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Do Graduate Level Content Degrees Matter? An Analysis of the Effect of Content Area Master's Degrees on Student Achievement

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DO GRADUATE LEVEL CONTENT DEGREES MATTER? AN ANALYSIS OF THE EFFECT OF CONTENT AREA MASTER'S DEGREES ON STUDENT ACHIEVEMENT

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Abstract

This study addresses teacher education level and the impact it has on student achievement. The purpose of this study was to examine whether there are any differences in student achievement between students taught by teachers with advanced degrees in a specific content area and those students taught by teachers with only a bachelor's degree or those with a master's degree outside the subject area. The study examined ninth and tenth grade ACT Aspire student achievement data collected from teachers who hold a master's degree in a subject-related content area and teachers who do not hold a master's degree in a subject-related content area. Data from six different local educational agencies (LEA) was analyzed to determine statistical significance between degree attainment and student achievement. The results varied based on content area and teacher degree; however, overall, content area master's degrees do not have a significant positive effect on student achievement.

Keywords: student achievement; teacher quality; degree attainment; content area master's degrees

Table of Contents

Page

ABSTRACT v

LIST OF TABLES ix

I. INTRODUCTION 1

Background of the Problem 1

Statement of the Problem 2

Purpose of the Study 3

Conceptual Framework 3

Research Hypotheses 5

Research Questions 6

Significance of the Study 6

Scope of the Study 7

Limitations 8

Delimitations 9

Definitions of Terms 10

Summary 12

II. LITERATURE REVIEW 14

The Need for Improved Student Achievement 14

Factors that Influence Student Achievement 15

Teacher Effectiveness: What Makes a High-Quality Teacher? 16

Teacher behaviors and attitudes 16

Teacher experience and knowledge 17

Effects of Advanced Degrees on Teacher Quality....19
Content area master's degrees....21
Changes in Current Graduate Degree Programs....23
Implications of Prior Research for Future Research....27
Summary....28
III. RESEARCH METHODOLOGY....30
Participants....30
Instrumentation....31
Procedures....33
Data Analysis....34
IV. RESULTS....35
Research Question One....36
Literacy scores....37
Math scores....38
Science scores....40
Research Question Two....41
Literacy scores based on gender....41
Math scores based on gender....44
Science scores based on gender....46
Literacy scores based on socio-economic status....49
Math scores based on socio-economic status....51
Science scores based on socio-economic status....52
Literacy scores based on ethnicity....54

Math scores based on ethnicity 56
Science scores based on ethnicity 57
V. SUMMARY, DISCUSSION, & RECOMMENDATIONS 60
Research Question One 60
Research Question Two 62
Limitations 63
Recommendations for Future Research 64
Final Summary 65
REFERENCES 66
APPENDICES 77
Appendix A. Ethical Consideration 77

List of Tables

Table 1: LEA Characteristics 31

Table 2: Frequencies and Percentages for Student Demographic Variables (n=8,271) 36

Table 3: Frequencies and Percentages for Teacher Variables (n=121) 36

Table 4: Master's in Literacy vs. Master's in Other Area 37

Table 5: Master's in Literacy vs. Bachelor's in Literacy 38

Table 6: Master's in Other Area vs. Bachelor's in Literacy 38

Table 7: Master's in Math vs. Master's in Other Area 39

Table 8: Master's in Math vs. Bachelor's in Math 39

Table 9: Master's in Other Area vs. Bachelor's in Math 40

Table 10: Master's in Science vs. Master's in Other Area 40

Table 11: Master's in Science vs. Bachelor's in Science 40

Table 12: Master's in Other Area vs. Bachelor's in Science 41

Table 13: Master's in Literacy vs. Master's in Other Area (Female Students) 42

Table 14: Master's in Literacy vs. Bachelor's in Literacy (Female Students) 42

Table 15: Master's in Other Area vs. Bachelor's in Literacy (Female Students) 42

Table 16: Master's in Literacy vs. Master's in Other Area (Male Students) 43

Table 17: Master's in Literacy vs. Bachelor's in Literacy (Male Students) 43

Table 18: Master's in Other Area vs. Bachelor's in Literacy (Male Students) 44

Table 19: Master's in Math vs. Master's in Other Area (Female Students) 44

Table 20: Master's in Math vs. Bachelor's in Math (Female Students) 44

Table 21: Master's in Other Area vs. Bachelor's in Math (Female Students) 45

Table 22: Master's in Math vs. Master's in Other Area (Male Students).....45

Table 23: Master's in Math vs. Bachelor's in Math (Male Students).....46

Table 24: Master's in Other Area vs. Bachelor's in Math (Male Students) 46

Table 25: Master's in Science vs. Master's in Other Area (Female Students) 47

Table 26: Master's in Science vs. Bachelor's in Science (Female Students) 47

Table 27: Master's in Other Area vs. Bachelor's in Science (Female Students).....47

Table 28: Master's in Science vs. Master's in Other Area (Male Students).....48

Table 29: Master's in Science vs. Bachelor's in Science (Male Students).....48

Table 30: Master's in Other Area vs. Bachelor's in Science (Male Students) 49

Table 31: Low SES Students vs. All Other Students (ACT Aspire Literacy) 49

Table 32: Master's in Literacy vs. Master's in Other Area (Low SES Students).....50

Table 33: Master's in Literacy vs. Bachelor's in Literacy (Low SES Students).....50

Table 34: Master's in Other Area vs. Bachelor's in Literacy (Low SES Students) 51

Table 35: Low SES Students vs. All Other Students (ACT Aspire Math) 51

Table 36: Master's in Math vs. Master's in Other Area (Low SES Students).....51

Table 37: Master's in Math vs. Bachelor's in Math (Low SES Students).....52

Table 38: Master's in Other Area vs. Bachelor's in Math (Low SES Students) 52

Table 39: Low SES Students vs. All Other Students (ACT Aspire Science) 53

Table 40: Master's in Science vs. Master's in Other Area (Low SES Students).....53

Table 41: Master's in Science vs. Bachelor's in Science (Low SES Students).....53

Table 42: Master's in Other Area vs. Bachelor's in Science (Low SES Students) 54

Table 43: White Students vs. Non-White Students (ACT Aspire English).....54

Table 44: Master's in Literacy vs. Master's in Other Area (Non-White Students).....55

Table 45: Master's in Literacy vs. Bachelor's in Literacy (Non-White Students) 55

Table 46: Master's in Other Area vs. Bachelor's in Literacy (Non-White Students).....56

