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Effects of Teacher Degree and Teacher Experience on Literacy Achievement for Students Grades 3-6 in Arkansas

James Clay Hendrix

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EFFECTS OF TEACHER DEGREE AND TEACHER EXPERIENCE ON LITERACY
ACHIEVEMENT FOR STUDENTS GRADES 3-6 IN ARKANSAS

by

James Clay Hendrix

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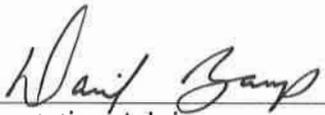
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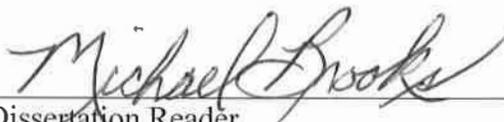
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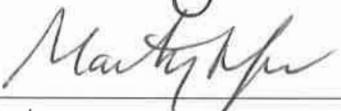
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My accomplishments are my own to the extent that I was present for all of them. However, the things I have learned are a result of the many individuals who taught me, mentored me, encouraged me, and a few who did all three. I offer endless thanks to each of you.

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ABSTRACT

by
James Clay Hendrix
Harding University
December 2018

Title: Effects of Teacher Degree and Teacher Experience on Literacy Achievement for Students Grades 3-6 in Arkansas (Under the direction of Dr. David Bangs)

The purpose of this dissertation was to determine the effects of teacher degree and teacher experience on student achievement in literacy for Grades 3-6. School leaders are under pressure from state and national legislation to improve student achievement continuously. At the times hiring and teaching assignment decisions are made, often there is little verifiable data available about individual teacher applicants. Throughout most of the history of public education, teacher degree and teacher experience have been thought to have an impact on school quality and student achievement, so much so that nearly all teacher pay models are based on those two characteristics. Through this study I examined the effects of teacher experience, defined as 3 or less years of experience or 4 or more years of experience, and teacher degree, defined as bachelor's degree or master's degree or higher on literacy achievement measured by the literacy portion of the ACTAAP exam in Arkansas. There were no significant interaction effects between the two independent variables for the 4 hypotheses. Similarly, the main effect for teacher experience on student achievement was also not significant for all grade levels. However, regarding teacher degree, 2 main effect hypotheses were significant in Grades 4 and 6.

One interesting finding was that in these grades, students of teachers with bachelor's degrees outperformed students of teachers with master's degrees, with small effect sizes. For the other 2 grade levels (third and fifth), no significant effect was found. More research is needed with regard to student achievement at other grade levels, other subject areas, and as measured by other assessments. However, implications of this study indicate that colleges of education should consider why studies have revealed that students of teachers with master's or higher degrees do not outperform students of teachers with bachelor's degrees. In addition, administrators should determine the weight placed on characteristics such as teacher degree and teacher experience in the process of hiring, assigning, and paying new teachers to their districts.

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CHAPTER I

INTRODUCTION

School administrators devote much thought toward the outcome of making correct decisions regarding the hiring of teachers because of some basic assumptions. When making hiring decisions, two factors that are generally considered, in addition to others, are the level of education based on degree level and years teaching experience (Cruickshank & Haefele, 2001; Darling-Hammond, 1999; Stronge, 2007). For some time, educators have assumed that training creates good teachers. Therefore, more training should lead to better teachers. Second, it has also been assumed that teachers with more experience are better at providing content in meaningful ways compared to teachers who have less experience. In fact, because of these and other assumptions, teacher salaries are based on teacher degree and experience in most states (Hanushek, 1997). The postulation here is that with every degree added and with every year of teaching, educators improve their ability to teach. Thus, teachers should be paid commensurate with their teaching capacity. However, are these assumptions valid? Does each year of teaching translate into more effective teaching? In addition, does an advanced degree translate into better teaching?

No one would question that administrators should hire quality teachers and that quality teaching can translate into higher achieving students. Teacher quality is one key factor pertaining to student achievement, and teacher performance affects student

performance to a significant extent (Aaronson, Barrow, & Sander, 2007; Hanushek, Kain, & Rivkin, 1998; Kane, Rockoff, & Staiger, 2008; Rivkin, Hanushek, & Kain, 2005; Rockoff, 2004; Sanders & Rivers, 1996). It has long been known that good teachers can make positive differences in the lives of their students. Because of this, administrators should hire the best teachers if they want to establish a high-achieving learning culture in their school districts. Further, Goldhaber (2002) suggested that excluding peer effects, “among the various influences that schools and policymakers can control, teacher quality was found to account for a larger portion of the variation in student test scores than all other characteristics of a school” (p. 2). There are many physical variables in children’s lives that educators cannot control including whether students have adequate food, clothing, and shelter in their homes. In addition, many emotional variables are out of the control of educators such as love, security, belonging, and purpose. However, quality educators provide many things in students’ lives far beyond the basic ABCs of the curriculum. Although no one would question that administrators should hire quality teachers and that quality teaching can translate into higher achieving students, exactly what teacher characteristics lead to higher student outcomes?

Another assumption is that certain teacher characteristics lead to more effective teaching, which in turn result in higher achieving students. When making hiring decisions, an important goal is to hire teachers who will produce students who achieve at a high level on high-stakes tests (Darling-Hammond, 1999; Goldhaber, 2002; Stronge, 2007). If it is true that characteristics that result in effective teaching can be identified and if effective teaching leads to increased student achievement, then attempts should be made to identify those characteristics that help predict good teaching. However,

Goldhaber (2002) noted, “the relationship between readily quantifiable attributes—such as a teacher’s highest degree attained or level of experience—and student outcomes is tenuous at best” (p. 2). Goldhaber argued that characteristics such as teacher degree and experience did not guarantee high student achievement. Among the myriad of characteristics teachers possess, do teacher degree and experience contribute significantly to increased student outcomes?

Statement of the Problem

The purposes of this study were four-fold. First, the purpose of this study was to determine the effect by teacher degree between teachers with 3 or fewer years of experience versus 4 or more years on literacy achievement as measured by the literacy Arkansas Comprehensive Testing, Assessment, and Accountability Program (ACTAAP) benchmark for third-grade students in a Northwest Arkansas school district. Second, the purpose of this study was to determine the effect by teacher degree between teachers with 3 or fewer years of experience versus 4 or more years on literacy achievement as measured by the literacy ACTAAP benchmark for fourth-grade students in a Northwest Arkansas school district. Third, the purpose of this study was to determine the effect by teacher degree between teachers with 3 or fewer years of experience versus 4 or more years on literacy achievement as measured by the literacy ACTAAP benchmark for fifth-grade students in a Northwest Arkansas school district. Fourth, the purpose of this study was to determine the effect by teacher degree between teachers with 3 or fewer years of experience versus 4 or more years on literacy achievement as measured by the literacy ACTAAP benchmark for sixth-grade students in a Northwest Arkansas school district.

Background

History of Teacher Pay

In the last 200 years, major changes in teacher compensation systems have surfaced with each system having advantages and disadvantages and meeting the needs of its unique time and educational structure. First, in the 1800s, a method of paying teachers with room and board was formed. This method required teachers to move from the home of one student to another each week. This system was called *boarded round* and served as compensation to teachers for their service in the classroom (Protsik, 1995). Spring (1994) observed, “In 1862, sixty-eight percent of teachers in Vermont boarded ‘round’” (p. 106). This system served an agrarian community well. However, as the country moved from an agrarian society to an industrial one, the face of education and teacher compensation changed with it.

A second major method of paying teachers was based on the grade level(s) taught. As the number of farm workers decreased, the number of children attending school increased. Schools, which had been controlled locally in all regards, struggled to keep pace with the demands placed on them. By 1900, reform on the educational front was budding, and a solution emerged that placed individuals trained in educational systems, such as county superintendents, in charge of schools (Tyack, 1974). With this type of reform, smaller one-room schoolhouses were consolidated, and schools became larger units that were more efficient financially and in other ways. During this time, more standardization in textbooks and equipment was achieved. For the first time, schools also took on a graded structure with certified teachers, and these changes resulted in a need for a new compensation model (Protsik, 1995).

The graded structure adopted during this time resembles the model used in most schools today. Using this method, administrators group students into classrooms with other students who are in the same grade. Grades in school are based on students' chronological age. In these grade-based schools, teachers were compensated differently for a variety of demographic factors including their own race, age, and sex (Katz, 1987). However, teachers were most notably paid based on the grade of the students they taught (Katz, 1987; Tyack & Strober, 1981). Across the school district, teachers in the same grade level received the same pay as other individuals with their own demographics, which brought about an increase in the level of equity found in the teacher compensation system (English, 1991). Thus, the graded compensation system brought equality in some regard for the first time to educators teaching at the same grade level.

The third system was the method most widely used. Springer (2010) pointed out that this system often called a *single salary schedule*, rewarded teachers for experience and the highest level of education they achieved. At the same time, the graded system was gaining popularity across the nation, another system was in its infancy and was being developed in Chicago led by Margaret Haley, “organizer of the Chicago Teachers’ Federation” (Protsik, 1995, p. 10). Inequalities in pay for female teachers were addressed as the system attempted to raise “the standard of the teaching profession by securing for teachers conditions essential to the best professional service” (Tyack, 1974, p. 260). Subsequently, the movement led to a nationwide trend in teacher compensation changes. Protsik (1995) found, “By 1925, eighty percent of women in the nation’s largest cities had won equality” (p. 11). This system was named the single salary schedule because “all classroom teachers . . . were paid on the same scale regardless of gender, race, grade level

taught, or family status of the teacher” (Educational Research Service, 1978, p. 11).

Despite circumstances, demographics, or years of experience, education seemed to have a single salary schedule.

Teacher Experience

Today, salary schedules provide more compensation for teachers who have more experience in the classroom. Such a system is designed for individual reward based upon commitment to or experience in a school, district, or profession. However, commitment cannot always be measured by the longevity of teachers in the classroom (Rowan, Carrenti, & Miller, 2002). Because commitment is a subjective concept, the difficulty lies in trying to measure this abstract idea by years of experience, which objectively measures how many years teachers have been hired. Although commitment might well be important in determining teacher success in increasing the level of student achievement or even in the quality of instruction, teacher commitment is not currently widely measured, and a system to do so uniformly does not exist.

Researchers have examined possible characteristics that experienced teachers exhibit when compared to teachers with little or no experience including positive teacher-student relationships, effective classroom management, and problem-solving skills (Goh & Khine, 2002; Martin & Shoho, 2000; Moore, 1989). Michael (2007) noted that the most powerful characteristic might be teacher maturity, which usually increases with teaching experience. Teacher maturity, however, is difficult to quantify and would require a complicated measurement system if it were to be collected and analyzed because of its subjective nature. In trying to avoid abstract concepts in lieu of more objective measures, administrators gravitate to a reliance on teacher experience, which is

objective and more easily stored in databases of teacher data. Prior teaching experience is often listed as a requirement or preference for employment in school districts.

Additionally, teacher experience is required to be eligible for an administrative licensure in Arkansas (Arkansas Department of Education, 2003). Although this practice is not unique to Arkansas, administrators seek experienced teachers across the nation (Stronge, 2007).

Protsik (1995) suggested that this focus on teacher experience is much different from years past when the local controlling board of a small, rural school system would hire teachers without certification. Protsik contended that members of the local board's families were hired in an attempt to regain some of the property taxes paid to the school. Due to this type of educational culture during the one-room school structure of American public education, teacher turnover was high, and teacher effectiveness was low on the local priorities. Clifford (1991) tabulated that, on average, a woman teacher in the 1850s would usually end up teaching only 18 months in states like Wisconsin.

Teacher Degree

Degrees and additional formal education are also rewarded through today's teacher pay scales. It is commonly believed that individuals who achieve increased levels of formal education at institutions of higher education are better equipped to handle situations they will encounter across many professions. Croninger, Rice, Rathbun, and Nishioa (2006) believed that the teaching profession, in general, holds to this view. They asserted that the benefits of increased amounts of formal education are believed to lead to increased content knowledge and pedagogical skills. By holding this view, therefore, a master's degree would represent an increase in the subject content matter, in methods of

instruction or leadership, or in both. However, in one study, Rowan et al. (2002) found that the actual knowledge and skills that teachers glean are not perfectly correlated to the teachers' degree. The degree teachers have achieved in the profession is believed to speak to their own cognitive abilities (Croninger et al., 2006). Yet, measuring teachers' content knowledge or abilities to teach has proven to be difficult, and a standardized system of assessment is not currently in place to carry out such a task. The current assessment system used to qualify teachers for licenses is based on cut scores and a minimum performance model rather than on a model that differentiates a more proficient teacher from another less proficient teacher (Rowan et al., 2002).

In the beginnings of the public-school system in this nation, teachers were not certified or licensed, and certainly, most did not have college degrees (Protsik, 1995). However, the preparation needed to function in that society was vastly different from today's world. Protsik (1995) surmised that teachers' primary role was providing an excellent moral example for students and secondarily focused on the educational areas of reading, writing, and arithmetic. Today, teachers are preparing students for a world where change is fast paced. The problems that students will be asked to solve as adults are presently unknown.

High Stakes Testing

A disadvantage of a compensation procedure based on teacher experience and teacher degree is that it does not take into consideration student achievement on high stakes exams required by the No Child Left Behind (NCLB) legislation. The NCLB Act of 2001 (2002) changed the way schools focused on student academic achievement. The Act placed direct focus on the performance of entire schools, but a larger impact was the

way the Act forced schools to report the academic achievement of smaller groups of students divided into sub-populations based on certain demographic characteristics. Since that time, schools have worked hard to improve student academic achievement. This has been pervasive and has affected the hiring process of school districts and the way that school administrators focus on teacher hiring (Darling-Hammond, 1999; Goldhaber, 2002; Stronge, 2007).

