research hypotheses were tested:

H₃: There will be a statistically significant difference between black third graders' ACT Aspire reading scores who were taught by NBCTs and black third graders' reading scores who were taught by non-NBC teachers?

H₄: There will be a statistically significant difference between black third graders' ACT Aspire mathematics scores who were taught by NBCTs and black third graders' mathematics scores who were taught by non-NBC teachers?

Archived data generated from the 122 students who took the ACT Aspire test given during the 2018 spring assessment administration period were collected. Of the third-grade students, 64 were taught by non-NBC teachers; 58 third grade students were taught by NBC teachers. For the statistical analysis, an Independent *t*-test was conducted to determine if the mean score differences between the two groups of students taught by the NBCT and non-NBC teachers on the two measures were statistically significant. An alpha level of $p < .05$ was established to accept or reject the research hypotheses. The statistical analysis is presented in Table 5.

Table 5

A Comparison of Reading and Math Scores between Third Grade Black Students Taught by NBCT and Third Grade Black Students Taught by Non-NBC Teachers

ACT Aspire Scaled Scores	NBC Teachers (<i>n</i> = 28)		Non-NBC Teachers (<i>n</i> = 16)		<i>t-value</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Reading Scores	410.77	5.07	413.13	6.63	1.335	.189
Math Scores	410.50	4.64	412.69	5.69	1.385	.173

The data presented in Table 5 indicated the differences of third grade black students' reading scores generated from the ACT Aspire. The data indicate there were no statistically significant differences between students taught by NBC and students taught by non-NBC teachers. The mean scores of those students taught by non-NBC teachers ($M = 413.13$) were higher, than the mean scores of those students taught by NBC Teachers ($M = 410.77$).

The data presented in table five indicated the differences of black third grade students' math scores generated from the ACT Aspire. The data indicate there were no statistically significant difference between students taught by NBC and students taught by non-NBC teachers. The mean scores of those students taught by non-NBC teachers ($M = 412.69$) were higher, than the mean scores of students taught by NBC teachers ($M = 410.50$). The two research hypotheses were rejected, and the two research questions were addressed.

CHAPTER 5: CONCLUSIONS, DISCUSSION AND RECOMMENDATIONS

Background

The National Board for Professional teaching Standards (NBPTS) has become a growing educational reform movement since its inception in 1987. States across the nations are investing millions to produce NBCTs. More than half of all states and numerous districts offer free support, conditional loans, and/or salary incentives to encourage teachers to pursue and achieve NBC (“National Board for Professional Teaching Standards,” n.d.). Many states count Board certification towards state licensure, renewal, or step increase (“National Board for Professional Teaching Standards,” n.d.)

The National Board for Professional Teaching Standards (NBPTS) was referenced as the “gold standard” in teacher certification (“Mission and History,” 2019). The NBPTS is an independent, non-profit organization working to advance skilled teaching for students. The use of National Board Certified teachers are increasingly becoming agents of school reform by school districts (Koppich et al., 2006). Title II of Every Student Succeeds Act (ESSA) provides \$2.5 billion to states and districts for professional learning and offers flexibility in the way they spend this money. Beginning the 2017 school year, state school districts were given the option of investing these funds into National Board Certification.

Many school districts including the PCSSD have attempted to improve student achievement through improved teacher quality (Laura & Stickler, 2008). The PCSSD has turned to National Board for Professional Teaching Standards as a means to improve teacher quality; thereby, increasing student achievement.

Findings and Analysis

This research examined how NBC teachers in the Pulaski County Special School District impacted third grade student achievement in the content areas of reading and mathematics. This research also examined how NBC teachers impacted the achievement of third grade black students in the content areas of reading and mathematics based on the spring 2018 ACT Aspire. Specifically, this quantitative study addressed the following research questions:

1. What is the difference between the ACT Aspire reading scale scores of students taught by NBCTs and those who are taught by non-NBCTs in Pulaski County Special School District?
2. What is the difference between the ACT Aspire mathematics scale scores of students taught by NBCTs and those who are taught by non-NBCTs in Pulaski County Special School District?
3. What is the difference between the ACT Aspire reading scale scores of black versus non-black students taught by NBCTs as opposed to those who are taught by non-NBCTs in Pulaski County Special School District?
4. What is the difference between the ACT Aspire mathematics scale scores of black versus non-black students taught by NBCTs as opposed to those who are taught by non-NBCTs in Pulaski County Special School District?

The research examined third grade ACT Aspire achievement score differences in the subject areas of reading and mathematics compared to an equivalent group of non-NBCTs. The data were obtained from the Pulaski County Special School District, which is the sixth largest school district in Arkansas. The data were representative of six third

grade classrooms. Half of the teachers were NBC, and the other half were not Board certified. The NBC group was composed of fifty-eight students and the non-NBC group was composed of sixty-four students.