Table 47: White Students vs. Non-White Students (ACT Aspire Math).....56

Table 48: Master's in Math vs. Master's in Other Area (Non-White Students).....56

Table 49: Master's in Math vs. Bachelor's in Math (Non-White Students).....57

Table 50: Master's in Other Area vs. Bachelor's in Math (Non-White Students) 57

Table 51: White Students vs. Non-White Students (ACT Aspire Science).....58

Table 52: Master's in Science vs. Master's in Other Area (Non-White Students).....58

Table 53: Master's in Science vs. Bachelor's in Science (Non-White Students).....58

Table 54: Master's in Other Area vs. Bachelor's in Science (Non-White Students) 59

Chapter I: Introduction

Background of the Problem

Student achievement is critically important to every school, and teachers have a direct impact on students in their classroom (McCaffrey, Lockwood, Koretz, Louis, & Hamilton, 2004; Reynolds et al., 2014; Townsend 1997). Therefore, finding the most qualified teachers to place in each classroom is imperative. The variables that most directly impact teacher quality have been the subject of numerous research studies (Gere & Berebitsky, 2009; Stronge, Ward, & Grant, 2011; Woolley, Strutchens, Gilbert, & Martin, 2010; Yetisir, 2014). Past studies have shown that a teacher's degree level has little impact on student achievement (Coleman, 1966; Goldhaber, & Dominic, 1996; Klinger, Poth, Rodgers, Anderson, & Coleman, 2006; Wayne & Youngs, 2003). However, studies also have shown that teachers with high levels of content knowledge contribute to improved student achievement (Gess-Newsome, Carlson, Gardner, & Taylor, 2010; Tchoshanov, Lesser, & Salazar, 2008). This raises the question as to whether a teacher's content area degree has a significant effect on student achievement. This study examined whether a teacher's content area master's degree positively impacts student achievement.

This study examined ninth and tenth grade students' test scores on the 2018 ACT Aspire in selected Class 5A (2,000 students or above) schools in Arkansas. Student data was analyzed to determine if students perform better on the ACT Aspire exam when taught by teachers who hold a master's degree in the content area. These results may be important in helping administrators, boards of education, and state legislators as they make educational policy decisions. Furthermore, the results may assist teachers in deciding which advanced degrees they should pursue.

The study determined if there is a statistically significant difference between the percentage of students who scored at or above the readiness benchmark ("Ready" or "Exceeding") on the ACT Aspire exam and were taught by teachers with content area master's degrees and the percentage of students who scored at or above the readiness benchmark ("Ready" or "Exceeding") on the ACT Aspire exam and were not taught by teachers with content area master's degrees.

Data was further analyzed on factors including socioeconomic status (SES), gender, and ethnicity, to investigate whether these variables affect the relationship between teacher degree type and student achievement.

Statement of the Problem

The question of how to substantially improve student achievement has long been on the mind of educators across the country. As a whole, students in Arkansas schools are struggling to succeed in the core subjects of math, language arts, reading, and science (Arkansas Department of Education [ADE], 2018b). Teacher quality has been shown to be the most influential factor on student achievement (Bahar, 2016; Gere & Berebitsky, 2009; McCaffrey et al., 2004; Reynolds et al., 2014; Sirait, 2016; Stronge et al., 2011; Townsend 1997; Woolley et al., 2010; Yetisir, 2014). Characteristics such as various teaching strategies (Gere & Berebitsky, 2009), teacher satisfaction and experience (Yetisir, 2014), teacher belief in students (Woolley et al., 2010), classroom management, relationships with students (Stronge et al., 2011), teacher's content knowledge (Gess-Newsome et al., 2010; Tchoshanov et al., 2008), and teacher degree level (Clotfelter, Ladd, & Vigdor, 2007) have all been cited as influential in improving student achievement. This study examined whether obtaining a master's degree in the subject

content area improves a teacher's quality to the point it significantly improves student achievement.

Purpose of the Study

The purpose of this study was to examine whether there is a statistically significant difference in students scoring at or above the readiness level on the state benchmark exam when compared based on students taught by teachers with advanced degrees in their teaching content area and students taught by teachers with only a bachelor's degree or those with a master's degree outside the subject area. Data was analyzed to determine statistical difference between the achievement levels of students taught by teachers with master's degrees in the content area and the achievement levels of students who are not taught by teachers with content area master's degrees.

Conceptual Framework

Several studies have been conducted on the effectiveness of master's degrees in improving teaching practices and programs. Coleman (1966) was the seminal work in teacher and school factors influencing student achievement. Coleman's research, along with many other studies, concluded that a teacher's degree level has little impact on student achievement. Contrastingly, Gess-Newsome et al. (2010) determined that raising teachers' content knowledge improves teacher effectiveness. This outcome leads to the belief that increased content knowledge has a statistically significant positive effect on student achievement. Also, a state-funded professional development project during the 2005-2006 school year looked at the factors within professional development that positively affected student achievement (Tchoshanov et al., 2008). The study concluded that there was a connection between teacher content knowledge and student achievement.

Based on these results, logic would assume that the more content knowledge a teacher has, the more effective the instruction will be for the students. Therefore, earning a master's degree within a teacher's chosen content area would seemingly increase that teacher's quality. In an attempt to prove or disprove this theory, this study examined the impact of content area master's degrees on student achievement.

The context for further examination of the relevance of a content area master's degree and any corollary benefits for students also relates to the changing dynamics of the classroom. Not only are the classroom dynamics changing in K-12 education but also in higher education programs for teachers. Recent research was conducted on a year-long master's program for Physical Education teachers. Two of the learning outcomes for this program were: (a) teachers know the subjects they teach and how to teach those subjects to students and (b) teachers use technology to facilitate student learning (Banville, White, & Fox, 2014). The data showed that a prolonged approach to gaining content knowledge and learning how to teach that content as well as the use of technology in the classroom provided the teachers with a more specific understanding of both content and pedagogical content knowledge (Banville et al., 2014). Participants provided evidence that through the program they developed an understanding of particular principles of their content and then applied them in their own context (Banville et al., 2014). Although universities vary somewhat in their approach, the shift toward student-centered and technology-driven can be seen in a majority of master's degree programs. Recently, master's programs, such as the aforementioned Physical Education program, have shifted their focus to ensuring that teachers who complete their programs

have not only the content knowledge but also the pedagogical content knowledge necessary to understand student thinking in that specific content area.