The primary focus of NCLB (2002) was to improve student achievement in literacy and mathematics. The legislation also indicated that schools should focus more heavily on literacy until all children are proficient in that area, but both areas are included in adequate yearly progress requirements. NCLB requires that teachers in classrooms where core subjects are taught be highly qualified. Highly qualified status for teachers is defined by the legislation. Although this status is separate from teacher licensure that is controlled by each state, it brings some federal regulations to who may and may not be hired as a teacher in a particular classroom based on the grade level of the students or the content of the subject to be taught.

Conflicting information exists concerning the effect of teacher experience on student achievement. In one study of 10,632 students, Myrberg (2007) searched for relationships between several teacher characteristics and student performance but found that teacher degree and experience have no effect on student achievement. Another study by Odden, Borman, and Fermanich (2004) confirmed these findings, with regard to annual standardized exams, but found a significant difference between teacher experience and pre-test to posttest gains during one school year. However, in another study consisting of 7,000 elementary school students, Archibald (2009) found that teacher

degree and experience do have an effect on student achievement. Other studies supported that finding (Hanushek, 1992, 1997; Rowan et al., 2002). Hanushek (1997) supported that finding as well but revealed that most increases in student achievement as related to teacher experience was realized in the first few years of teaching.

Hypotheses

Reviews were mixed regarding the relationship between teacher degree and student academic achievement, with some finding no significant relationship (Croninger et al., 2006; Cruickshank & Haefele, 2001; Darling-Hammond, 1999; Goldhaber, 2002; Stronge, 2007) and some finding a significant link. An analysis of the relationship between teacher experience and student academic achievement yielded the same conflicting reports, with some finding no significant relationship (Croninger et al., 2006; Goh & Khine, 2002; Goldhaber, 2002; Martin & Shoho, 2000; Michael, 2007; Moore, 1989). In light of these evaluations, the following hypotheses were generated.

1. No significant difference will exist by teacher degree between teachers with 3 or fewer years of experience versus 4 or more years on literacy achievement as measured by the literacy ACTAAP benchmark for third-grade students in a Northwest Arkansas school district.
2. No significant difference will exist by teacher degree between teachers with 3 or fewer years of experience versus 4 or more years on literacy achievement as measured by the literacy ACTAAP benchmark for fourth-grade students in a Northwest Arkansas school district.
3. No significant difference will exist by teacher degree between teachers with 3 or fewer years of experience versus 4 or more years on literacy achievement

as measured by the literacy ACTAAP benchmark for fifth-grade students in a Northwest Arkansas school district.

4. No significant difference will exist by teacher degree between teachers with 3 or fewer years of experience versus 4 or more years on literacy achievement as measured by the literacy ACTAAP benchmark for sixth-grade students in a Northwest Arkansas school district.

Description of Terms

Academic achievement. The Arkansas Comprehensive Testing, Assessment, and Accountability Program encompassed the state's Smart Start Initiative that focused on Grades K-4, the state's Smart Step Initiative that focused on Grades 5-8, and education for Grades 9-12. "The authority to implement ACTAAP was firmly established in the legislation by Act 999 of 1999. ACTAAP was a comprehensive system that focused on high academic standards, professional development, student assessment, and accountability for schools" (Arkansas Department of Education, 2006, para. 2). For this study, academic achievement was measured by the raw score earned by each student on the benchmark exam as a portion of the ACTAAP in literacy.

Teacher degree. The highest degree held by a classroom teacher was used as the levels of one of the independent variables. In Arkansas, teachers are required to have a minimum of a bachelor's degree; however, teachers can have master's degrees, specialist's degrees, or doctoral degrees.

Teacher experience. For this study, teaching experience included the number of years educators had spent teaching full-time in the classroom from the beginning of their careers to the present (3 or fewer years of experience versus 4 or more years). Years of

classroom experience that included partial years were rounded up to the next highest non-partial year if the portion was one-half of a year or greater. Teachers with partial years were rounded down to next lowest non-partial year if the portion was less than one-half.

Significance

Research Gap

A gap exists in the current research that justified a need for this study. Studies exist that were based around the idea of teacher effectiveness; however, they examined new and progressive measures for teachers based on student achievement and less on the factors most commonly used to compensate teachers (Albasheer, Khasawneh, Nabah, & Hailat, 2008; Graham, 2007; Moir, 2009). Based on the literature review, research needed to be conducted on the current system of teacher compensation to address that gap by determining if there was a link between the system and teacher effectiveness. Boyd, Goldhaber, Lankford, and Wyckoff (2007) concluded that “the research evidence is simply too thin to have serious implications for policy” in areas of teacher quality including teacher degree and teacher experience (p. 45). Therefore, this study sought to determine the effect, if any, teacher degree and teacher experience have on student achievement. Based on the gap in the research regarding the effects of teacher degree and teacher experience on student achievement, this study serves as an important tool to be used in human resource matters regarding teachers.

Possible Implications for Practice

Both factors, teacher experience and teacher degree, need to be studied individually and in tandem to determine if either factor positively influences the level of student achievement in the classroom. Rowan et al. (2002) found that “‘teachers’

credentials are seen as ‘proxies’ for the actual knowledge and expertise of teachers, under the assumption that teachers’ degrees, certification, or experience index the instructionally relevant knowledge that teachers bring to bear in the classrooms” (p. 17). In this study I examined if the traditional metrics used for measuring teachers, experience and degree, were congruent with increased student achievement. Further, teacher degree and teacher experience were two factors that were easy to collect and to code into a database. Analyzing these data were manageable because the data were more objective in nature.

The findings from this study may help school administrators and district leaders make informed decisions regarding recruiting and retaining teachers within the current system. Currently, federal and state laws mandate increasing student achievement; yet, teacher pay is not based on student achievement, but rather it is based on the amount of experience teachers have and the level of degree they hold. Some administrators focused on improving teacher compensation systems based on data that were not uniformly collected, but the current procedure is still the norm, and states must hire the candidates they feel are the best qualified to meet the demands for increased student achievement.

In addition, the findings from this study may help States in their role as licensing agents. States control teacher licensure, and school administrators must hire teachers licensed in the state in which they will teach (Boyd et al., 2007). Because all teachers eligible to fill a teaching vacancy must have a state teacher’s license, other information specific to individual teachers must be used to determine which teachers will have the most positive impact on student achievement. Hiring decisions are infrequently made based on student achievement records for students that teachers have previously taught.

Teacher degree and teacher experience data are more readily available than past student achievement data, and specific information about each teacher's experience and degree is readily accessed because each district tracks this information by the teacher.

Process to Accomplish

Design

A quantitative, causal-comparative strategy was used in this study. The project included a post-test-only nonequivalent groups 2 x 2 factorial design. The independent variables for the four hypotheses were teacher degree (bachelor's degree versus master's degree) and teacher experience (3 or fewer years of experience versus 4 or more years). The dependent variable for all four hypotheses was literacy achievement measured by raw scores from the ACTAAP literacy benchmark exam for the third, fourth, fifth, and sixth grades, respectively.

Sample

Scores from students in Grades 3, 4, 5, and 6 in a Northwest Arkansas School District were used in this study. Data from the 2013-2014 school year were collected. Students served in the special education department who were considered significantly cognitively impaired, and students served in the special education department who were receiving homebound services were the only students excluded from the study. Students in the district qualified for free or reduced lunches at the rate of 72%.

Instrumentation

Information for the independent variables in this study, teacher degree and teacher experience, were collected from the Arkansas Public School Computer Network human

resources module. In the database, the total number of years of experience each teacher has completed and the type of degree a teacher holds were retrieved.

The ACTAAP Augmented Benchmark Test was used to measure the dependent variable, literacy achievement, for the study (Pearson, 2009). Two components made up this test for Grades 3-8: a criterion-referenced test and a norm-referenced test. The criterion-referenced test component focused on establishing student performance levels and contained items aligned with Arkansas content frameworks. The ACTAAP was composed of custom-developed items and Stanford Achievement Test–Version 10 items that were aligned to the Arkansas content frameworks. An independent alignment study was conducted by Achieve to identify which items were aligned to the Arkansas Content Standards. Each mathematics assessment contained 15 aligned Stanford Achievement Test–Version 10 items that were also aligned to the Arkansas Content Standards. Each Literacy assessment contained four aligned Stanford Achievement Test–Version 10 items that were also aligned to the Arkansas Content Standards for Writing. The Reading Assessment did not contain any Stanford Achievement Test–Version 10 items (Pearson, 2009).

The ACTAAP was constructed from a common framework, so each administration of the exam was certain to measure the same construct (Pearson, 2009). Although test forms were built using a common framework and using common statistical targets to ensure that the underlying structure of different test forms was consistent, post-equating adjusts for any differences in difficulty that occurred between different forms of the exam. This design provided information about how many operational, and field test items were in each session for each item type. There were six embedded field exam

forms. The exam layout provided information on how the exam was configured (Pearson, 2009).

A post-equating methodology was carried out using a common item, non-equivalent groups linking strategy (Pearson, 2009). The initial linking set comprised custom-developed multiple-choice items. Therefore, the percentage of linking items on the 2009 exam forms was large and allowed a robust linkage to be made between the 2009 and 2008 exam forms. Accuracy rates were reasonably high at .89 or above for all grades and subjects (Pearson, 2009). The reliability approach approved by the Technical Advisory Committee was the Stratified Alpha method developed by the Audrey Qualls in 1995. In this approach, reliability for each item was estimated separately and was then combined with other item types' reliabilities to yield a more accurate estimate of the overall reliability. This approach accounted for the variance of each item in estimating the reliability of the exam. It was known that various item types contributed to the variance of exam differentially. Estimating the reliability separately by item type and then combining those reliabilities weighed the variance conditioned on item type appropriately (Pearson, 2009).

Students' raw scores of the Benchmark test were collected from The National Office for Research on Measurement and Evaluation Systems (NORMES) ED.STATS Portal. The ED.STATS Portal database fields that were used in this study included the following: school LEA number, year, grade, student grade, exceptional student identification code, student special education identifier, class name, and literacy total raw score 2014.

Data Analysis

The results of the ACTAAP benchmark literacy scores were compiled for the four groups in each grade level (bachelor's degree/3 or fewer years of experience, bachelor's degree/4 or more years, master's degree/3 or fewer years of experience, and master's degree/4 or more years). To address the null hypotheses, four 2 x 2 ANOVAs were conducted using teacher degree (bachelor's degree versus master's degree) and teacher experience (3 or fewer years of experience versus 4 or more years) as the independent variables and the literacy raw scores for each of the four grade levels as the dependent variables. To determine statistical significance for the hypotheses, the researcher used a two-tailed test with an alpha level of .05.

CHAPTER II

REVIEW OF RELATED LITERATURE

School leaders find themselves in a constantly changing environment. However, some things do not change and other change less frequently. Among the more constant issues, school leaders work with improving the quality of instruction and increasing student achievement. Increasing student achievement is a goal of all school leaders. Even leaders of schools that have excellent student achievement as measured by federal and state-mandated testing will find themselves striving to improve student achievement. In those schools, perhaps the focus shifts from the mandated exams to other voluntary exams, grade point average, college entrance exams, or other similar measures of student success.

Increasing student achievement as a goal is easy to understand and easy to measure. However, determining the factors that influence student achievement in an individual school or school district is not an easy task. Across the nation, across the state, and even across the county, one will find that no two communities are the same, resulting in diverse schools and school districts. One constant factor throughout is the teacher. This is because teachers are responsible for student learning on a day-to-day basis. Regardless of the socioeconomic, racial, geographic, or another type of demographic measurement, the basic structure of school remains constant: teachers drive student learning (Marzano, Norford, Paynter, Pickering, & Gaddy, 2001).

Therefore, there is great interest in the characteristics of educators that are the most effective in student achievement. Some of the characteristics of teachers are quite simple to determine, measure, and monitor. Others are much more difficult and time consuming on the part of the school leader. As far back as one can read about the structure of schools and for what seems as far ahead as one can see, the classroom teacher has had and will continue to have the largest impact on student learning and therefore student achievement.

History of Teaching and School Structure

Beginning in the 19th century, one finds the one-room schoolhouse as the typical school design (Protsik, 1995). This design was also referred to as a *common school* during the 18th century, and during the colonial period, people paid for their children's educational experience. During that time, Protsik (1995) noted that schools in the rural areas typically had half as many days of school as their urban counterparts. One can easily recognize that major differences in schools would have as large an impact on student learning as teachers would, however, the same cannot be said for the modern school and the state and federal guidelines that govern the operation of public schools.

The typical teacher of the 19th century did not have proper professional training. In 1860, a study of teachers in Southeastern Michigan found that 77% of female teachers were younger than 24 with few having an education beyond the elementary level (Spring, 1994). One good reason for this lack of professional training and youth of those in the profession was that teaching was not normally thought of as a career in those days but rather a "transition from the parents' home to the husbands' home" (Protsik, 1995, p. 4). Most schools did not allow married women to teach, and therefore, a large number of

teachers left the profession prior to gaining years of experience when they married. These circumstances further detracted from the need to invest in professional teacher training (Protsik, 1995). Additionally, the local school boards and communities also did not find the expense associated with teacher training to be a worthwhile one because the local classroom teacher was quite likely to only teaching for a few years. This lack of retention of teachers staying in the profession would greatly multiply the cost of training teachers.

Paying teachers during this time was not just based upon money. Compensation to teachers was sometimes made with money, but teacher pay normally involved room and board as well (Protsik, 1995; Spring, 1994; Springer, 2010). Although this decreased the financial burden of the community and local school board, it also contributed to a less than ideal living situation. Frequently, teachers moved from the home of one student to the home of another student monthly or even weekly. One study of Wisconsin teachers in the 1850s found that the average female teacher's career was 18 months long (Clifford, 1991). With the lack of formal education, ongoing training, and financial compensation that allowed teachers to later afford their own private residence, along with the restrictions many schools placed requiring teachers to remain unmarried, teacher retention was low, and the quality of instruction failed to increase for several years.