To determine whether there was a difference between NBCTs and non-NBCTs related to achievement, ACT Aspire results in reading and mathematics in the Pulaski County Special School District were generated and statistically analyzed using independent t-tests. Mean reading and mathematics scores were compared between the group of third grade students who were taught by National Board Certification, and the group of students who had teachers who were not National Board certified.

Limitations

This study had a few limitations. One limitation was the use of ACT Aspire scaled scores instead of raw scores. The ACT Aspire score scale runs from third grade to tenth grade for English, math, reading, and science. Raw scores (the number of correctly answered questions) on the ACT Aspire tests were not presented as an option by the ACT Aspire test generators. The ACT Aspire test developer stated that the raw scores were figured using the total of the points an examinee earned across the multiple-choice, technology-enhanced, and constructed-response items on the administered test form (ACT Aspire, 2017). Therefore, the ACT Aspire scores were presented only as scale scores. This type of data represented student scores may have produced results that were not accurate or statistically valid.

Another limitation of this research was the small sample size. In this study, the teachers were determined from an available group, and were not a random sample. Although the Pulaski County Special School District has over two hundred NBCTs, only

thirty-six are elementary teachers. Of the thirty-six elementary NBCTS, only three taught third grade during the 2018 spring ACT Aspire testing period.

There was some variance in teaching experience and degree levels achieved amongst the participating teachers. The researcher was unable to perfectly pair the NBC group to the non-NBC group. The Pulaski County Special School District only maintains the number of years taught in the district through teacher demographic data. The years taught are called “steps” and were not counted beyond seventeen years. This type of year counting by the school district prevented the creation of an exact match between NBCTs and non-NBCTS regarding years of teaching. There was no way to know exactly how many years of teaching experience the teachers had, if they have taught in a district outside of the Pulaski County Special School District, or if they taught beyond seventeen years.

The students who participated were cluster sampled and defined as available groups. Therefore, no generalizations beyond this target population were considered. The study was delimited to third grade because these students are taught in a self-contained environment. This approach assured the students in each group would receive instruction from a single teacher. The teachers in this research study were responsible for both reading and mathematics.

Conclusions and Implications

Students of NBCTs were matched to students of non-NBCTs. The data analysis determined students taught by non-NBCTs scored significantly higher in reading than students taught by NBCTs. Non-NBCTs’ students’ Mean = 415.31 was statistically higher than the NBCTs’ students’ Mean = 412.78.

The data analysis also determined that students taught by non-NBCTs scored significantly higher in mathematics as compared to students taught by NBCTs. Non-NBCTs students' Mean = 415.17 was statistically higher than the NBCTs students' Mean = 412.76.

The results of these findings refuted Hakel et al. (2008) study that compared the achievement test scores of students with NBPTS-certified teachers to students with non-NBPTS-certified teachers. The researchers concluded that students taught by NBPTS-certified teachers made greater gains on achievement tests than students taught by non-NBPTS-certified teachers. The results also contradicted the study completed by Goldhaber and Anthony (2007). They examined third and fifth grade students in reading and mathematics scores of NCBCT's and compared the scores to student of non-NBCTs. For three years, the researcher found NBCT students significantly outscored the students of non-NBCTs (Goldhaber and Anthony, 2007). Cowan and Goldwater (2016) concluded NBCTs were more effective than non-NBCTs in mathematics and reading, which different from the research findings in this study.

Several studies referenced in Chapter Two concluded that National Board Certification was connected to increased student achievement and confirmed that National Board Certification was an indicator of quality teaching (Cantrell et al., 2008; Cavalluzzo, 2004; Goldhaber & Anthony, 2007; Harris & Sass, 2009b; Vandervoort et al., 2004).

Based on the data generated in this study, the findings were more consistent with a study requested by the National Board for Professional Teaching Standards. Researchers studied two Charlotte school districts, the Mecklenburg and Wake School

Districts in North Carolina. This study found no positive relationship between the scores of fourth to eighth grade students in both reading and mathematics who were taught NBCTs (Sanders et al., 2005).

McColskey et al. (2006) results were also consistent with Hakel et al. (2008) findings. The researchers investigated the relationship between National Board Certification and North Carolina students' End-of-Grade tests in reading and math. Their study included 307 teachers in three North Carolina public schools' districts. The researchers found no significant differences between NBPTS-certified teachers and non-NBPTS-certified teachers on any of the reading or math variables (McColskey et al. 2006).

Cantrell and Hughes (2008) conducted a study in the Los Angeles Unified School District in California. The National Board Certified teachers were matched with similar teachers at the same grade level, in the same school, who were not National Board Certified. Math and language arts standardized test score results indicated no significant difference between the test score of National Board Certified teachers and non-National Board Certified teachers. Students of teachers who had obtained National Board Certification had significantly lower test scores than students of non-National Board Certified teachers.