Therefore, the knowledge and strategies gained from a content area master's degree should lead to increased student outcomes. Yet, the question still remains: Does a content area master's degree actually provide the deeper understanding and increased teacher quality that leads to higher performing students?

Although Coleman (1966) found that schools were not the greatest determinant of student achievement, research since his seminal work has shown teacher qualities have a substantial impact on student achievement (McCaffrey et al., 2004; Reynolds et al., 2014; Townsend 1997). This study could contribute meaningful answers to the question of whether teachers with a master's degree in their teaching content area truly impact student achievement.

Research Hypotheses

H_0: There is no statistically significant difference between the percentages of students who scored "Ready" or "Exceeding" on the ACT Aspire and were taught by teachers with a subject-content master's degree and the percentages of students who scored "Ready" or "Exceeding" on the ACT Aspire and were taught by teachers without such degree.

H_1: There is a statistically significant difference between the percentages of students who scored "Ready" or "Exceeding" on the ACT Aspire and were taught by teachers with a subject-content master's degree and the percentages of students who scored "Ready" or "Exceeding" on the ACT Aspire and were taught by teachers without such degree.

Research Questions

1. Is there a statistically significant difference between the mean scores of students who scored "Ready" or "Exceeding" on the ACT Aspire and were taught by teachers with a subject-content master's degree and the mean scores of students who scored "Ready" or "Exceeding" on the ACT Aspire and were taught by teachers without such degree?

2. Is there a significant difference between the mean scores of students who scored "Ready" or "Exceeding" on the ACT Aspire and were taught by teachers with a subject-content master's degree and the mean scores of students who scored "Ready" or "Exceeding" on the ACT Aspire and were taught by teachers without such degree when analyzed on demographic factors, including students' SES, gender, and ethnicity?

Significance of the Study

The study determined whether there is a statistically significant difference in achievement between students taught by teachers with content area master's degrees and students not taught by teachers with content area master's degrees. The information gathered should help guide district administrators, board members, and policy makers on how best to allocate resources for student achievement. The study may provide information to practitioners in Arkansas and beyond with a proven strategy to improve the practices of teaching and, in turn, raise student achievement.

The study could be used on state and local levels to help guide policies and procedures that aim to improve instruction. The information could be vital to determine the impact of content area advanced degrees on student achievement. Furthermore,

higher education institutions should consider the results of this study to determine if adjustments to higher education are needed.

Scope of the Study

This was a quantitative study to examine the results of the ACT Aspire test cross referenced with the content area degree level of the students' teachers. The examination of data from student performance determined if there is a statistically significant difference in student achievement when groups are compared based on teacher's content area degree level.

The methods were to examine one year of ACT Aspire data from ninth and tenth grade students. These data were grouped by classroom and analyzed based on the degree level of the teachers who taught these classes. Students' data was compared to peers in other classes to examine any statistical differences between students with teachers who have a master's degree in the content area and students with teachers who do not have a master's degree in the content area.

The study examined data from six different school districts across the state. The student data and teacher characteristics were obtained from the districts with the permission of the superintendents. Teacher names were redacted for privacy concerns. The goal of the study was to use six school districts located throughout the state, so the results would not be regional in nature. The sample size consisted of 121 teachers and 8,271 students.

The data used for the research study was the 2017-18 ACT Aspire test data for ninth and tenth grade students. The ACT Aspire test is a nationally accredited test. Data was obtained directly from the schools involved in the study and was disaggregated by

classroom teacher. Another variable to consider was the teacher's degree attainment and teaching subject area.

At the student level, special consideration was given to SES, gender, and ethnicity. SES was addressed by identifying students who qualify for the National School Lunch Program (NSLP). The sample for the study was all of the students from each classroom where teacher attainment is at a master's level in the content area compared to all of the students from each classroom where teacher attainment is not at a master's level in the content area.

Data was entered into a Microsoft Excel spreadsheet. The data was then uploaded into SPSS software. T-tests and Cohen's D Test were used to determine if there were statistically significant differences between the groups and the effect size.

The data analysis provided evidence of whether there is value in teachers at the secondary level obtaining content area master's degrees. The results of this study helped fill the gap in literature on the subject of advanced content area degrees and their effect on student achievement.

Limitations

Due to the fact that Arkansas is a rural state with many of the districts being smaller than 1,000 students, the study was not able to measure many small rural districts and the effectiveness of their practices. Also, the participant sample affected the generalizability of the study's results since it only included teachers from 6 large districts of Arkansas' 343 total school districts.

Furthermore, the fact that only ninth and tenth grade student scores were analyzed limits the extent to which the study's findings can be applied to other grade levels.

Delimitations

The initial delimitation for the study was that since the study was constructed on measuring statistical significance between teachers with master's degree in content area and those without, all schools in the study are Class 4A and above. Arkansas has a classification system from Class A – 7A. Throughout the state, schools are organized by rank based on high school enrollment numbers rather than by a minimum threshold in order to maintain a consistent number of districts in each classification. Other than private schools, the smallest Class 4A school in Arkansas has a total enrollment of 1,010 students (Arkansas Activities Association [AAA], 2018). Therefore, all teacher and student data considered for the study was gathered from school districts with an enrollment of 1,010 or more students. This delimitation is due to the fact the study was set to evaluate multiple teachers with content area master's degrees at each district, and, in Arkansas, only larger districts have high numbers of teachers who hold master's degrees in their content area. This is likely due to the fact larger districts generally compensate teachers at a higher level than smaller districts, who often just meet the state mandated minimum. State minimums do not include extensions on salary schedules such as master's, specialist, and doctoral degrees, so smaller districts usually compensate for advanced degrees at a lower rate than larger districts.

This study was also delimited to include only six districts. Furthermore, the study only analyzed student achievement based on ACT Aspire scores in the areas of math, literacy, and science. The study did not seek to obtain data from other possible measures of student achievement, such as student attitudes and classroom achievement, or other subject areas. Student achievement is certainly not solely determined by how students

score on a standardized exam. However, the ACT Aspire results provided clear data to support the study's conclusions. The ACT Aspire is the testing vehicle that has been adopted for the last three years in Arkansas. All students in Grades 3-10 in Arkansas are required to take the exam, and this gave the study the best chance to analyze student achievement over a period of one year in an objective manner.

The number of teachers to analyze in the study was determined through statistical analysis. In order to obtain data from 121 teachers' classrooms, multiple teachers with content area master's degrees and teachers without content area master's degrees were utilized from each district. G-Power was run to ensure that the sample size was large enough to validate any statistical significance or lack thereof that was present.