During the late 1800s and early 1900s, the population of the nation changed with the process of urbanization. During this process, cities became much larger, and fewer people lived on the subsistence farm. These changes required changes in the school system because in some locales, the student population in small, rural, one-room schoolhouses declined, and the student population in urban schools increased. Yet, in other communities, families that remained in rural areas did not continue to farm simply

to survive in ways they had previously. Combined with the availability of mechanized farm equipment, fewer students were required to work on the farm, and more students were able to attend school. A popular solution to both of these changes in student population density was to consolidate the tiny one-room schoolhouses into a countywide school district supervised by a county superintendent (Protsik, 1995). This consolidation allowed less oversight of the classroom teacher by the local school board because as schools became larger, the supervisory role of the principal became necessary. In addition, new laws brought about longer school years and teacher certification requirements.

These larger schools experienced another development: the graded school. Students were grouped in classrooms by ability and age, much how traditional schools are still organized today (Protsik, 1995). This level of organization brought about the beginnings of a more rigid curriculum with a pre-determined set of knowledge and skills. Then, students were expected to learn the content associated with a particular grade level of course of study (Springer, 2010). The origins of the graded school in the late 19th century are comparable to the structure in many public schools used today, over 100 years later. There are innovative practices that have vastly changed the structure of schools, but many school districts across the United States find that the graded structure based on ability and age is efficient and predictable for growth and budgeting purposes.

The shift to the graded school paved the way for reform in teacher pay. Even though salary schedules based on peoples' gender or other demographic characteristics varied greatly, there was some organization in how the salaries were distributed. Therefore, teachers could predict what their compensation would be over the next several

years, even though the salary schedules were still viewed as “overtly sexist and racist” (Protsik, 1995, p. 9). During the late 1800s and early 1900s, as aforementioned changes were made into laws that regulated the education and training a teacher must possess, there were also differences between the requirements of elementary and secondary classroom teachers. Therefore, in recognizing more advanced training and education, most secondary teachers received higher pay compared to elementary teachers. Paying all classroom teachers that taught students of the same grade level equally represented progress.

As early as 1897, changes from this system of pay to a system that more resembles the one used today were beginning to come about. By the end of the 1920s, most of the nation was paying teachers using what was called a *single salary schedule* (Protsik, 1995). Single salary schedule referred to what one would recognize today as a school district’s teacher salary schedule: teachers received a higher salary for both more years of experience and for more formal education. Even more fairly, under this system of pay, which was new at the time, elementary school classroom teachers received the same pay as high school classroom teachers with the same years of teaching experience and the same level of education. This represented a significant shift in teacher salary from the demographics of the teacher to the experience and training or formal education a teacher possessed. Thus, the common salary schedule of the 1930s resembled the common salary schedule used nearly 100 years later.

The changes in the structure of communities and associated population density led to a more organized school district system. Additionally, the advancements in race and gender equality had major impacts on teacher salary. These changes, combined with other

modifications, had a major impact on the number of individuals who were able to choose school teaching as a long-term professional career. With more members of the profession viewing their job more as a career and less of a transitional job, the quality of instruction had the potential to improve in ways that were not possible just a few years prior.

History of Legal Impacts on Education

Not until April 23, 1635, did the first public school in the colonies open (*Boston Latin School History*, n.d.). In the 17th century, public schooling was new, and the system of schooling outside the home or church was an optional method of education. However, in 1642 that system began to change. The colony of Massachusetts passed the first compulsory education law. Through the next two decades, other colonies followed with similar laws. Compulsory attendance laws were written in one of two periods: the symbolic or the bureaucratic (Provasnik, 2006). The point in time separating these two eras of compulsory attendance laws, Provasnik (2006) argued, was 1890. Prior to that, the laws were not written in a way that enabled enforcement. Thus, they were primarily symbolic. The laws symbolized the idea that children attended school but failed to provide avenues to allow the ideal to become a reality. In contrast, the laws passed after 1890 provided school leaders, local law enforcement, and the judicial system to enforce the mandatory attendance of children in schools. As with most changes, even historians have marked 1890 as the pivotal year. After this time, when looking across the nation, a profound but gradual change occurred. It cannot be disputed that these laws provided more students than ever access to the classroom, but Provasnik questioned the degree to which these bureaucratic laws mandated education for all children. By the time the 20th

century arrived, over 30 states had compulsory attendance laws; and by 1910, 72% of the nation's children attended school (Lingwall, 2014).

In the United States, the federal government has historically had a small or nonexistent role in educational law-making. All state constitutions require states to provide an education to students; therefore, laws governing individual states are widely varied (U.S. Department of Education, 2005). However, in the last half-century, federal laws have been passed, bringing drastic changes to the public education systems of the states. For example, in 1965, The Elementary and Secondary Education Act and the State School's Act were passed by Congress. These laws gave support to states in the form of grants to serve children with disabilities (NCLB, 2002). In 1973, the Rehabilitation Act of 1973 contained sweeping changes to the legal landscape of education, the most notable being Section 504. Section 504 guaranteed certain rights for all citizens regardless of their disabilities and took effect in May of 1977 (NCLB, 2002). This law was the first guarantee of a free appropriate public education to all children. Additionally, Congress enacted the Education for All Handicapped Children Act (1975), otherwise known as Public Law 94-142 or PL 94-142. Today, educators, administrators, and families might not realize that the concepts emanating from these laws are recent in nature and have not always been the principles upon which education for students with disabilities was founded.

Case law in the years since the passage of these laws has clarified the responsibility of the local public school to select qualified teachers to uphold the principles of these legislative actions. Improving educational results for all children, even those with disabilities, was an essential element of the national policy that ensured

equality of opportunity, full participation, independent living, and economic self-sufficiency for all children (Education for All Handicapped Children Act, 1975). Only the selection of qualified teachers could ensure this mandate, qualified in the sense of proper training and experience. For example, prior to the enactment of these laws, the needs of a large number of children classified as disabled were simply not met (NCLB, 2002). Because teachers lacked the training to deal with specific student conditions, some children were not receiving the correct services specific to their conditions and were not provided with a proper diagnosis of their conditions. However, because teacher training now includes these skills, students can attend their local public school and be educated in the same environment and with the same methods as their non-disabled peers (NCLB, 2002). Because of the advancements in teacher training, many schools can offer students with disabilities an appropriate education inside the public school system.

A later revision of PL 94-142 recognized that it was initially not as successful as intended due to low expectations and a lack of focus on research-based instructional methods. This law was renamed the Individuals with Disabilities Education Act (2012), and it is still in effect today. The revision specified that the education of all children, even those with special needs, can be made more effective by having high expectations, increasing the parents' role in the educational process, using local and state laws in harmonious conjunction with the federal law, employing teachers with specific training in educating disabled children, providing instructional aids, providing teacher professional development, and more. Among other things, this law applauded changes that had been made but called for more reform and a better educational experience for all students.

The NCLB Act of 2001 (2002) changed the way schools focused on student academic achievement. Since that time, schools have worked hard to improve student academic achievement by improving and refining teacher hiring practices by school administrators (Darling-Hammond, 1999; Goldhaber, 2002; Stronge, 2007). Even though the primary focus of NCLB (2002) was to improve student achievement in literacy and mathematics, NCLB required that teachers in classrooms where core subjects were taught be highly qualified. Although separate from teacher licensing, highly qualified status for teachers is defined by the legislation. While this status was separate from teacher licensure, federal regulations dictated who may and may not be hired as a teacher in a particular classroom based on the grade level of the students or the content of the subject to be taught.

NCLB (2002) aimed to ensure that all children have a fair, equal, and significant opportunity to obtain a high-quality education by the following:

- Providing high-quality academic assessments, accountability systems, teacher preparation and training, curriculum, and instructional materials are aligned with standards;
- Meeting the educational needs of low-achieving students including limited English proficient children, migratory children, children with disabilities, and more;
- Closing the achievement gap between high- and low-performing children, especially between minority and nonminority students, and between disadvantaged children and their more advantaged peers;

- Holding schools, districts, and States accountable and turning around low-performing schools;
- Budgeting resources to make a difference in schools where students have more need;
- Using state assessment systems designed for student achievement;
- Providing greater decision-making authority and flexibility to schools and teachers in exchange for greater responsibility for student performance; and
- Affording parents substantial and meaningful opportunities to participate in the education of their children; and more.

The law was specifically aimed at closing the achievement gap between different populations of students within schools and school districts by providing students with teachers who were qualified to offer high-quality instruction and follow up. This was believed to be an effective way to close the achievement gap between different populations of students across the nation.

The NCLB Act of 2001 was a broad federal law that encompassed many areas of public education. However, these tenants of the law were considered to be the most noteworthy: an assessment and accountability system, a definition of and demand for highly qualified teachers, and the use of scientifically-based research. The law also contained a variety of other aspects inherited from previous versions of the Elementary and Secondary Act (Hess & Petrilli, 2006). “NCLB ... has directed greater attention to low-achieving students and intensified efforts to improve persistently low-performing schools” (Jennings & Rentner, 2006, p. 110). The decades-old federal law that mandated a variety of improvements in public education had a great impact on the typical focus and

work of teachers and school leaders (Jennings & Rentner, 2006). According to Hess and Petrilli (2006), NCLB “is probably the most ambitious and far-reaching education legislation that Congress has ever passed. Its aims are far more dramatic than those of the original Elementary and Secondary Education Act” (p. 2). The accountability systems that came with NCLB regarding student achievement levels had an impact on many aspects of education (Hess & Petrilli, 2006). In an effort to meet the accountability system outlined by NCLB, school leaders attempted to improve many aspects of the school experience, specifically teacher quality and teacher selection.

Over a decade after the law was enacted, the future of the law was in question. Gains in student achievement had been made, but the achievement gap was not closed completely. The comparison between Public Law 94-142 and NCLB indicated that, on two separate occasions, Congress sought to find a solution to the achievement gap of different populations of students. There were approximately 25 years between the passing of these two laws. Yet, it was difficult to see the effect of the first legislation since special education students were still an important part of NCLB. However, the emphasis on the teachers’ previous training had opened the door for more study on the effects of teacher degree and experience on student achievement.

What Is Student Achievement?

Student achievement is a broadly defined topic. Some indicators of student achievement include grade point average, student scores on standardized academic achievement exams, measures of annual growth of students’ standardized academic achievement exam scores, student scores on college entrance exams, success after high school graduation, and career advancement (Archibald, 2009; Gronlund, 1998; Rowan et

al., 2002). “Although there are many ways to judge the success of a teacher or a school, today’s standards-based accountability systems focus most on student performance on standardized tests” (Archibald, 2009, p. 26). There is more than one reason why this statement is true. Standardized exam data are much easier to use in studies from a statistical analysis standpoint. Data such as grade point average or surveys about student success after school are not controlled in the strict manner in which the administration of standardized exams is. Additionally, standardized exams are developed for large numbers of students; therefore, the sample sizes available from these data are most convenient for analysis of student achievement, because they are large.

The relationship between student achievement and success after high school is difficult to measure. Many students go to the workplace after high school, and some of their peers seek higher education. There are about as many different types of higher education available to students after high school as there are types of jobs. The true measure of a school is the degree to which its students are successful after they graduate, but due to the difficulties in collecting the needed data regarding student performance after high school, student achievement examinations that are taken during their public school years are most frequently and reliably used in determining the quality of teachers and schools.

NCLB demanded that student achievement be used to measure the effectiveness of schools (Boyd et al., 2007; NCLB, 2002). Furthermore, through NCLB, “the federal government has become more deeply involved in seeking to boost student achievement” (Archibald, 2009, p. 4). NCLB (2002) indicated that schools must work to improve student achievement through “adequate yearly progress,” and those schools that do not

will “come under corrective action” (p. 3). As a preemptive measure, the goal of many school administrators throughout the nation was to improve student achievement in advance of the student achievement requirements in this law to avoid corrective action. Therefore, administrators looked for teachers who could contribute to the attainment of the student achievement requirements of NCLB (Darling-Hammond, 1999; Goldhaber, 2002; Stronge, 2007).

Many studies have looked into the relationship between adequate resources and student achievement (Archibald, 2009; Hanushek, 1989; Greenwald, Hedges, & Laine, 1996; Hedges, Laine, & Greenwald, 1994). These studies revealed mixed results. Thus, combined with other studies, scholarly debates have been fueled regarding the measurement of student growth and school effectiveness. This study did not attempt to deny the importance of resources schools had available to them but sought to add more information regarding the factors that impact student achievement. This study analyzed the relationships between teacher characteristics and student achievement: specifically, teacher degree and teacher experience.

Teacher Quality: Teacher Degree and Teacher Experience

In most states, including Arkansas, individuals are eligible for teacher licensure with a bachelor’s degree. Although some teachers pursue a master’s degree, few states require a master’s degree for the purpose of licensing teachers. Salary plans across the nation indicate more pay for a master’s degree when compared to pay for a bachelor’s degree (Darling-Hammond, 1999; Goldhaber, 2002; Stronge, 2007). However, Goldhaber (2002) found that the number of advanced degrees conferred in education is declining. Prior to the NCLB Act of 2001 (2002), there were varied definitions of what made

teachers qualified for service in the classroom (Boyd, Lankford, Loeb, Rockoff, & Wychoff, 2008). Regarding teacher quality data as it relates to student achievement, Boyd et al. (2007) concluded that “the research evidence is simply too thin to have serious implications for policy” (p. 45). The highly qualified teacher designation required by NCLB (2002) has created a standardized definition of what training and experiences one should have to be a classroom teacher.