Research questions three and four compared reading and mathematics scores between third grade black students taught by NBCTs and students taught by non-NBCTs. The statistical data analysis generated from the ACT Aspire reading test found no statistically significant differences between black students taught by NBCTs and black

students taught by non-NBCTs. Black students taught by non-NBCTs ($M = 413.13$) were higher than black students taught by NBCTs ($M = 410.77$).

Data generated from the ACT Aspire mathematics test were not statistically significant between black students taught by NBCTs and black students taught by non-NBCTs. Black students taught by non-NBCTs ($M = 412.69$) were higher than black students taught by NBCTs ($M = 410.50$). Although the mean scores were higher in mathematics and reading for those students taught by NBCTs, the results were not statically significant. Clotfelter et al. (2007) findings contradicted the outcomes of this study. The researchers revealed students of NBCTs outperformed students of non-NBCTs on achievement tests. Their findings also demonstrated a greater effect for minority students. Due to the small sample size of black students in this study, definitive conclusions may not be determined.

The researcher acknowledged that the data collected for non-NBCTs revealed slightly higher scale scores in both reading and mathematics. Most of these students would be considered proficient or higher based on the cut scores reported by the Arkansas Department of Education.

This study utilized a large school district in Arkansas to determine the differences between ACT scale score of third grade students taught by NBCTs, and third grade students who were taught by non-NBCTs. The analysis of this study produced some interesting results related to the achievement of NBCTs. The research study results contradicted the bulk of the research presented in Chapter Two. Many of the studies referenced in the literature review utilized raw scores and much larger sample sizes (Cavulluzzo, 2004; Clotfelter et al., 2007; Goldhaber & Anthony, 2007). Definitive

conclusions should not be assumed regarding NBCTs in the Pulaski County Special School District due to the small sample size and use of scale scores over raw scores. These two significant factors could call into question the validity of the study results.

Recommendations for Further Research

The following are recommendations for further research that should be considered:

1. A replication of this study utilizing Act Aspire Raw scores may lead to more statistically and reasonable results.
2. A replication of this study is suggested using data from all third grade National Board Certified Teachers and third grade non–National Board Certified Teachers to study the impact on student academic achievement from across the state of Arkansas using a similar matched-pair design. This model may result in findings that could be more credible regarding the impact of National Board Certified Teachers upon student achievement. Thus, this particular research could also aid in determining if the National Board Certification process impacts student achievement.
3. Arkansas and the Pulaski County Special School District has a significant financial investment in National Board Certified Teachers. The state or the school district could develop a process to track the achievement of students of NBCTs.

Final Summary

While the results of this study did not conclude the anticipated positive association between NBCTs and student achievement, the majority of the research indicated Board certification was an indicator of teacher quality.

The idea of improving teacher quality as a means for improving student outcomes is not a new one. Improving teacher quality to affect student outcomes dates back as far as the 16th century with Johann Comenius, a Czech pedagogical scholar, who set the stage for the concept of mastery teaching. In the United States, educational reformists Horace Mann and Samuel Hall began the quest for teacher quality (PBS, n.d.).

In the age of accountability, states rely on high-stakes testing as a tool for evaluating student achievement and growth. Darling-Hammond (1999) provided a list of policies that states have implemented to increase the quality of their teaching workforce. Darling-Hammond's study found a positive correlation between the increase of teacher quality and student achievement when analyzing standardized test scores. The results of these studies provided justification for policies that support the National Board Certification process as a method to improve teacher quality (Jaquith, Snyder, & Bristol, 2016).

School districts invest substantial resources in professional development to improve teacher performance. For instance, The New Teacher Project (2015) found that districts spend an average of \$18,000 per year, per teacher on professional development, but most professional development programs fail to produce changes in teacher effectiveness that are measurable in student test scores ("The Mirage," 2015).

In further support for the National Board Certification, NEA members corroborated the positive effects the National Board Certification process has on their

classroom practices (“National Board Certification of Teachers,” 2007). The certification process is rigorous, and this challenging process causes teachers to:

- reflect on classroom practices,
- analyze their work,
- manage and monitor student learning,
- learn from experiences and think systemically about their practice, and
- participate in learning communities.

National Board Certified teachers must prove through the certification process that they are capable of recognizing individual student differences in learning styles, cultural differences, as well as differences in family structures. They are capable of addressing learning gaps; utilize a variety of instructional techniques; stay abreast of current instructional practices and research; and strive to build partnerships in an effort to improve student achievement. The research from the literature review overwhelmingly supports using NBCTs as a method of effective and cost-efficient educational reform in improving teacher quality (Cantrell et al., 2008; Cavalluzzo, 2004; Goldhaber & Anthony, 2007; Harris & Sass, 2009b; Vandevoort et al., 2004).