Definitions of Terms

Several recurring terms appear in this study. The following section will help illuminate for the reader of the study.

ACT Aspire: Includes a vertically scaled battery of achievement tests designed to measure student growth in a longitudinal assessment system for Grades 3–10 in English, reading, writing, mathematics, and science ("Summative Assessment," 2014).

Bachelor's Degree: A bachelor's degree is a four-year degree, meaning it typically takes four years of full-time study to complete your bachelor's degree. In these four years, you will complete 120 semester credits or around 40 college courses.
A bachelor's degree is a post-secondary undergraduate degree.

Class 4A: The fourth largest classification category in the Arkansas Activities Association. Arkansas has a classification system from Class A – 7A. Throughout the state, schools are organized by rank based on high school enrollment numbers rather than

by a minimum threshold in order to maintain a consistent number of districts in each classification. Other than private schools, the smallest Class 4A school in Arkansas has a total enrollment of 1,010 students, (AAA, 2018).

Community Type: The category to which a community belongs based on its population and characteristics. Most communities are defined as either urban, rural, or suburban type.

Content Knowledge: Refers to the body of knowledge and information that teachers teach and that students are expected to learn in a given subject or content area, such as English language arts, mathematics, science, or social studies ("Content knowledge," 2016).

Content Area Master's Degree: A master's degree that is directly related to the content or subject area in which a teacher is certified and teaching.

Master's Degree: A graduate level award that requires the completion of a program of study at least the full-time equivalent of one but usually not more than two academic years of work beyond the bachelor's degree.

Gender: "Either of the two sexes (male and female), especially when considered with reference to social and cultural differences rather than biological ones" (English Oxford Living Dictionaries, 2019).

Ethnicity: A social group that shares a common and distinctive culture, language, religion, or the like ("Ethnicity," 2018).

Non-Content Area Master's Degree: A master's degree that is not directly related to the content or subject area in which a teacher is certified and teaching. Examples include a master's degree in educational administration or school counseling.

Pedagogical Content Knowledge: "A type of knowledge that is unique to teachers, and is based on the manner in which teachers relate their pedagogical knowledge (what they know about teaching) to their subject matter knowledge (what they know about what they teach)" (Cochran, 1997).

Performance Level Descriptors (PLD's): Outline the knowledge, skills, and practices that students performing at any given level achieve in each content area at each grade level. They indicate if the students are academically prepared to engage successfully in further studies in each content area, the next grade's material and, eventually at the high school level to verify that they are college and career ready. Standard setting panelists use PLDs to determine the threshold expectations for students to demonstrate the knowledge and skills necessary to attain performance levels of "In Need of Support", "Close", "Ready", and "Exceeding" on the ACT Aspire (ACT Aspire, 2016c).

Socioeconomic Status (SES): The social standing or class of an individual or group. It is often measured as a combination of education, income, and occupation.

Student Achievement: Students are achieving when they acquire the knowledge, skills, and attitudes that will prepare them to lead happy and successful lives (Education Evolving, 2016). In this study, student achievement will be measured based on students' ability to achieve the readiness benchmark on the ACT Aspire.

Teacher quality: The knowledge, skills, abilities, and dispositions of teachers.

Summary

This study sought to close the gap in literature on the importance of content area master's degrees and the effect they have on student outcomes. Many studies have been

conducted to measure the effectiveness of master's degrees in relation to student achievement, but very few have isolated only content area master's degrees. This study examined data from students across the state of Arkansas and looked for an association between higher student outcomes and teachers who hold master's degrees within their content areas. The study analyzed one year of data on freshmen and sophomores from across the state to see how students in classrooms with teachers holding advanced degrees in their subject matter compare to their cohorts who were in classrooms with teachers who do not hold such degree.

The study was designed to look for statistical significance among six school districts from the five different geographic regions across the state. The study examined multiple classrooms from each school. Examination of data determined if there is a statistically significant difference between student achievement and the content-related degree attainment of the teacher.

Chapter II: Review of Literature

The Need for Improved Student Achievement

The question of how to improve student achievement has long haunted educators in the United States. Student achievement is not easy to define, but it is most commonly associated with a student's academic performance in the core areas of reading, language arts, math, and science (Cunningham, 2012). Now more than ever, our students are entering a competitive job market where high competencies in literacy, math, and science are a necessity. Although success should not simply be measured by a student's earning of a high school diploma, research shows that individuals without a high school diploma will have far less earning potential over the course of their life than those who graduate high school (Bureau of Labor Statistics, 2017). In fact, according to statistics, the more education students receive, the higher their lifetime earnings will be (Day & Newburger, 2002; Julian & Kominski, 2011). This journey begins in secondary school. One study by Allensworth and Easton (2007) concluded poor performance in core high school courses is highly predictive of students' failure to graduate.

On the ACT Aspire, students' readiness levels are identified using the Performance Level Descriptors (PLDs) of "In need of support," "Close," "Ready," and "Exceeding." These descriptors indicate how prepared students are to engage successfully in further studies in each content area. Preliminary state results for the ACT Aspire in the 2017-18 school year indicate that among 10th grade students in Arkansas, 40% are below "Ready" in English, 49% are "In need of support" in math, 45% are "In need of support" in science, and 40% are "In need of support" in reading (ADE, 2018b). It is the responsibility of educators and school administrators to identify the factors that

most affect these students' ability to succeed in core subjects, which are strong indicators for what the students will achieve later in life.

Factors that Influence Student Achievement

Factors that influence student achievement are wide-ranging. Bertolini, Stremmel, and Thorngren (2012) divide these factors based on Bronfenbrenner's bio-ecological model. Within this model, Bertolini et al. (2012) identify student-related achievement factors, such as student resiliency, health, and attendance, as well as school- and teacher-related achievement factors, such as teacher mentor systems. Other factors that have been cited as influential on student achievement include qualified teachers and staff (McCaffrey et al., 1997), academic and administrative leadership (Grissom, Kalogrides & Loeb, 2014; Townsend, 1997), school processes (Townsend, 1997), and a safe and positive school climate (Dronkers & Robert, 2008; Townsend, 1997).

Teacher quality is the most cited factor known to affect student achievement. A majority of researchers agree teachers have a tremendous effect on student achievement (McCaffrey et al., 2004; Townsend, 1997). One study conducted in Turkey surveyed student perceptions of what contributed to their academic achievement (Bahar, 2016). Teacher factors were the most frequent response, followed by individual factors (Bahar, 2016). Sirait (2016) found that, at the high school level, teacher quality significantly affects student achievement. According to researchers, future efforts in education reform need to be more focused on teaching and teachers (Reynolds et al., 2014). However, all of the teacher variables that influence student outcomes are hard to isolate (Goldhaber, 2016).