Teacher quality is an important factor in the success of students and schools, because after removing the effects of student demographics, studies have found that the greatest factor affecting student achievement is characteristics of the students’ teacher, which is even more impactful than the student’s socioeconomic status (Archibald, 2009; Sanders, 2000; Sanders & Rivers, 1996). Wenglinsky (2000) found that the impact of teacher quality was as large as socioeconomic status. Since changing student demographics was impossible, teacher quality became the most practical variable that affected student achievement that could be changed, selected, or preferred. Previous studies have focused on teacher quality by looking at factors such as teacher experience, education, certification or licensure, licensure exam scores, ability, and evaluation score, the school district’s ongoing professional development practices, and per-pupil expenditures (Myrberg, 2007; Wayne & Youngs, 2003).

This study sought to determine the degree to which student achievement was affected by two specific components of teacher quality: teacher degree and teacher experience. Archibald (2009) conducted a study primarily to determine if increases in per-pupil expenditures in certain categories had an impact on student achievement. While conducting that study and attempting to remove the effects of other variables, it was

determined that both teacher degree and teacher experience positively and significantly impacted student achievement. However, not all studies found favorable results.

Teacher Degree

Darling-Hammond (1999) researched the effects of state policy upon student achievement, specifically seeking whether or not certain types of state policy regarding learning standards impacted student achievement. She determined that across all types of state standards initiatives studies, teacher education had a positive impact on student achievement, in most cases. Specifically, she identified that there were several types of advanced degrees that teachers might earn: teaching, leadership, administration, subject area in which the teacher is teaching, a different subject area, school counseling, curriculum, media specialist, gifted and talented, among others. Her results are interesting to school leaders today because it helps them to know that encouraging or supporting a teacher to earn an advanced degree in any educationally related area will increase that teacher's student achievement scores. In her study, Darling-Hammond accepted both certain types of professional development and teacher degree as teacher education. More specific to teacher degree, Darling-Hammond, Berry, and Thoreson (2001) concluded that the students of teachers who had master's degrees performed better on state exams than those of teachers with bachelor's degrees. They indicated the power of the impact was lesser in teachers with more experience but still present when compared to those teachers with less experience. The authors specifically stated that the positive effects of teacher degree were greatest upon the student achievement in mathematics and science.

Archibald (2009) found that a master's degree in any subject area, meaning a master's degree in a content area, not a positional or functional area like administration,

translated into increased student achievement. Regardless of whether the master's degree was in the same subject area for which students' exam scores were studied or not. Furthermore, he stated that since the impact of teacher experience was controlled in this study, this finding was even more powerful.

Myrberg (2007) used regression analysis to seek predictive relationships between student achievement on standardized tests and several other variables including teacher degree, teacher preparation program characteristics, and characteristics of ongoing professional development. Although his study only examined Grade 3 literacy, he found teacher degree and teacher preparation programs had a positive effect on student achievement. This study also found that teacher experience had no effect on student achievement.

In contrast to the previous studies discussed, Rowan et al. (2002) found something different. They reported that not only did an advanced degree attained by a teacher not result in increases in student achievement but in certain grade levels, an advanced degree negatively impacted student achievement. Specifically, the early grades were the most susceptible to this inverse relationship between teacher degree and student achievement. Rowan et al. did note that, in many cases, the advanced degrees could have been used to circumvent the traditional teacher preparation programs. In certain states, it is possible to more quickly obtain a teaching license and a teaching job without the traditional bachelor's degree in education. Many of those methods allow an individual with a master's degree or higher to obtain a teaching license after passing content area exams. These programs also do not require teachers to participate in supervised student teaching

or internship programs. Therefore, the teachers in the sample might have had less pedagogical training.

Teacher Experience

Andrew and Schwab (2012) found that the first year of teaching experience provided teachers with the largest increase in their effectiveness as teachers as measured by student exam scores. However, growth was larger for teachers whose preparation programs did not include experience in the classroom as a component of the program. Additionally, the study concluded that even teachers with 10-20 years of teaching continued to improve, as measured by their students' achievement via exam scores, but the annual improvements diminished as each year passed.

Myrberg (2007) found that teacher experience had no significant effect on student achievement. This study only included students in Grade 3 and solely in the area of literacy. It examined several other teacher characteristics while seeking to find relationships between those and student achievement. In contrast, Hanushek (1997) determined that having some teaching experience affects student achievement. Hanushek noted that most improvements in teacher quality through experience were realized early in the teacher's career, and the effects on student achievement after just four years of teaching and for the years following were not significant. However, he found improvements in teacher quality for teachers receiving embedded and ongoing professional development. According to other studies, similar increases in student achievement were detected up through three to five years of teaching experience (Hanushek, Kain, O'Brien, & Rivkin, 2005; Rockoff, 2004). These studies found that

after that initial period, however, increases in student achievement were only slightly significant.

In a similar study, Rowan et al. (2002) found that increasing student achievement occurs in a significant way for the first three years of a teacher's career. After the third year, the increase in student achievement was not significant over the previous year. However, the research found that the experience gained did translate to significantly higher student achievement after each 7-year period of teaching.

Goe (2007) had similar results in a study examining the impacts that several teacher quality characteristics had on student achievement. She found that after four or five years of teaching experience, student achievement stopped increasing based upon teacher experience. Additionally, she concluded that even though student achievement increases stopped after that period of time, experienced teachers continued to add value to schools after the increase in student achievement ceased as experience continued to accumulate. Her research found that more experienced teachers contribute to schools in other positive ways aside from increasing student achievement on standardized exam schools. This was accomplished by providing a stable maturity that comes with experience and providing mentorship to teachers in need, such as new teachers or those who are struggling with a particular teaching assignment, student, or in other ways.

In contrast, Kini and Podolsky (2016) found that as teachers' experience increased, so did student achievement and three more interesting results related to teacher experience. They found that in addition to increasing student achievement on exams, students' school attendance rates increased as teacher experience increased. Additionally, they reported that the longer a teacher gained experience in a particular grade level,

subject area, school, or district, the increase in their students' achievement continued at a faster rate than if any of those were changed. For instance, if a teacher changed grade levels or schools, his or her students' achievement did not increase as much as if he or she remained in the same teaching assignment. Finally, this study revealed that teachers with more experience were a better benefit to their teaching colleagues and the school overall than teachers with less experience. They found that experienced teachers knew the challenges that would arise from many situations. Because of their experience, they also had ideas, solutions, and best practices that teachers with less experience did not have. As a part of a grade level or departmental content team, experienced teachers shared their experiences with the team, which included the lesser experienced teachers, and brought added benefit for the good of the whole.

Archibald (2009) looked for a relationship between the change in student test scores from a pre-test given in the fall to a post-test given in the spring. He chose teacher experience as the variable. In his study, he found that teacher experience had a mixed impact on student achievement across subjects, meaning that teacher experience had a significant impact on student achievement in some, but not in all, subjects. Although not all subjects had exam data suitable for this study, he found that students' achievement in English language arts and social studies was not significantly different as teacher experience increased. However, in science, mathematics, and vocational studies, the increase in student achievement was significant as teacher experience increased.

Odden et al. (2004) analyzed the possibility that the growth of student academic achievement between pre-test and post-test was related to the experience teachers had in the classroom. This study painstakingly separated all years of employment as a teacher

from actual years of experience in the classroom as the primary teacher. The authors reported that student achievement increased as teachers gained more years of experience. Student achievement data from the examinations selected for this study were pre-test and post-test exams given during the same school year, as opposed to examining data from mandated, standardized exams from one year to the next. While this study was not designed to study the speed with which experienced teachers could help students close the achievement gap between their current performance level and the expected performance level, the analysis of the data from that concept would be of interest to school leaders.

Ladd and Sorenson (2014) examined the effect of teacher experience and found that it positively impacted student achievement. The impact in the first years of teaching was much higher for teachers of mathematics than the increase in student achievement for the first years of English language arts teachers. Their study purported that the difference in the impact of teacher experience upon these two subject areas was most likely due to the number of individuals that began teaching mathematics with emergency licensure. In other words, since mathematics is a subject for which it can be difficult to find a fully licensed teacher, some teachers begin to teach mathematics without having completed all of the training to do so. During their first years in the classroom, they are required to complete that training, and therefore, during the first years of their experience, they would become much better teachers. Ladd and Sorenson reported that the increase in student achievement attributed to teacher experience leveled off after the 12th year of teaching.

Why Examine Teacher Experience and Teacher Degree?

Teacher degree and teacher experience are believed to have some effect on teacher quality or effectiveness based on the evidence provided by teachers' national salary schedules. However, there is no clear indication in the literature that salary schedules were established in this manner because of a perceived increase in student achievement based upon either teacher experience or teacher degree. The reasons why the salary schedules developed are unknown. This study was designed to explore two commonly used teacher characteristics and determine their effects on student achievement.

Although there are various desirable characteristics administrators want when hiring a teacher, administrators only have access to a few of those characteristics during the period of time just prior to hiring a new classroom teacher; furthermore, finding the measures that contribute to student achievement is limited (Boyd et al., 2007). Teacher degree and teacher experience are two measurable and verifiable characteristics. School administrators need to know what impact these two variables have on student achievement considering their availability at the time hiring decisions are made. Boyd et al. (2007) also noted that other studies have examined these characteristics and found that evidence is too thin to make a definitive conclusion in all cases. However, studies have examined a variety of teacher characteristics on student achievement without solely focusing on teacher degree and teacher experience with intensity (Boyd et al., 2007). Therefore, a study focusing on teacher degree and teacher experience and collective effects each has on student achievement is necessary (Odden et al., 2004).

School administrators at institutions of higher education will also find interest in this study. Most commonly, teachers are paid more for having a master's degree than for having a bachelor's degree. Certain institutions of higher education rely on master's degree programs because of their profitability for the institution. This study does not examine the effects of master's degrees from one institution only or compare one institution with another, but it does provide general information regarding the increase in teacher quality that comes from a teacher that has a master's degree over one that only has a bachelor's degree.

Conclusion

Although studies have attempted to determine critical attributes of the school system's critical employee, the teacher, the relationship existing between teacher degree and teacher experience and their effects on student achievement should prove to be of great importance because of the ease with which these characteristics can be measured. Despite their simplicity to understand and measure, these metrics should be heavily considered if their effects are significant. The studies in the review of related literature revealed mixed results. Typically, these studies included many variables with either teacher experience or teacher degree being only one. None of these studies examined only these two variables, and none of these studies used the ACTAAP Benchmark exams to gather student achievement data.

CHAPTER III

METHODOLOGY

School leaders make decisions regarding education that lead their schools toward student achievement targets. Those decisions are broad in nature and encompass areas such as school culture and climate, curriculum, instructional methodologies, professional development, learning environment, budget, and more. In addition to these types of decisions school leaders face, the decisions regarding which teachers are best suited to work in their schools or school districts or which teachers will contribute the most to the attainment of student achievement targets are at the forefront of the minds of school leaders.

Research of related literature indicated that some studies had concluded there is a relationship between teacher degree and teacher experience with regard to the effect those variables have on student achievement (Andrew & Schwab, 2012; Archibald, 2009; Gallagher, 2004; Hanushek, 1997; Rowan et al., 2002), but other studies have indicated that there is no significant statistical relationship that exists (Darling-Hammond, 1999; Myrberg, 2007; Odden et al., 2004). These studies represented a wide range of general topics, specific intents, student achievement measures, student populations, nations, and measurements of teacher characteristics. The present study seeks to determine if a significant difference exists between teacher degree, teacher experience, and literacy achievement as measured by the Arkansas ACTAAP.

With student achievement goals becoming increasingly more difficult to reach each year, any clear relationship existing between characteristics of teachers and student achievement will serve school leaders well as they continue their decision-making work. No small amount of time is spent on personnel decisions in schools and school districts. Many factors influence which teachers are hired and, to a smaller extent, which teachers are not rehired for the next school year. Although hiring decisions cannot be greatly simplified, the information in this study would be helpful to have at hand during these periods when school leaders are called on to make choices about which individuals will come to work in their schools as teachers.

The main purpose of this study was to determine the possible effects teacher degree and teacher experience had on student literacy achievement. The following four hypotheses guided this study:

1. No significant difference will exist by teacher degree between teachers with 3 or fewer years of experience versus 4 or more years on literacy achievement as measured by the literacy ACTAAP benchmark for third-grade students in a Northwest Arkansas school district.
2. No significant difference will exist by teacher degree between teachers with 3 or fewer years of experience versus 4 or more years on literacy achievement as measured by the literacy ACTAAP benchmark for fourth-grade students in a Northwest Arkansas school district.
3. No significant difference will exist by teacher degree between teachers with 3 or fewer years of experience versus 4 or more years on literacy achievement

as measured by the literacy ACTAAP benchmark for fifth-grade students in a Northwest Arkansas school district.

4. No significant difference will exist by teacher degree between teachers with 3 or fewer years of experience versus 4 or more years on literacy achievement as measured by the literacy ACTAAP benchmark for sixth-grade students in a Northwest Arkansas school district.

In this chapter, I discussed the research design, the sample, the instrumentation used, the data collection, the analytical methods, and the limitations of this study.

Research Design

This was a quantitative, causal-comparative study. In this between groups design, the independent variables for each of the hypotheses were teacher experience and teacher degree. The dependent variable for the four hypotheses was literacy achievement as measured by the literacy portion of the ACTAAP Benchmark Examination for Grades 3, 4, 5, and 6, respectively. The use of the causal-comparative design was supported by Mills and Gay (2016) in instances where the factors already exist in the schools or the characteristics studied are pre-existing conditions.