Overwhelmingly, National Board Certified Teachers believe that standardized tests are not a strong predictor of student success (91% strongly agree), and that standardized tests are a weak predictor of students' creativity (97% strongly agree) (Rapp, 2001). NBCT's lesson plans are not typically based on standardized testing performance, but rather on actual student achievement obtained within the classroom. National Boards support the advancement of a skilled teacher that can only be evidenced through actual student engagement and student achievement assessed by and interpreted by the skilled

teacher who taught it. This is something standardized testing does not do. A standardized test score is only a score; therefore, it is not an indicator of student achievement.

The National Board for Professional Teaching Standards (NBPTS) has been referenced as the *gold standard* in teacher certification (“Mission and History,” 2019). The NBPTS is an independent, non-profit organization working to advance skilled teaching for students. The use of National Board Certified teachers (NBCTs) is increasingly becoming agents of school reform by school districts (Koppich et al., 2006).

Title II of Every Student Succeeds Act (ESSA) provides \$2.5 billion to states and districts for professional learning and offers flexibility in the way they spend this money. Beginning the 2017 school year, states and school districts had the option to invest these funds into National Board Certification. This funding opportunity is the singular best investment in the education of America’s students. In a 2005 study by Cohen and Rice (2005), National Board Certification was found to be a cost-effective professional development compared to other forms of professional development such as degree programs, consultants, and seminars.

Although the present study did not connect student achievement with National Board Certification of the teacher, it also does not indicate a need to abandon the process. While National Board certification is not an educational panacea, it is a potential pathway to improve quality teaching.

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Appendix A
IRB Approval Letter



**Office of Sponsored Programs
and University Initiatives**

Administration Building, Room 207
1509 North Boulder Avenue
Russellville, Arkansas 72801

Office: 479-880-4327
www.atu.edu

November 1, 2018

To Whom It May Concern:

The Arkansas Tech University Institutional Review Board has approved Sonya Whitfield's IRB application, "An Investigation of the Impact Nationally Board Certified Teachers in PCSSD Have on Student Achievement in the Content Areas of Mathematics and Reading," through November 1, 2021. The approval code is Whitfield_110118.

Thank you,

A handwritten signature in black ink, appearing to read "M. Kuroki".

Masanori Kuroki, Ph.D.
Institutional Review Board Chair



Appendix B
Request for Use of Data

Sonya Whitfield

20 Norfolk Drive | Maumelle, AR | swhitfield@pcssd.org

September 6, 2018

Dr. Charles McNulty
Superintendent
Pulaski County Special School District
925 East Dixon Road
Little Rock, AR 72206

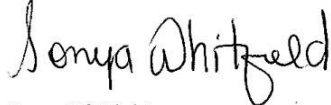
Dear Dr. McNulty

I am writing to request permission to conduct a research study in PCSSD. I am currently a doctoral student enrolled at Arkansas Tech University. I am in the process of writing my dissertation entitled, "National Board Certified Teachers: The Price and Payout of Student Performance in Pulaski County Special School District". My study focuses on the impact National Board Certified Teachers on the achievement of their students, specifically, the use of NBCTs as an effective and cost efficient education reform effort in PCSSD. This research will investigate the impact NBCTs in PCSSD have on student achievement in the content areas of reading and mathematics and the achievement of black verses non-black students.

I am requesting 2018 ACT Aspire reading and mathematics scores of third grade students who were taught by NBCTs as well as scores of students who were taught by non-NBCTs. Additional data such as years taught, degree levels, race, and gender of sampled teachers will be collected. For this study, I will also need the race of each student. Confidentiality will be ensured by the use of a coding system. No one will be identified by name.

Your approval to conduct this study will be greatly appreciated. I will follow-up with a phone call in a few days and would be happy to answer any questions or concerns you may have.

Sincerely,



Sonya Whitfield

Appendix C

Written Permission from School Administration to Obtain Data



PULASKI COUNTY SPECIAL SCHOOL DISTRICT

Office of the Superintendent

September 26, 2018

To Doctoral Committee,

I fully support Sonya Whitfield's inquiry in the Pulaski County Special School District to complete her doctoral dissertation. Ms. Whitfield is a transformational leader whose doctoral studies will not only add to public knowledge and discourse on the profession of teaching, but will also advance our district with regards to the impact of Nationally Board Certified Teachers on student achievement and equity. I look forward to reading her study!

Sincerely,

A handwritten signature in blue ink, appearing to read "Charles McNulty", is written over a light blue circular background.

Charles McNulty, Ph.D.
Superintendent

925 East Dixon Road ◊ Little Rock, Arkansas 72206
Phone: (501) 234-2001 ◊ Fax: (501) 490-0483 ◊ Email: cmcnulty@pcssd.org