Teacher Effectiveness: What Makes a High-Quality Teacher?

While it is widely recognized teacher quality is the most significant factor that affects student achievement, the characteristics that make a high-quality teacher are more difficult to determine. Many characteristics make up a quality teacher, and classrooms have so many variables that isolating teacher characteristics to measure for effectiveness is a difficult proposition. In many studies, the central question is, what makes a teacher effective and able to produce high student achievement?

Two methods that have been used in the student achievement evaluation process are the input and output models. Gere and Berebitsky (2009) suggest output models, such as various teaching strategies, have been linked to higher student achievement. On the other hand, input models such as teacher grade point average, certifications, and degrees have not been statistically significant in producing higher student outcomes (Gere & Berebitsky, 2009).

Teacher behaviors and attitudes. A study in Turkey attempted to identify the characteristics of effective teachers. The study used data gathered from fourth and eighth grade students to determine what caused the student achievement data to move in a positive direction (Yetisir, 2014). The researchers examined many variables in an attempt to isolate the key variable that makes teachers effective. The study found that teacher satisfaction and experience were the two most critical characteristics for teaching success (Yetisir, 2014).

Examining students that are underserved, such as minority or poverty students, also allows for the evaluation of data and the effects of teaching techniques and levels of degrees. Research shows minority students are usually underserved compared to their

white counterparts. There are many factors shaping this situation, including fewer teachers who have traditional certification, less experienced teachers, and not as many teachers with advanced degrees. A study that examined which factors affect minority students the most concluded that teacher belief in students, not advanced degrees, was most closely related to student achievement (Woolley, Strutchens, Gilbert, & Martin, 2010)

Another study that identified characteristics of effective teachers looked at fifth grade students in the subjects of reading and math (Stronge et al., 2011). This study identified the factors that led to higher student achievement as fewer disruptions, better classroom management skills, and better relationships with their students. The teachers that exhibited these proficiencies in the study had statistically higher student achievement.

Teacher experience and knowledge. Buddin and Zamarro (2009) conducted a longitudinal study in Los Angeles schools in the subjects of math and reading. The study tracked student achievements and examined teacher factors that include teacher experience, teacher degree level, classroom size, and teacher licensure scores. The only positive results concluded from the study were classroom reduction and teacher experience showed positive student achievement gains, but only slightly (Buddin & Zamarro, 2009). However, this faded over time, suggesting minimal gains by students.

Another study conducted to measure teacher effectiveness found academic content knowledge was the only statistically significant relationship to classroom practice (Gess-Newsome et al., 2010). Gess-Newsome et al. (2010) examined many factors such as teacher effectiveness, academic content knowledge, general pedagogical knowledge,

pedagogical content knowledge, and teacher practice. The outcome of this study leads to the belief that increased content knowledge has a statistically significant positive effect on student achievement. Another outcome to this study (Gess-Newsome et al., 2010) was relevant professional development embedded in the year that challenges and stimulates teachers can have a statistically significant influence on student achievement.

A state funded professional development project during the 2005-2006 school year looked at what factors during professional development positively affected student achievement (Tchoshanov, M, Lesser, L & Salazar, J, 2008). This study concluded there was a connection between teacher knowledge and student achievement. The rationale is actually quite simple: the more content knowledge a teacher has, the more effective the instruction will be for the students.

However, a contradictory study by Darling-Hammond (2000) on teacher effectiveness looked at what factors have a positive impact on student achievement. Darling-Hammond (2000) found no correlation between the measure of subject matter knowledge measured by the National Teacher Exam (NTE) and student outcome.

Identifying high quality teacher characteristics is a challenge for both school administrators and policy makers. While there have been mixed results, several studies have concluded that teachers' content knowledge as well as their behaviors and attitudes have a positive effect on student achievement (Buddin & Zamarro, 2009; Gess-Newsome et al., 2010; Stronge et al., 2011; Tchoshanov et al., 2008; Woolley et al., 2010; Yetisir, 2014).

Effects of Advanced Degrees on Teacher Quality

In the past ten years, studies have been produced to address both sides of the debate on the value of advanced degrees for teachers. However, the question of whether or not a master's degree is beneficial to students has been studied for over 60 years with mixed results. Historical data and studies on this subject have generally concluded teachers with master's degrees are not statistically prone to generate higher achievement levels than teachers with bachelor's degrees (Goldhaber & Dominic, 1996). The Coleman Report was a seminal work for education which examined many factors that influenced student outcomes as well as race. This report concluded a master's degree was not a statistically significant factor in the classroom (Coleman, 1966). Also, the National Educational Longitudinal Study (NELS) has shown master's degrees do not increase student achievement (Goldhaber, 1997).

Strictly considering teacher's degree level has not indicated substantial student growth when comparing teachers with bachelor's degrees to teachers with master's degrees. A past review of teacher characteristics and student achievement supports these results (Wayne & Youngs, 2003). This study looked at four teacher characteristics, including level of degree, and how these characteristics affected student outcomes. The study concluded that a master's degree did not lead to improved student outcomes.

Furthermore, a study conducted in Ontario, Canada examined seniors on a high stakes exam, Ontario Secondary School Literacy Test (OSSL), to identify teacher characteristics that lead to high student achievement (Klinger et al., 2006). Advanced degrees showed very little influence in boosting students academically (Klinger et al.,

2006). The results of the study also showed that schools and curriculum were not statistically relevant to higher student achievement.

A recent study by Goldhaber (2016) states neither having nor obtaining a master's degree impacts student achievement. The study concluded teachers improve for the first four years in the profession, but then plateau in the years following. Student achievement data stayed stagnant after the four-year mark in a majority of teachers examined in the study, regardless of their degree level.

While some studies indicate advanced degrees do not impact student achievement, several studies suggest otherwise. One study conducted in North Carolina looked at the performance of secondary students and how teacher characteristics affected student achievement. Obtaining advanced degrees in content areas was a considered characteristic in this study (Clotfelter, Ladd, & Vigdor, 2007). The study investigated a cross-subject student achievement with student fixed effects. The results showed a standard deviation of 0.34 for students in a highly qualified teacher's classroom as compared to students in a less qualified teacher's classroom.