Sample

For this study, the population was comprised of students from a suburban school district in Northwest Arkansas. Data from the 2013-2014 school year literacy portion of the ACTAAP Augmented Benchmark examination administration were used. Of the usable data, there were 1,411 student scores in Grade 3; 1,453 student scores in Grade 4; 1,488 student scores in Grade 5; and 1,409 student scores in Grade 6. All the students in these grades were required to take this exam except students considered by the special

education department to be significantly cognitively impaired and students served through the special education department with homebound services; these students were excluded from the study. In addition, students whose teachers had incomplete data were excluded from this study. The students' racial percentages were 30% White, 58% Hispanic, 10% Asian/Pacific Islander, and 2% African American. Of the students in the sample, 67% qualified for free or reduced-cost lunches.

Instrumentation

Electronic student exam scores from the literacy portion of the ACTAAP Augmented Benchmark examination were used for this study. The Technology Department from the Northwest Arkansas school district provided these scores electronically. It also provided information about teacher degree and teacher experience. Student and teacher names were removed by an employee of the Technology Department to protect the privacy of these individuals. The employee of the district's Technology Department received these data, which included the scores from the literacy portion of the ACTAAP Augmented Benchmark Examination, from the Arkansas Department of Education Data Center.

Teacher degree was entered as a bachelor's degree or a master's degree or higher. Teachers must have completed a higher degree before the beginning of the 2013-2014 school year to have the master's degree or higher characteristic. Teacher experience was entered as the amount of experience recorded in the Arkansas Public School Computer Network (APSCN) Financial Management System (FMS) database for the 2013-2014 school year. Teachers occasionally have a half a year of teaching experience. The amount of experience used in this study is the exact amount entered into APSCN FMS even if

that number was not a whole number. The individual district's policies and procedures regarding one-half of one year's teaching experience were followed during this study.

The metric for student academic achievement used in this study was the literacy portion of the ACTAAP Augmented Benchmark examination for Grades 3-6. This exam was developed for the Arkansas Department of Education by Pearson Assessments Company (2009). The examination was typically administered during the month of April on dates set by the Arkansas Department of Education. The examination consisted of language, mathematics, reading, and writing sections for Grades 3-6. Grade 5 also included a section for science. The literacy portion of the examination was reported as one score, and it was made up of the language, reading, and writing sections of the examination.

The language section of the examination consisted of one timed segment 30 minutes in length consisting of 43, 47, 51, and 54 multiple-choice questions for Grades 3, 4, 5, and 6, respectively. The reading section of the examination consisted of five segments. Four of those segments were timed segments 30 minutes in length. There were eight multiple-choice questions and one open-response question during each of these four segments. The fifth reading segment was divided into two parts. For Grades 3-6, Part 1 was five minutes in length and consisted of 10, 11, 12, and 13 multiple-choice questions for Grades 3, 4, 5, and 6, respectively. Part 2 was 25 minutes in length for Grades 3-6 and consisted of 17, 19, 20, and 21 multiple choice questions for Grades 3, 4, 5, and 6, respectively. The writing section of the examination consisted of two timed segments with each being 45 minutes in length and including one open response question.

The examination was given over multiple school days. Four mornings were used for Grades 3, 4, and 6. Five mornings were used for Grade 5 because of the additional science portion of the examination. The Arkansas Augmented Benchmark Examination was based on the Arkansas Curriculum Standards Frameworks. Writers of the *Arkansas Augmented Benchmark Examinations Technical Report* (Arkansas Department of Education, 2013) noted the following:

Content validity involves the systematic examination of the test content essentially to determine whether it covers the curricular standards to be measured. The Arkansas Augmented Benchmark Examinations are developed to measure what Arkansas educators believe all students should know and be able to achieve in the respective content areas. Assessment results paint a picture of how Arkansas students and schools are doing when compared with frameworks established by the ADE. Each test is carefully and deliberately constructed to reflect a detailed description of the content it purports to measure.

For assessments like Arkansas Augmented Benchmark Mathematics, Literacy, and Science Examinations, which are intended to measure student performance in relation to the Arkansas Frameworks, content validity evidence is primary.

Content validity is the most relevant and important source of evidence. The content validity of the Arkansas Augmented Benchmark Examinations is based on the alignment of the assessments to the Arkansas Frameworks and the knowledge and skills expected of Arkansas students. (p. 66)

The highest achievable score was 96 on the literacy portion of the exam and 60 on the mathematics portion of the exam. Student raw scores were then converted to scaled

scores, and these scaled scores were compared against cut score benchmark levels. At that point, students were determined to be below basic, basic, proficient, or advanced in the areas of literacy, mathematics, and science individually.

The reliability of the ACTAAP is displayed in Table 1. Table 1 “displays the overall stratified coefficient alpha, indicating the degree of internal consistency of each assessment” for the Spring 2011 administration of the exam (Arkansas Department of Education, 2013, p. 62). In addition, Table 1 “shows the average item-test correlations for multiple-choice and open-response items” for the Spring 2011 administration of the exam (Arkansas Department of Education, 2013, p. 62).

Table 1

ACTAAP Reliability Scores

Grade	Subject	Stratified Coefficient Alpha	Multiple-Choice	Open-Response
3	Literacy	.88	.34	.54
3	Mathematics	.88	.33	.63
4	Literacy	.88	.30	.49
4	Mathematics	.87	.32	.60
5	Literacy	.88	.31	.47
5	Mathematics	.86	.33	.60
6	Literacy	.89	.32	.49
6	Mathematics	.89	.37	.63

The decision consistency measure scores how well the examination places examinees into the performance classifications (Arkansas Department of Education, 2013). Table 2 shows decision consistency measure indices for the Spring 2011 administration of the exam.

Table 2

Decision Consistency Measure

Grade	Subject	Decision Consistency Measure	
		Decision Accuracy	Decision Consistency
3	Literacy	.805	.729
3	Mathematics	.838	.776
4	Literacy	.834	.767
4	Mathematics	.816	.746
5	Literacy	.816	.742
5	Mathematics	.782	.704
6	Literacy	.811	.735
6	Mathematics	.813	.743

Validity is another important concern regarding the use of student examination scores. The state of Arkansas' Department of Education (2013) issued the following statement noting the validity of the ACTAAP Augmented Benchmark Examination:

The content validity of the Arkansas Augmented Benchmark Examinations is based on the alignment of the assessments to the Arkansas Frameworks and the knowledge and skills expected of Arkansas students. From the inception of the

Arkansas Augmented Benchmark Examinations, committees of educator, item development experts, and assessment experts, and the Arkansas Department of Education staff have met annually to review new and field-tested items. The review committees participate in this process in order to ensure test content validity of the Arkansas Augmented Benchmark Examinations. (p. 66)

Data Collection

Data were collected by the Technology Department of a Northwest Arkansas school district by importing the results dataset spreadsheet into its locally managed database. An employee of the Technology Department collected the data. He created the dataset, compiled the information, and followed these procedures to protect the privacy of the students and teachers involved. The data were collected during November 2013. They were collected then because the data corrections process was completed by that time, and the data had been certified as correct by the Arkansas Department of Education and the school district. The data collection took less than one day to complete.

Those student achievement results were prepared into a dataset by removing the students' names and all other demographic information except those used in this study: grade and gender. A new unique identification number was assigned to students' data. This identification number was not based on any identification number that previously existed. This protected the privacy of those students involved by preventing this researcher from determining who the students were or what their test results were.

From the local database, data about the students' teachers were added into the dataset. Teacher data only included teacher experience in years, teacher degree, and students in the dataset that each teacher taught for the year being studied. Teacher

experience was reported from APSCN data as whole years. Teacher degree was reported from APSCN as bachelor's, master's, specialist, doctorate, or other. Both of these pieces of data about each teacher were included in the dataset. A new unique identification number was assigned to teachers. This identification number was not based on any previously existing identification.

Analytical Methods

The results of the ACTAAP benchmark literacy scores were compiled for the four groups in each grade level (bachelor's degree/3 or fewer years of experience, bachelor's degree/4 or more years of experience, master's degree/3 or fewer years, and master's degree/4 or more years). To address the null hypotheses, four 2 x 2 factorial ANOVAs were conducted using teacher degree (bachelor's degree versus master's degree or higher) and teacher experience (3 or fewer years of experience versus 4 or more years) as the independent variables and the literacy raw scores for each of the four grade levels as the dependent variables. To determine statistical significance for the hypotheses, the researcher used a two-tailed test with an alpha level of .05.

Limitations

Limitations are noted in most research studies and help readers interpret the results of the various studies. The following were limitations identified with this study. First, the sample in this study was restricted to only one school district in Northwest Arkansas. Even though the school district was large and included 29 schools and approximately 22,000 students, only using students from one school district was a possible limitation of this study. In a related matter, because only one district was used, the diversity of the demographics did not resemble the students from across the state.

However, the school district did have more diversity compared to some districts in the state.

Second, the achievement levels of the schools used in this study were high compared to many schools in other districts in the state. Schools that had lower or higher overall student achievement or were in school improvement status as determined by NCLB had, on average, lower or higher student achievement than other schools.

Third, this study used scores from only one exam, which was state-specific to Arkansas. Using student achievement data from a nationally standardized assessment instrument would have increased the validity and reliability of the study. It would have also increased the generalizability of the results. Similarly, scores from only one year's administration of the exam were used for this study. Increasing the number of years of student scores for individual teachers could have provided a more accurate measure of the value teachers contributed to student learning and helped reduce the effects of above or below average classes of students.

Fourth, although teachers were divided into categories of those with bachelor's degrees and those with master's degrees or higher, those categories could have been defined more precisely and provided more information to the reader. Specifically, if a teacher had any master's degree that was recognized by the school district as justification to increase the teacher's pay according to the district's salary schedule, which pays more for higher education attained, that teacher was included in the category of teachers with a master's degree. What was not considered for the purposes of this study was whether the master's degree was in the specific content area taught or whether it was a pedagogical degree. Furthermore, teachers who had attained master's degrees in a content area might

be divided into categories with regard to whether their content area master's degree was in the area in which their students' scores were used for the purposes of this study. Also, teachers who were currently in a master's degree program or had completed a master's degree program during the current school year were placed in the bachelor's degree category.

Fifth, this study excluded students who were severely and profoundly disabled because those students took a different examination. Therefore, the results of this study may not pertain to teachers of those students as strongly as it pertains to teachers of students not considered severely and profoundly disabled.

CHAPTER IV

RESULTS

This quantitative study determined the effects of teacher degree and teacher experience at differing grade levels of students' literacy achievement. For this study, literacy achievement was measured by the Arkansas ACTAAP Augmented Benchmark Examination. Scores from students included in this study were those in Grades 3-6 in a Northwest Arkansas school district during the 2013-2014 school year.

For this study, two independent variables were used. The first independent variable was teacher degree with two levels; either teachers had either a bachelor's degree or a master's degree or higher. The second independent variable was teacher experience with two levels; either teachers had 3 or fewer years of experience or 4 or more years of experience. Table 3 depicts a representation of the manner in which scores from students' achievement were divided for this study.

Table 3

Graphic of Between-Groups Factorial Design Showing Teacher Experience by Teacher Degree Type on Literacy Achievement Scores

Degree	Experience	
	3 Years or Fewer	4 Years or More
Bachelor's	Scores from students whose teachers had a bachelor's degree and three years or fewer of teaching experience	Scores from students whose teachers had a bachelor's degree and four years or more of teaching experience
Master's	Scores from students whose teachers had a master's degree and three years or fewer of teaching experience	Scores from students whose teachers had a master's degree and four years or more of teaching experience

Scores from students in a Northwest Arkansas school district were used. From within the school district, scores were collected from 21 different schools: 17 elementary schools and 4 middle schools. The average enrollment for the 21 schools was 628 students. The average enrollment for the 17 elementary schools was 594 with a range of enrollment from 488 to 820. The average enrollment for the 4 middle schools was 771 with a range of enrollment from 674 to 920. Grade configurations for the 17 elementary schools consisted of pre-kindergarten through fifth grade. Grade configurations for the four middle schools consisted of sixth and seventh grades.

The average percentage of students eligible for free or reduced-price lunches for the 21 schools was 72% with a range from 18 to 97%. The average percentage of students eligible for free or reduced-price lunches for the 17 elementary schools was 72% with a

range from 18 to 97%. The average percentage of students eligible for free or reduced-price lunches for the 4 middle schools was 72% with a range from 49 to 87%.

The average percentage of students whose home language was a language other than English for the 21 schools was 54% with a range from 9 to 87%. The average percentage of students whose home language was a language other than English for the 17 elementary schools was 54% with a range from 9 to 87%. The average percentage of students whose home language was a language other than English for the four middle schools was 54% with a range from 30 to 74%.

All analyses were conducted with IBM Statistical Packages for Social Sciences Version 24. Assumptions of normality and homogeneity of variances were tested as the beginning step of the statistical analyses. Box and whisker plots for student raw scores were analyzed, and approximate normal distributions were determined with few outliers. Data points determined to be outliers were appropriately addressed.

Hypothesis 1

The first hypothesis stated no significant difference will exist by teacher degree between teachers with 3 or fewer years of experience versus 4 or more years on literacy achievement as measured by the literacy ACTAAP benchmark for third-grade students in a Northwest Arkansas school district. Data were screened for entry errors and missing values, with none being found. The Kolmogorov-Smirnov (KS) statistics and histograms were used to test the assumption of normality. Examination of the histogram for each grade level group of data revealed a normal distribution. Results from the KS tests confirmed this assumption for the academic achievement on the literacy portion of the ACTAAP benchmark exam for students whose teachers had bachelor's degrees and 3

years or fewer of experience, $D(110) = 0.09, p = .036$; students whose teachers had bachelor's degrees and 4 years or more of experience, $D(110) = 0.12, p = .000$; students whose teachers had master's degrees and 3 year or fewer of experience, $D(100) = 0.10, p = .007$; and students whose teachers had master's degrees and 4 years or more of experience, $D(110) = 0.12, p = .000$. Table 4 presents a summary of the group means and standard deviations for this analysis.

Table 4

Descriptive Statistics of Teacher Experience &. Degree Type from Grade 3, 2014 Arkansas Benchmark Literacy Examination Raw Scores

Degree Type	Teacher Experience							
	3 Years or Fewer			4 Years or More			Total	
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Bachelor's	110	575.86	158.21	110	570.86	168.95	573.36	163.31
Master's	110	544.36	173.66	110	578.77	164.09	561.57	169.43
Total	220	560.11	166.48	220	574.82	166.20	567.47	166.32

To test the assumption of equality of variances, Levene's test was conducted with ANOVA and indicated that the assumption of variances was not violated, $F(3, 436) = 1.13, p = .336$. Further examination of the data revealed no significant outliers. Having checked all the assumptions associated with ANOVA, Hypothesis 1 was tested using a 2 x 2 factorial ANOVA to evaluate the effects of teacher experience and teacher degree on

literacy achievement as measured by the 2014 ACTAAP Literacy Exam. Results of this analysis are displayed in Table 5.

Table 5

Factorial ANOVA Results from Grade 3, 2014 Arkansas Benchmark Literacy Examination Raw Scores

Source	SS	df	MS	F	p	ES
Experience	23,784.60	1	23,784.60	0.86	.354	0.002
Degree	15,304.60	1	15,304.60	0.55	.457	0.001
Experience*Degree	42,709.60	1	42,709.60	1.54	.215	0.004
Error	12,061,600.70	436	27,664.22			
Total	153,831,125.00	440				

The results revealed no significant interaction between experience and degree on the literacy exam performance of Grade 3 students, $F(1, 436) = 1.54, p = .215, ES = 0.004$. Therefore, teacher experience and degree did not combine to affect the literacy achievement of the third-grade students significantly. Given there was no significant interaction between the variables of experience and degree, the main effect of each variable was examined separately. The main effect for experience was not significant, $F(1, 436) = 0.86, p = .354, ES = 0.002$. In addition, the main effect of degree was not significant, $F(1, 436) = 0.55, p = .457, ES = 0.001$. Figure 1 shows the means for Grade 3 literacy achievement as a function of experience and degree.

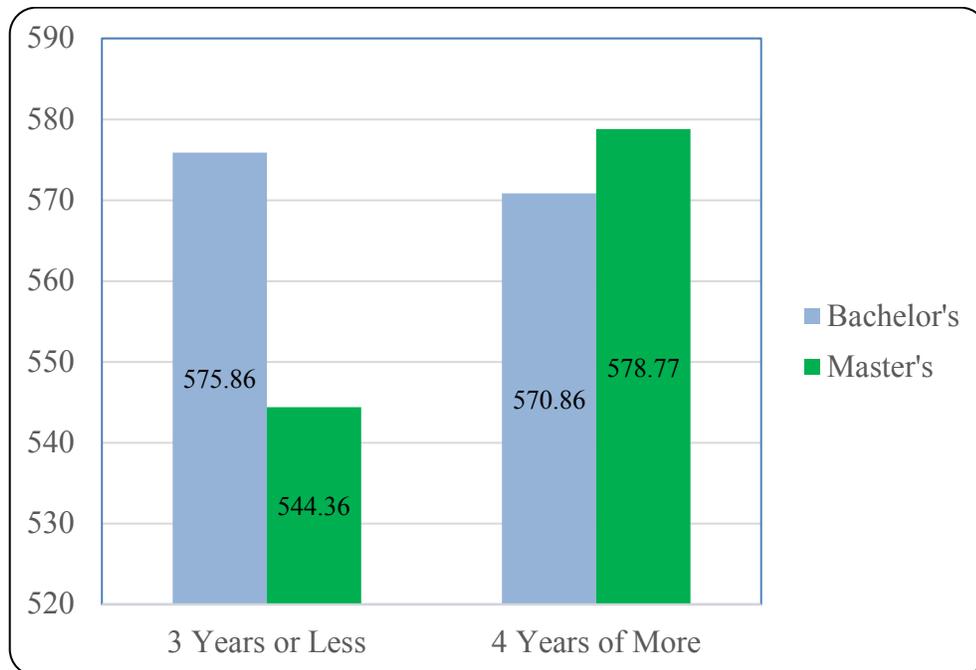


Figure 1. Grade 3 literacy achievement means as a function of teacher experience and degree.

The results show that neither teacher experience nor teacher degree significantly impacted Grade 3 literacy achievement. Therefore, the null hypothesis was not rejected for the interaction between experience and degree, as well as the main effect hypotheses for both experience and degree.

Hypothesis 2

The second hypothesis stated no significant difference will exist by teacher degree between teachers with 3 or fewer years of experience versus 4 or more years on literacy achievement as measured by the literacy ACTAAP benchmark for fourth-grade students in a Northwest Arkansas school district. Data were screened for entry errors and missing values, with none being found. The KS statistics and histograms were used to test the assumption of normality. Examination of the histogram for each grade level group of data revealed a normal distribution. Results from the KS tests confirmed this assumption for

the academic achievement on the literacy portion of the ACTAAP benchmark exam for students whose teachers had bachelor’s degrees and 3 years or fewer of experience, $D(110) = 0.10, p = .006$; students whose teachers had master’s degrees and 3 year or fewer of experience, $D(110) = 0.09, p = .030$; students whose teachers had bachelor’s degrees and 4 or more years of experience, $D(110) = 0.20, p = .000$; and students whose teachers had master’s degrees and 4 years or more of experience, $D(110) = 0.08, p = .091$. Table 6 presents a summary of the group means and standard deviations for this analysis.

Table 6

Descriptive Statistics of Teacher Experience and Degree Type from Grade 4, 2014 Arkansas Benchmark Literacy Examination Raw Scores

Degree Type	Teacher Experience							
	3 Years or Fewer			4 Years or More			Total	
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Bachelor’s	110	675.68	148.45	110	712.59	156.43	745.34	125.87
Master’s	110	627.50	183.55	110	707.55	124.62	667.52	161.57
Total	220	651.59	168.28	220	710.07	141.11	680.83	157.87

To test the assumption of equality of variances, Levene’s test was conducted with ANOVA and indicated that the assumption of variances was not violated, $F(3, 436) = 1.13, p = .336$. Further examination of the data revealed no significant outliers. Having checked all the assumptions associated with ANOVA, Hypothesis 2 was tested using a 2

x 2 factorial ANOVA to evaluate the effects of teacher experience and teacher degree on literacy achievement as measured by the 2014 ACTAAP Literacy Exam. Results of this analysis are displayed in Table 7.

Table 7

Factorial ANOVA Results from Grade 4, 2014 Arkansas Benchmark Literacy Examination Raw Scores

Source	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	<i>ES</i>
Experience	376,155.06	1	376,155.06	15.72	.072	0.002
Degree	77,911.42	1	77,911.42	3.26	.000	0.001
Experience*Degree	51,170.51	1	51,170.51	2.14	.144	0.004
Error	10,433,935.23	436	23,931.04			
Total	21,4891,875.00	440				

The results revealed no significant interaction between experience and degree on the literacy exam performance of Grade 4 students, $F(1, 436) = 2.14, p = .144, ES = 0.004$. Therefore, teacher experience and degree did not combine to affect the literacy achievement of the fourth-grade students significantly. Given there was no significant interaction between the variables of experience and degree, the main effect of each variable was examined separately. The main effect for experience was not significant, $F(1, 436) = 15.72, p = .072, ES = 0.002$. However, the main effect for degree was significant with a small effect size, $F(1, 436) = 3.26, p = .000, ES = 0.001$. Figure 2

shows the means for Grade 4 literacy achievement as a function of experience and degree.

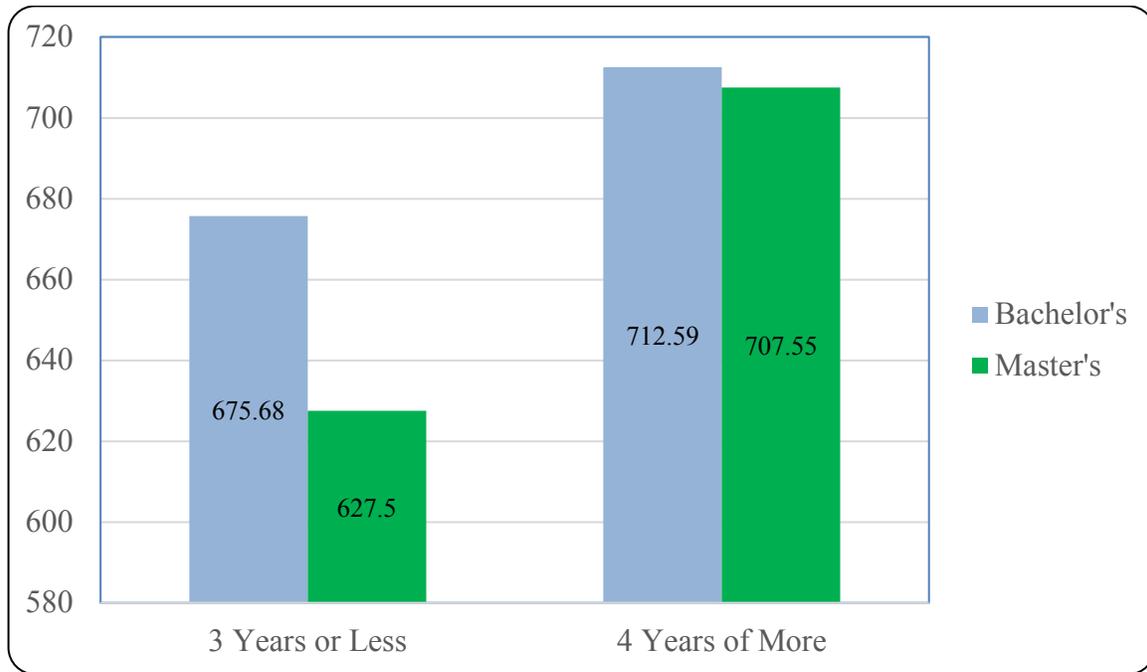


Figure 2. Grade 4 literacy achievement means as a function of teacher experience and degree.

The results showed that students whose teachers had bachelor's degrees ($M = 745.34$, $SD = 125.87$) outperformed students whose teachers had master's degree ($M = 667.52$, $SD = 161.57$) regardless of the whether the students' teachers had 3 or fewer years of experience or 4 or more years of experience. On the basis of these results, the null hypothesis could not be rejected for the interaction effect of teacher degree and experience. Additionally, the null hypothesis for the main effect of teacher experience could not be rejected. However, there was enough evidence to reject the null hypothesis for the main effect of teacher degree.

Hypothesis 3

The third hypothesis stated no significant difference will exist by teacher degree between teachers with 3 or fewer years of experience versus 4 or more years on literacy achievement as measured by the literacy ACTAAP benchmark for fifth-grade students in a Northwest Arkansas school district. Data were screened for entry errors and missing values, with none being found. The KS statistics and histograms were used to test the assumption of normality. Examination of the histogram for each grade level group of data revealed a normal distribution. Results from the KS tests confirmed this assumption for the academic achievement on the literacy portion of the ACTAAP benchmark exam for students whose teachers had bachelor's degrees and 3 years or fewer of experience, $D(99) = 0.08, p = .161$; students whose teachers had master's degrees and 3 year or fewer of experience, $D(110) = 0.11, p = .001$; students whose teachers had bachelor's degrees and 4 or more years of experience, $D(110) = 0.10, p = .005$; and students whose teachers had master's degrees and 4 years or more of experience, $D(110) = 0.14, p = .000$. Table 8 presents a summary of the group means and standard deviations for this analysis.

Table 8

*Descriptive Statistics of Teacher Experience and Degree Type from Grade 5, 2014
Arkansas Benchmark Literacy Examination Raw Scores*

Degree Type	Teacher Experience						Total	
	3 Years or Fewer			4 Years or More			<i>M</i>	<i>SD</i>
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>		
Bachelor's	110	698.54	160.20	110	688.64	170.23	693.33	165.23
Master's	110	669.09	165.99	110	704.41	155.61	686.75	161.49
Total	220	683.04	163.55	220	696.52	162.90	689.95	163.17

To test the assumption of equality of variances, Levene's test was conducted with ANOVA and indicated that the assumption of variances was not violated, $F(3, 425) = 1.02, p = .385$. Further examination of the data revealed no significant outliers. Having checked all the assumptions associated with ANOVA, Hypothesis 3 was tested using a 2 x 2 factorial ANOVA to evaluate the effects of teacher experience and teacher degree on literacy achievement as measured by ACTAAP Literacy. Results of this analysis are displayed in Table 9.

Table 9

Factorial ANOVA Results from Grade 5, 2014 Arkansas Benchmark Literacy Examination Raw Scores

Source	SS	df	MS	F	p	ES
Experience	17,288.49	1	17,288.49	0.65	.421	0.002
Degree	5,001.26	1	5,001.26	0.19	.665	0.000
Experience*Degree	554,706.67	1	54,706.67	2.06	.152	0.005
Error	11,316,353.76	425	26,626.72			
Total	215,614,000.00	428				

The results revealed no significant interaction between experience and degree on the literacy exam performance of Grade 5 students, $F(1, 428) = 2.06, p = .152, ES = 0.005$. Therefore, teacher experience and degree did not combine to significantly affect the literacy achievement of the fifth-grade students. Given there was no significant interaction between the variables of experience and degree, the main effect of each variable was examined separately. The main effect for experience was not significant, $F(1, 428) = 0.65, p = .421, ES = 0.002$. In addition, the main effect for degree was not significant, $F(1, 428) = 0.19, p = .665, ES = 0.000$. Figure 3 shows the means for Grade 5 literacy achievement as a function of experience and degree.