Zhang's (2008) study of science teachers had a contradictory result. This study examined 655 students in the sixth to eighth grade and also encompassed 12 science teachers (Zhang, 2008). Zhang (2008) found holding an advanced degree did indeed positively influence student achievement. Another interesting conclusion of the study was teachers with advanced degrees are most effective early in their teaching career. As teachers gained experience, the positive impact dissipated (Zhang, 2008). The Zhang study (2008) supports the importance of advanced degrees but also identifies that teacher experience is not a contributing factor to higher student achievement.

Darling-Hammond's (2000) quantitative analyses indicate teacher preparation and certifications are the strongest correlates of student achievement in reading and math. National surveys from all 50 states examined data to come to this conclusion.

Talaga (2015) looked at teacher self-efficacy among elementary teachers with advanced degrees in mathematics. This qualitative study reported increased teacher self-efficacy for those who held advanced degrees through several factors, including peer experiences, new content-specific teaching techniques, and professor input on these practices (Talaga, 2015). Shoulders and Krei (2015) found teachers with master's degrees benefited in the areas of efficacy in instructional practices and classroom management but indicated no statistical difference in student engagement. Both the Shoulders and Krei (2015) and Talaga (2015) studies suggest teacher efficacy is increased through obtaining master's degrees.

The article "Conference Looks Toward the Future" (Adam, 2011) states there is no empirical evidence that proves master's degrees for teachers are not effective for student achievement. The author states research should be done to examine what type of master's degrees are being pursued and that the financial incentive should not be taken away from teachers (Adam, 2011).

Content area master's degrees. Some studies have shown teachers with content area master's degrees are beneficial to students while master's degrees not in the certification area had little value to the students (Odden, 2001).

One study conducted in Michigan by Huntoon and Baltensperger (2012) focused on a master's degree in Earth Science designed to encourage teachers in Michigan to become certified to teach Earth Science courses. The program was set up over a two-year

period in which nine teachers piloted the program. The results showed a new approach could lead to positive results for both teachers and students. Of the nine students who piloted the program, four passed the High School Content Expectations (HSCE) on the first try. The goal of producing teachers certified in Earth Science was achieved. More importantly, the model of focusing on content knowledge and classroom skills produced more confident teachers who were examined through surveys throughout the study (Huntoon & Baltensperger, 2012). According to this study, a shift to content area master's degrees that incorporate technology and effective use of time leads to better student outcomes in the classroom (Huntoon & Baltensperger, 2012).

A study conducted in Texas validates content mastery in the classroom and its direct effect on student outcomes. A factor in this study was content undergraduate degrees and master's degrees. This study was conducted due to a teacher shortage in the state, and researchers wanted to see if lowered credentials and alternative, non-traditional certifications were negatively affecting student outcomes (Harrell & McLean, 2011). The study tracked students in math and compared scores. The data showed a strong correlation between student success and teachers who majored in math or had a master's degree in math. Three statistically significant correlations between domain scores and Algebra were found for twenty-seven students (Harrell and McLean, 2011).

Goldhaber and Dominic (1996) studied teacher degree level's impact on educational performance and found teachers with master's degrees and doctoral degrees are no more or less effective than those teachers without graduate degrees. However, in math and science teachers, subject-specific training had a significant impact on student test scores in these areas (Goldhaber & Dominic, 1996). These conclusions lead to the

belief, at least in math and science, content area degrees are impactful for students. In the subjects of English or history, there is no evidence content area degrees have a positive impact on student achievement (Goldhaber & Dominic, 1996).

Changes in Current Graduate Degree Programs

Although some past studies have indicated that master's degrees do not significantly affect a teacher's impact on student achievement, it is important to determine whether updated master's programs have caused a shift in the data.

Master's degree programs have changed greatly in the last 60 years, but have the results changed as well? Recent research was conducted on a year-long master's program for Physical Education teachers. Two of the learning outcomes for this program were: (a) teachers know the subjects they teach and how to teach those subjects to students and (b) teachers use technology to facilitate student learning (Banville et al., 2014). The data showed a prolonged approach to gaining content knowledge and learning how to teach that content, as well as the use of technology in the classroom, provided the teachers with a more specific understanding of both content and pedagogical content knowledge (Banville et al., 2014). Participants provided evidence that through the program they developed an understanding of particular principles of their content and then applied them in their own context (Banville et al., 2014).

Another approach to master's degree programs is the one that the Centennial School utilizes in conjunction with Lehigh University (George, George, Kern, & Fogt, 2013). For the first two years, teachers enrolled in this program work with students and a mentor teacher with a master's degree in the same classroom and attend classes at night to attain a master's degree. George et al. (2013) state that during master's work, teachers

receive supervision from program coordinators who act like defacto principals for support.

Current master's programs usually have two different structures, with the first being the university model. This model allows for teachers to attend traditional universities off of the kindergarten or secondary campus and follow the curriculum in an isolated manner. A second approach is the university-school mode, which takes place in the practitioner's school. On-site practice allows for students to work with the university in curriculum while gaining knowledge and applying these new skills in the classroom. A study examining these two models found that the university-school approach is more effective in increasing student performance (Cornelissen, van Swet, Beijaard, & Bergen, 2012). This new master's programs approach to teacher preparation has shown promise in achieving higher student response. A Palomino (2015) study stated students in a secondary teaching master's program in Spain thrived when classes were established in student-centered environments. Students in the Spanish University system achieve better results when professors have these common factors: explain content well and have a good command over the material, have an initial assessment at the beginning of the course to establish a baseline for student knowledge, use a variety of teaching methods, communicate effectively, and collaborate with students (Palomino, 2015).

Another study examined not only current master's programs but also the future of higher education placed high importance on student choice and input (Ilisko, Skindra, & Micule, 2014). This study examined eight master's level students and conducted one-on-one interviews with these students. The results provided a student's perspective as to

what would make for a successful educational experience that would benefit the student and society as a whole. The students' vision of the future school was comprised of student-centered organizations with democratic processes that challenged students to look at current trends and protect the environment (Ilisko et al., 2014). The student perspective is a powerful tool in shifting from traditional approaches in higher education to a more flexible approach that truly is student-centered.