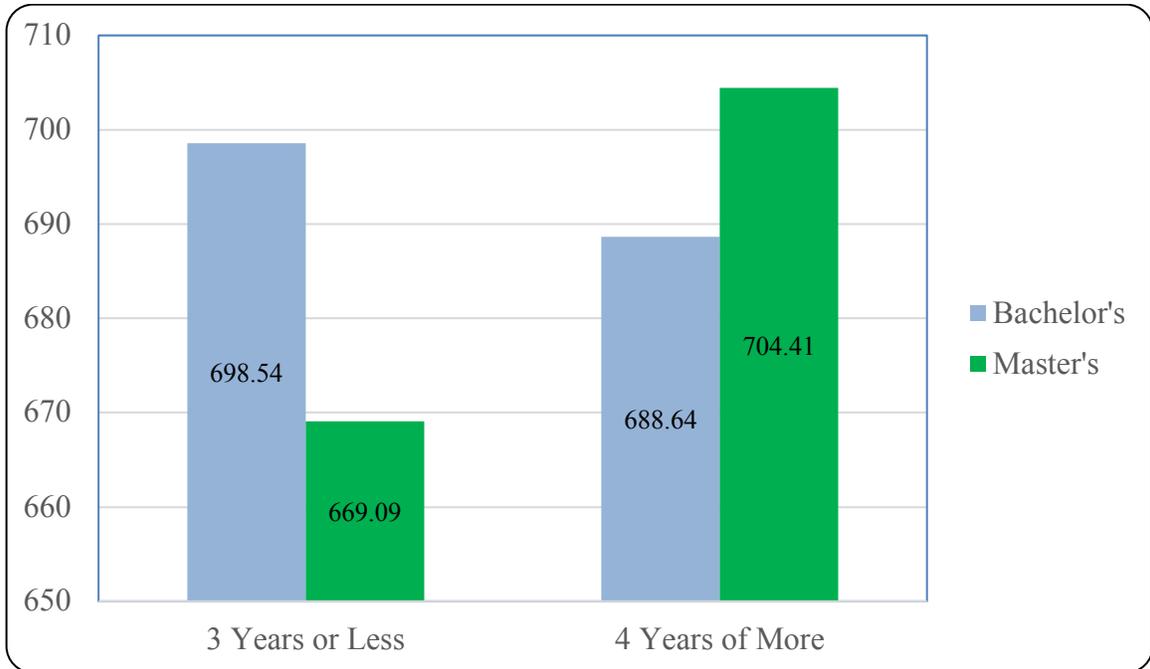


Figure 3. Grade 5 literacy achievement means as a function of teacher experience and degree.

The results show that neither teacher experience nor teacher degree significantly impacted Grade 5 literacy achievement. Therefore, the null hypothesis was not rejected for the interaction between experience and degree, as well as the main effect hypotheses for both experience and degree.

Hypothesis 4

The fourth hypothesis stated no significant difference will exist by teacher degree between teachers with 3 or fewer years of experience versus 4 or more years on literacy achievement as measured by the literacy ACTAAP benchmark for sixth-grade students in a Northwest Arkansas school district. Data were screened for entry errors and missing values, with none being found. The KS statistics and histograms were used to test the assumption of normality. Examination of the histogram for each grade level group of data

revealed a normal distribution. Results from the KS tests confirmed this assumption for the academic achievement on the literacy portion of the ACTAAP benchmark exam for students whose teachers had bachelor’s degrees and 3 years or fewer of experience, $D(110) = 0.06, p = .200$; students whose teachers had master’s degrees and 3 year or fewer of experience, $D(98) = 0.08, p = .195$; students whose teachers had bachelor’s degrees and 4 or more years of experience, $D(110) = 0.08, p = .056$; and students whose teachers had master’s degrees and 4 years or more of experience, $D(110) = 0.12, p = .001$. Table 10 presents a summary of the group means and standard deviations for this analysis.

Table 10

*Descriptive Statistics of Teacher Experience & Degree Type from Grade 6, 2014
Arkansas Benchmark Literacy Examination Raw Scores*

Degree Type	Teacher Experience							
	3 Years or Fewer			4 Years or More			Total	
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Bachelor’s	110	735.82	110.43	110	739.14	123.62	737.48	116.96
Master’s	110	692.14	119.73	110	704.36	148.97	698.61	135.79
Total	220	715.24	116.69	220	721.75	137.68	718.59	127.80

To test the assumption of equality of variances, Levene’s test was conducted with ANOVA and indicated that the assumption of variances was not violated, $F(3, 424) = 3.51, p = .015$. Further examination of the data revealed no significant outliers. Having checked all the assumptions associated with ANOVA, Hypothesis 4 was tested using a 2

x 2 factorial ANOVA to evaluate the effects of teacher experience and teacher degree on literacy achievement as measured by ACTAAP Literacy. Results of this analysis are displayed in Table 11.

Table 11

Factorial ANOVA Results from Grade 6, 2014 Arkansas Benchmark Literacy Examination Raw Scores

Source	SS	df	MS	F	p	ES
Experience	6,422.90	1	6,442.90	0.40	.527	0.001
Degree	164,210.80	1	164,210.80	10.23	.001	0.024
Experience*Degree	2,114.81	1	2,114.81	0.13	.717	0.000
Error	6,804,274.77	424	16,047.82			
Total	227,979,025.00	428				

The results revealed no significant interaction between experience and degree on the literacy exam performance of Grade 6 students, $F(1, 424) = 0.13, p = .717, ES = 0.000$. Therefore, teacher experience and degree did not combine to affect the literacy achievement of the sixth-grade students significantly. Given there was no significant interaction between the variables of experience and degree, the main effect of each variable was examined separately. The main effect for experience was not significant, $F(1, 424) = 0.40, p = .527, ES = 0.001$. However, the main effect for degree was significant with a small effect size, $F(1, 424) = 10.23, p = .001, ES = 0.024$. Figure 4 shows the means for Grade 6 literacy achievement as a function of experience and degree.

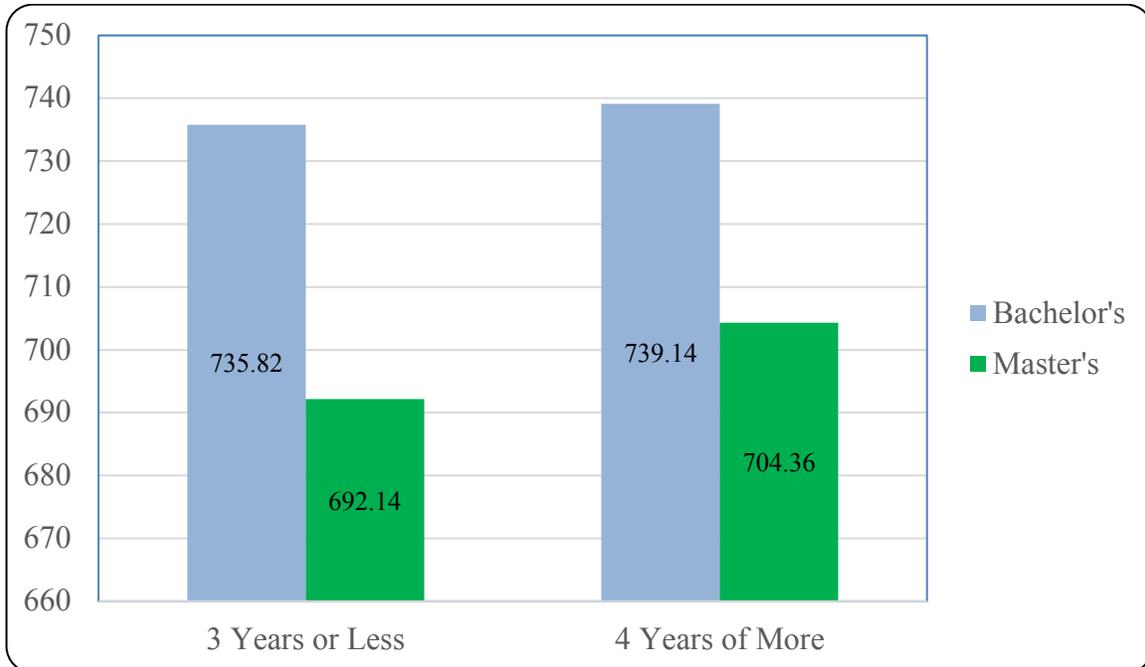


Figure 4. Grade 6 literacy achievement means as a function of teacher experience and degree.

The results showed that students whose teachers had bachelor's degrees ($M = 737.48$, $SD = 116.96$) outperformed students whose teachers had master's degrees ($M = 698.61$, $SD = 135.79$) regardless of the whether the students' teachers had 3 or fewer years of experience or 4 or more years of experience. On the basis of these results, the null hypothesis could not be rejected for the interaction effect of teacher degree and experience or the main effect of teacher experience. However, there was enough evidence to reject the null hypothesis for the main effect of teacher degree.

Summary

The purpose of this study was to determine the effects of teacher degree and teacher experience on literacy achievement for Grades 3-6 students in a Northwest

Arkansas school district. Table 12 summarizes the results of the interaction and main effects of the four hypotheses.

Table 12

Summary of Statistically Significant of Literacy Achievement Results by Hypotheses 1-4

Variable	<i>p</i>			
	H1	H2	H3	H4
Teacher Experience* Degree	.215	.144	.152	.717
Experience	.354	.072	.421	.527
Degree	.457	.000*	.665	.001*

Note: Significance = $p \leq .001^*$,

For the four hypotheses, none displayed a significant interaction between teacher degree and teacher experience. Additionally, the main effect for teacher experience was not significant for the four hypotheses. Although the main effect for teacher degree was not significant for Hypotheses 1 and 3 (Grades 3 and 5), degree was significant for Hypotheses 2 and 4 (Grades 4 and 6) with the students taught by teachers with bachelor's degrees outperforming, on average, students taught by teachers with master's degrees. However, the effect sizes for both were small.

CHAPTER V

DISCUSSION

Beginning with the accountability measures enacted in NCLB and then continuing with additional measures authorized by the passage of ESSA, decisions on teacher hiring teacher assignments have become crucial. Administrators, under considerable pressure from federal, state, and local entities, search to determine the link between teacher quality and student achievement (Aaronson et al., 2007; Kane et al., 2008; Rivkin et al., 2005; Rockoff, 2004). Teacher quality accounts for a more significant amount of value-added student achievement compared to all other factors within a school (Goldhaber, 2002). Therefore, administrators must hire the highest quality teachers to ensure increasing levels of student achievement. However, what elements contribute to teacher quality? Some elements are easily quantifiable compared to others that are more abstract. Also, time is also a factor in the hiring process. How do administrators make the right decisions that lead to quality teacher candidates in the least amount of time possible? These decisions are not always easy and are not without error. This study attempted to clarify if two elements of teacher data are useful in making those decisions: teacher degree and teaching experience.

Teacher degree and teaching experience are easily quantifiable and verified through college transcripts and work history. Also, administrators can collect both pieces of information promptly. For most of the last century, administrators have linked these

two elements with teacher quality. Therefore, teacher degree and teaching experience have been used not only to determine hiring and assignment practices but have also been used to determine teacher salary. Because of the readiness of the data and the extent to which these two elements are used, this researcher used these two elements in the present study as the independent variables.

Furthermore, administrators often use student achievement data as one piece in evaluating the quality of their teachers, especially new teacher hires. Because schools collect student achievement data every year, administrators can easily compare the scores with different elements of teachers to determine their teaching effectiveness and quality. In Arkansas, schools collect student achievement data every year, especially in literacy and mathematics. For this study, the researcher collected students' raw scores in literacy from the ACTAAP Benchmark and categorized them into four categories: low teacher experience and bachelor's degree, high teacher experience and bachelor's degree, low teacher experience and master's degree, or high teacher experience and master's degree. The researcher defined low teacher experience as 3 or fewer years and high teacher experience as 4 or more years and tested the interaction effects and the main effects of the four groups.

In this chapter, I interpret the findings of the statistical analyses conducted. First, I translate the results in a nontechnical format using narrative explanations in the Conclusions section. Second, in the Implications section, I interpret the results in a holistic view in light of the context of the literature review. Finally, in the Recommendations section, I provide concrete suggestions on how the results will be used

as well as recommendations on how future studies might modify or adapt the variables of this study for future research.

Conclusions

A 2 x 2 factorial ANOVA was conducted to evaluate each of the four hypotheses. For each hypothesis, the dependent variable was the students' raw scores on the ACTAAP literacy examination for the grade level indicated. The independent variables for the four hypotheses were teacher degree and teaching experience. To test the null hypotheses, the researcher used a .05 level of significance. Interaction and main effects were examined to determine statistical significance.

Hypothesis 1

The first hypothesis stated that no significant difference will exist by teacher degree between teachers with three or less years of experience versus 4 or more years on literacy achievement as measured by the literacy ACTAAP benchmark for third-grade students in a Northwest Arkansas school district. ANOVA results indicated no significant interaction between teacher degree and teacher experience. Therefore, teacher degree and teacher experience did not combine to influence the literacy achievement as measured by the ACTAPP benchmark for the third-grade students. Based on the results, there was not enough evidence to reject the null hypothesis for the interaction effect. For the main effects of teacher degree and teacher experience, the researcher found no statistical significance on literacy achievement as measured by the ACTAPP benchmark for the third-grade students. Similarly, no evidence existed to reject the null hypothesis for the two main effects for the first hypothesis.