Furthermore, the advent of technology has revolutionized the educational process. Devices and internet access have transformed the classroom. Higher education has adapted to meet the needs of students worldwide. An example of this change in current master's teacher content is taking place at George Mason University (Shaklee, Mattix-Foster, & Lebron, 2015). The FAST TRAIN program focuses on an in-depth understanding of linguistics with diverse and exceptional leaders, emphasizing collaboration in the school community. Advances in the ability to share information and experiences have led to more opportunities for educators to continue advanced degrees. Thirty percent of the students currently enrolled in graduate school programs are using online services (Liu, 2013). The trends show online master's education programs will continue to increase for several reasons (Liu, 2013). The first is the convenience. With the advent of better internet and software, students are able to connect and access information. Economically, online degrees offer a viable option for students as compared to brick and mortar schools. The last indicator online master's programs are the present and future is the current financial incentive for teachers to pursue master's degrees. Teacher salaries can be substantially raised up to $10,000 dollars nationally upon acquiring a master's degree (Liu, 2013).

Furthermore, universities are now exploring options for delivering information that allows teachers to not only become certified but also receive a master's degree in the process. The Masters of Arts in Teaching at the University of Southern California (MAT@USC) is a relatively new program that allows students to interact with peers and faculty through the use of software and video cameras (Liu, 2013). Western Governor's University has a different approach to bringing the content to its students. The program is not built on credits but rather competencies. Although both programs are relatively new, initial feedback suggests results similar to those of traditional institutions (Liu, 2013).

Students' and professors' attitudes toward incorporating technology into higher education plays a crucial role in the development of beneficial master's programs. Kisanga (2016) conducted a study on teachers' attitudes toward e-learning in Tanzania. The survey research study stated that teacher attitudes toward e-learning in higher education programs varied based on many factors (Kisanga, 2016). The factors included age, experience level, degree level, and exposure to computers (Kisanga, 2016). The statistics from the study showed 53% of the 248 teachers had a positive perception of e-learning. These results indicate an innovative technological approach to learning could have positive effects for both teachers in the higher education programs and students in the school community.

However, online approaches also have side effects for students in the program. Adult students in master's programs trend toward delayed completion of the degree (Motseke, 2016). Motseke (2016) listed several factors that slow adult learners' completion of degree, including lack of computer skills, stress, work, and supervision

problems. Another issue when dealing with online degrees is a lack of communication between faculty and students when backgrounds differ (Dwivedi, 2013). Technology can be leveraged to deliver content and availability, but the institution must also consider the student in the program and try to accommodate student needs with support from faculty.

Research of master's degree programs from different areas and approaches leads to the conclusion master's degree programs differ based on location and availability of technology (Briones & Toth, 2013). Although universities vary somewhat in their approach, the shift toward student-centered and technology-driven can be seen in a majority of master's degree programs. For example, Manfra and Bolick (2008) found a greater focus on pedagogical content knowledge and the infusion of technology in a Social Studies teacher master's program improved Social Studies instruction.

Recently, master's programs have shifted their focus to ensuring teachers who complete their programs have not only the content knowledge but also the pedagogical content knowledge necessary to understand student thinking in that specific content area. The recent acknowledgment of these factors further drives the question of whether current master's degree programs are producing teachers who have a greater impact on student achievement.

Implications of Prior Research for Future Research

While it is widely recognized teacher quality is the most significant factor that leads to student achievement, the impact of experience and education level on teacher quality has not been clearly determined. This topic has been examined for over 60 years, but will current data lead to new results that should shape future policies for Arkansas schools?

Many studies conclude teachers with master's degrees do not improve student outcomes more than their peers who hold bachelor's degrees. However, the issues in this study are more complex than whether or not a master's degree improves student outcomes; one must also consider the content area in which the master's degree was obtained as well as the fact that master's programs are constantly changing to meet the needs of teachers.

Data can be skewed by the fact that a teacher with a master's degree could either have been certified through alternative methods or already had an undergraduate degree in the field in which they are teaching. Many educators go on to receive master's degrees in educational leadership, which has no immediate impact on content-specific pedagogy. How then do researchers identify if a teacher's master degree is a significant contributor to great instruction? This study assessed whether content area master's degrees affect student outcomes.

Summary

It is no secret that improving student outcomes is of the highest priority for education in our country. Many factors have been shown to contribute to student outcomes, but teacher quality has garnered the most attention. The literature consistently states high quality teachers lead to high student outcomes, but there is no conclusive evidence that one of the defining characteristics of a high-quality teacher is an advanced degree. The literature reviewed reveals contradicting viewpoints on how much a master's degree enhances student achievement. Further examination will need to include a comparison of content-specific master's degrees in the content area versus bachelor's degrees and advanced degrees not in the content area. Historical data and studies find

little correlation between student success and a teacher's level of degree. New research, however, has suggested that teachers' content knowledge does positively affect student achievement. Further research is needed to determine whether or not the knowledge gained from a content area master's degree improves student outcomes.

Completing a master's program can have serious implications for teachers' outlook on the profession. Programs can lead to a more positive outlook on the profession if the experience is deemed relevant and beneficial (Sari, 2010). This qualitative analysis determined whether student data showed positive student outcomes, as well.

Chapter III: Research Methodology

Chapter 3 describes the methodology used in this study to determine how teacher degree level, specifically master's degree within content area, affects student achievement. This study used a quantitative design that compared student achievement, as measured by ACT Aspire content area scores, between students who were taught by teachers with content-specific master's degrees and students who were not taught by teachers with content-specific master's degrees. In this chapter, participants, instrumentation, procedures, and data analysis are described in detail. The findings from this study can be used to provide Arkansas school districts with valuable information regarding the effect degree level has on teacher quality and student achievement.

Participants

Data was gathered from six school districts throughout the state of Arkansas. This sample was purposive. The schools are located in five regions across the state. These five regions are Central, Northwest, Northeast, Southeast, and Southwest. These regions were chosen based on the Arkansas Department of Education maps that identify the five geographical regions of the state. Each local education agency (LEA) examined has different demographics and geographical make-ups. The districts vary in size, number of low socio-economic students (SES), and teacher qualifications. The rationale behind the sample diversity was to gather a true reflection of how teacher degree level affects student achievement throughout the entire state of Arkansas.

Each LEA was examined at the class level in order to determine if there was a statistically significant difference between groups of students based on the chosen variables of teacher degree level, SES, gender, ethnicity, and community type.

In total, student achievement data from 121 teachers' classrooms and over 8,000 students across the six districts was examined. Thirty of the teachers have a master's degree in the content area in which they teach. The other teachers hold a degree other than a content area master's degree, including a bachelor of arts degree. Comparison of the student groups allowed us to analyze the effect teacher degree level has on student achievement scores. The number of participants were sufficient as the student data from all districts was combined into a dataset for analysis. G-Power was run to ensure the size of the sample allowed results to be valid and reliable (Knapp, 2017).