Hypothesis 2

The second hypothesis stated that no significant difference will exist by teacher degree between teachers with three or less years of experience versus 4 or more years on literacy achievement as measured by the literacy ACTAAP benchmark for fourth-grade students in a Northwest Arkansas school district. ANOVA results indicated no significant interaction between teacher degree and teacher experience. Therefore, teacher degree and teacher experience did not combine to influence the literacy achievement as measured by the ACTAPP benchmark for the fourth-grade students. In addition, there was not enough evidence to reject the null hypothesis for the main effect of teacher experience on literacy achievement. However, the main effect of teacher degree did reveal statistical significance on literacy achievement as measured by the ACTAAP benchmark for fourth graders with a small effect size. On average, students whose teachers had bachelor's degrees performed better on the literacy exam compared to those students whose teachers had master's degrees. Therefore, the null hypothesis for the interaction and main effects could not be rejected. However, the null hypothesis was rejected for the main effect of teacher degree on student achievement.

Hypothesis 3

The third hypothesis stated that no significant difference will exist by teacher degree between teachers with three or less years of experience versus 4 or more years on literacy achievement as measured by the literacy ACTAAP benchmark for fifth-grade students in a Northwest Arkansas school district. ANOVA results indicated no significant interaction between teacher degree and teacher experience. Therefore, teacher degree and teacher experience did not combine to influence the literacy achievement as measured by

the ACTAPP benchmark for the fifth-grade students. The main effects of teacher degree and teacher experience did not reveal statistical significance on literacy achievement.

Therefore, the null hypothesis for the interaction and main effects could not be rejected.

Hypothesis 4

The fourth hypothesis stated that no significant difference will exist by teacher degree between teachers with three or less years of experience versus 4 or more years on literacy achievement as measured by the literacy ACTAAP benchmark for sixth-grade students in a Northwest Arkansas school district. ANOVA results indicated no significant interaction between teacher degree and teacher experience. Therefore, teacher degree and teacher experience did not combine to influence the literacy achievement as measured by the ACTAPP benchmark for the sixth-grade students. Also, the main effect of teacher experience did not reveal statistical significance on literacy achievement. However, the main effect of teacher degree did reveal statistical significance on literacy achievement as measured by the ACTAAP benchmark for the sixth graders with a small effect size. On average, students whose teachers had bachelor's degrees performed better on the literacy exam compared to those whose teachers had master's degrees. Therefore, the null hypothesis for the interaction and main effect for teacher experience could not be rejected. However, enough evidence existed to reject the null hypothesis for the main effect of teacher degree.

Implications

To assist in the development of conclusions and as a method of bringing perspective to the present study's findings, the results of this study were compared to the review of related literature. The literature reviewed in Chapter II of this study revealed

mixed statistical significance of the effects of teacher degree and no statistical significance for teacher experience on literacy achievement. In this section, the results of this study are shared in comparison and contrast with the larger body of work surrounding these topics. In some cases, possible reasons for differences were purported.

First, in this study, the teacher degree and teacher experience did not combine to significantly affect literacy achievement for the elementary and middle school students. In contrast, Darling-Hammond et al. (2001) found that teachers with master's degrees had improved student achievement in their classrooms, especially in mathematics and science. However, the effect of the significance when adding teacher experience. Aside from the Darling-Hammond et al. study, the interaction effects of teacher degree and teacher experience were rarely studied with no statistically significant findings.

Second, as measured by this study, there was no significant impact of teacher experience on student achievement as measured by the literacy portion of the ACTAAP examination for students in Grades 3-6. Other studies found the same or similar results. Myrberg (2007) found that teacher experience had no significant effect on student achievement in Grade 3 literacy. Several studies found results similar to one another regarding teacher experience within a certain span of a teacher's career. Andrew and Schwab (2012), Goe (2007), Hanushek (1997), Hanushek et al. (2005), Rockoff (2004), and Rowen et al. (2002) all found that student achievement increases significantly during the early years of a teacher's career but then not significantly after his or her career has become established. These studies found that the significant increase in student achievement based on teacher experience ceased after one to five years.

Other studies found there were significant increases in student achievement as teachers gain experience, and those studies stand in contrast to the results of this study (Kini & Podolsky, 2016; Odden et al., 2004). Those studies did not examine student achievement data for the same grade levels or subject areas as did this study. For that reason, the differences in findings may not be in disagreement. That thought is supported by two more studies that found mixed results on the impact of teacher experience on student achievement based upon student grade or subject (Archibald, 2009; Ladd & Sorenson, 2014). Although Archibald's (2009) study was based on same-year and same-student pre- and post-testing, he found that student achievement in certain subjects was significantly impacted by teacher experience, and some were not. In that respect, the findings of this study were congruent with the findings of Archibald's study. Archibald found that student achievement in English language arts and social studies was not significantly impacted by teacher experience, as it was in other subjects. This present study solely examined student achievement in literacy, which was a component of English language arts.

Ladd and Sorenson (2014) found significant and varied results for teacher experience both across subjects and across the years of a teacher's experience. They reported that after the first year of teaching, increases in student achievement were not attributed to increasing teacher experience. As did Archibald (2009), Ladd and Sorenson (2014) found that student achievement in English language arts increased much less during the teacher's first year of experience compared to mathematics during that same year.

Third, regarding teacher degree and its impact on student achievement, every study examined in the literacy review found different results compared to this present study, except for one. Rowan et al. (2002) found significance that was congruent with the findings of this present study in two hypotheses and two grade levels. They found that teachers with advanced degrees had lower student achievement compared to those with bachelor's degrees as did this study for students in the fourth and sixth grades.

As mentioned in the review of the literature, the reasons for these findings may be related to routes individuals take to alternative teacher licensure. In many states, including Arkansas, individuals might gain a master's degree while becoming licensed to teach and circumvent the traditional teacher licensure process. It might be considered that those teachers who experience different components of teacher preparation programs are developing a broader range of capability for teaching. In this study, the effect sizes were small. This study did not analyze non-traditional routes to teacher licensure but only commented to that as a possible reason for the differing results.

Two other studies that found teacher degree significantly impacted student achievement, in contrast with this study, also spoke to caveats found during their analysis. Darling-Hammond et al. (2001) found that students of teachers with master's degrees performed significantly higher compared to those with bachelor's degrees, but only in mathematics and science and not in English language arts. Furthermore, that study found that although still significant, the effect size of master's degrees was smaller in teachers with less experience. Archibald (2009), with a different analysis structure, also found a caveat in different circumstances when a teacher's degree was significant and when it was not. That study revealed that teachers with master's degrees in a content

area had higher student achievement than teachers with master's degrees in non-content areas such as administration, counseling, library media science, and other areas not directly linked to a subject in which students were enrolled. This study did not differentiate the area in which teachers obtained a master's degree.

Darling-Hammond (2009) stated that teacher education positively impacted student achievement in most cases, however in that study, teacher professional development obtained independently of college or university coursework was considered teacher education. This study did not consider professional development as a component of teacher education or teacher degree, and therefore, it was not possible to determine if the results of the studies were congruent.

Finally, Myrberg (2007), while conducting a study to determine the effectiveness of professional development, found that teacher degree positively impacted Grade 3 students in the area of English language arts. Although Myrberg sought to find teacher characteristics that were influential in affecting language arts, he did find teacher degree to be a significant predictor and further removed its effect from his study so the effects of professional development could be analyzed. The first hypothesis of this present study specifically examined the effects of teacher degree on Grade 3 students in literacy, as did Myrberg, but with different results. The difference in results between these two studies could be attributed to the different assessment used to measure student achievement or the way in which the two studies treated master's degrees in different areas.

Recommendations

Potential for Practice/Policy

The result of one study should not determine, in and of itself, the direction of major educational decisions, but it should provide a piece of a whole foundation on which these decisions should be based. Further, a study does not have to result in a statistically significant finding to help inform practices and policies. Sometimes, non-significant findings point to serious discussions that need to take place. One of these discussions is the widely accepted practice of using teacher degree and teacher experience as key criteria in the school hiring process.

Regarding teacher degree, of the four hypotheses in the present study, only two were significant. However, when analyzing the results of the two hypotheses, on average, students whose teachers had bachelor's degrees performed better on the literacy exam compared to those students whose teachers had master's degrees. Even though the effects sizes were small, this result is probably contrary to current perceptions. At the beginning of an interview with any prospective teacher, many administrators would probably believe that a teacher with more education, a higher degree, would probably have more knowledge and skills. They would also probably believe that more knowledge and skills would translate into increased student achievement. However, research studies do not support this perception. With a large number of states and school districts emphasizing having a certain percentage of teachers with graduate or advanced degrees within their systems, they need to carefully and thoughtfully examine the rationale for this emphasis. To continue a practice that does not have a solid research base, administrators could cost their districts a considerable amount of money that could go into other more viable and

proven resources for increased student achievement. Also, institutions of higher education should consider why this study and others have revealed that students of teachers with master's degrees do not always perform better compared to students of teachers with bachelor's degrees. Are there changes in teacher preparation programs or graduate degree programs that could be made to help teachers have a stronger impact on student achievement? Is this an area that graduate schools have considered or are graduate schools even able to measure the impact of their teachers operating as they do currently?

Regarding teacher experience, this study revealed no significant impact of teacher experience on student achievement. Similar to teacher degree, most school leaders would probably consider hiring an experienced teacher to be a better choice than a teacher with little or no experience. The results of this study indicated that the differences between those teachers with three or less years versus 4 or more years of experience were not statistically significant. However, more experienced teachers may have other positive impacts on schools. Therefore, school leaders should not only hire less experienced teachers. Some studies have indicated that experienced teachers have significant impacts on other important aspects of a school such as culture, implementation of programs with fidelity, and institutional knowledge (Aaronson et al., 2007; Goldhaber, 2002; Sanders & Rivers, 1996). It has long been known that good teachers can make positive differences in the lives of their students. Because of this, administrators should hire the best teachers if they want to establish a high-achieving learning culture in their school districts (Goldhaber, 2002). Although this study revealed that experience did not impact student achievement, school leaders should still seek experienced teachers for the positive

impacts they may have at school, but they should not automatically expect that their students will outperform those of teachers with less experience.

Future Research Considerations

Several issues arose from this study that could be helpful in shaping future studies. To further evaluate the effect of teacher degree and teacher experience, the researcher recommends that the following studies be considered:

1. Because this study only used only two categories of teacher degree (bachelor's versus master's and beyond), another study could separate different advanced degrees to determine if there are effects of different graduate or advanced degrees on student achievement.
2. This study did not examine the content area of the degree (whether initial or advanced). This methodology might reveal strengths and weaknesses in some content area preparation programs and their effect on student achievement.
3. Teacher experience could either be subdivided into several smaller ranges (not just two in this study) or could be provided as an exact year and analyzed by a multiple regression formula. This type of study could produce a clearer picture of when experience ceases to affect student achievement, if at all.
4. Another study could examine the effect of teachers with multiple master's degrees.
5. Teacher experience could be analyzed less discreetly. While this study revealed only two main effects that were significant and those with small effect sizes, further analysis of these same variables could reveal helpful information for school leaders.

6. A study could investigate the effect of teachers who earn traditional versus non-traditional degrees on student achievement. One popular method of non-traditional teacher licensure are programs eligible to teachers who already hold a bachelor's degree but not an educational degree (Arkansas Department of Education, 2018). In those programs, individuals earn a master's degree in teaching or some pedagogical area and obtain teacher licensure in that manner.
7. Another researcher could use teacher degree and teacher experience to determine their effect on other dependent variables within the school environment, whether curricular or non-curricular, such as student motivation, student time on task, and teacher satisfaction.
8. Additionally, many teachers have graduate degrees that are professional. For example, some professionals in a school building have a master's in counseling or master's in educational leadership. How do these degrees affect the educational process? Further, how do these professional affect students beyond the school environment such as their careers after graduation?
9. A future study could examine how a teacher's degree content is matched to specific student achievement data. Namely, to what degree does a difference exist between a general licensing degree (i.e. an elementary K-6 license for all four subject areas) and a middle school mathematics license? Further, do certification areas gained only by passing a Praxis test translate into increased student achievement? Many times, the degree a teacher holds is more specific

to the path they have chosen and less specific to his or her teaching assignment (Gimbert, Cristol, & Sene, 2007).

10. A study could examine different types of teacher training program characteristics to determine which characteristics, if any, contribute more to increased student achievement.
11. Future researchers should determine how the Every Student Succeeds Act will influence teacher hiring practices as well as student achievement.
12. The current variables should be examined in different types of school districts. A comparison could be made between districts with more selective and rigid hiring practices and districts with less selective practices. The district in this study had stringent hiring standards.

These results and considerations for future studies are worthy of consideration because school leaders are pressed to improve student achievement continuously. Many researchers have sought to find links between various teacher characteristics and student achievement. This study focused on teacher degree and teacher experience because of the longstanding belief, as evidenced by current practices within education, that they make a difference in student achievement, and they are easily verified at the time hiring and assignment decisions are made.

Although other studies reported links between teacher experience and student achievement, this study did not. Study design, the definition of experience, the grade level, the subject areas tested, and other variables might have contributed to the differences in outcomes. However, most studies revealing links focused on students' grade level, the subject area examined, or the point in the teacher's career that was

studied. The effects of teacher degree and student achievement were widely varied when reviewing the literature. However, this study revealed similar results to Rowan et al. (2002) in that for two grade levels, the students of teachers with bachelor's degrees narrowly outperformed the students of teachers with master's degrees.

Taken as a whole, the results, implications, and recommendations all point in the same direction. Although educators know more about the effects of teacher characteristics on student achievement, there is little definitive agreement on which teacher characteristics impact student achievement significantly across education. Therefore, the arduous task for school leaders remains to make decisions based on the best data available and continue to focus efforts to improve the quality of the instruction being delivered by the teachers to improve student achievement.

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