The following table provides a description of each LEA setting:

Table 1. *LEA Characteristics*

LEA	Approx. Community Population	District Enrollment	9-12 Enrollment	# Full-time Teachers	Grad. Rate	% Free & Red. Lunch	Minority enrollment %
Central	35,789	5,141	1,534	315	95%	41.3%	19%
Central 2	8,146	3,390	951	232	80%	51.3%	11%
Southeast	4,886	4,210	1,232	280	85%	46.66%	9%
Southwest	36,915	4,378	1,372	255	83%	57.75%	21%
Northeast	28,488	3,197	839	227	90%	67.56%	16%
Northwest	9,405	3,710	1,161	226	93%	33.8%	12%

Note. Community population adapted from U.S. Census Bureau 2017 population estimates (U.S. Census Bureau, Population Division, 2018). District enrollment, 9-12 enrollment, full-time teachers, graduation rates, and minority enrollment percentage adapted from https://publicschoolreview.com. Percentage free and reduced lunch adapted from Arkansas Department of Education free and reduced school lunch data (ADE, 2014).

Instrumentation

The instrument that the study used to measure student outcomes was the ACT Aspire test. The ACT Aspire test is a standards-based system of assessment that allows states to check progress of students in grades 3-10 (ACT Aspire, 2016a). The testing

instrument also allows states to check progress on college and career readiness. The ACT Aspire exam aligns with Arkansas state standards.

ACT Aspire allows schools to give three periodical assessments throughout the year to progress monitor students. The check for understanding allows teachers to use data to guide instruction throughout the year. The data produced from the formative assessment gives school districts progress monitoring on college and career readiness. A summative assessment is given at the end of the year.

The ACT Aspire measures readiness in grades 3-10 in the following subject areas: literacy (English and reading), math, science, and writing (ACT Aspire, 2016a). The summative exam is a vertically-scaled assessment suite connected to the American College Testing (ACT). The ACT is the most frequently used college exam in the United States (ACT Aspire, 2016a).

The ACT Aspire is given during the school day in windows set by the Arkansas Department of Education. Each LEA is given flexibility to give the summative assessment at their discretion as long as if fits in the provided window. The test is administered over a three-day period. The order is left to the school district's discretion. The testing window expires after the designated three days.

Validity involves collection of evidence regarding the degree to which score interpretations for proposed uses are supported. Validity evidence for ACT Aspire is organized into six areas, including content-oriented evidence, cognitive processes, internal structure, relationships to other constructs, relationships with criteria, and consequences (ACT Aspire, 2016b). ACT Aspire scores include two primary and three

secondary interpretations (ACT Aspire, 2016a). The validity is based on student work evidenced in these areas.

The reliability of the ACT Aspire scores is based on disattenuated correlations between ACT Aspire scale scores and the ACT. Disattenuated correlations are estimates of the linear relationships between scores after the reliability of each test was considered. In classical test theory, disattenuated correlations are referred to as estimates of the relationship between true scores; they provide an estimate of the relationship between ACT Explore/ACT Plan and ACT Aspire as if each contributing score were perfectly reliable (ACT Aspire, 2016b).

Procedures

The researcher obtained permission from district superintendents to examine ninth and tenth grade 2018 ACT Aspire summative data from their respective school districts through examination of the summative exam. Superintendents provided the researcher with teacher demographic information, such as gender, ethnicity, highest degree held, and whether the teacher has a master's degree in the content area in which they are teaching, for each teacher whose students took the science, literacy, and math ACT Aspire tests. For each identified teacher, the percentage of students scoring "Ready" or "Exceeding" was provided. All names were redacted to ensure privacy of all participants in the study. No data was examined or collected until the study obtained IRB approval.

This study analyzed the percentages of students who scored "Ready" or "Exceeding" on the ACT Aspire test in each teacher's respective subject area. The rationale for using percentages and not raw data is two-fold. The use of percentages as opposed to reporting the raw data allows various sample sizes to be compared relative to

one another. The percentages also allow future analysis of similar data to be compared adequately. In addition, the use of percentages ensures the privacy of the student data as to not inadvertently identify students due to the size of the sample. This ensures compliance with Family Educational Rights and Privacy Act (FERPA).

Data Analysis

The data analysis for this study consisted of both descriptive and inferential statistics. T tests and Cohen's D tests were used to determine if there were statistical differences between the groups and what the effect size was. Data was analyzed to determine if significant differences exist between the percentage of students at the Ready or Exceeding level for teachers who have a master's degree in the content area with those who do not have a master's degree in the content area in which they are teaching. The data was analyzed at the LEA level as well as at the state level. Furthermore, content matter analysis of the data was performed to determine if a graduate degree in the content area has an impact on the percentage of students scoring at the "Ready" or "Exceeding" level.

Chapter IV: Results

The research in this study was driven by the academic impact on students in the ninth and tenth grade in six high schools across the state of Arkansas whose teachers possess a content area master's degree in a content area as defined by math, science, or literacy. The purpose was to investigate whether a teacher's degree level impacted student achievement as measured on the ACT Aspire exam. The following two questions were posited to evaluate the effect of student achievement with teacher degree.

1. Is there a statistically significant difference between the mean scores of students who scored "Ready" or "Exceeding" on the ACT Aspire and were taught by teachers with a subject-content master's degree and the mean scores of students who scored "Ready" or "Exceeding" on the ACT Aspire and were taught by teachers without such degree?

2. Is there a statistically significant difference between the mean scores of students who scored "Ready" or "Exceeding" on the ACT Aspire and were taught by teachers with a subject-content master's degree and the mean scores of students who scored "Ready" or "Exceeding" on the ACT Aspire and were taught by teachers without such degree when analyzed on demographic factors, including students' SES, gender, and ethnicity?

To address these questions, data from six high schools from all regions in the state of Arkansas were examined. The data analyzed included results from the 2017-2018 school year as reported from ACT Aspire. The data was imported from Excel and analyzed using SPSS version 25. Quantitative statistical methods, including t-tests, were used to analyze all the data submitted by the six school districts.

Table 2 provides demographic descriptions of the students sampled for the study. Table 3 provides degree descriptions for the teachers sampled in the study.

Table 2. *Frequencies and Percentages for Student Demographic Variables (n=8,271)*

Variables	*n*	%
Gender		
Male	4,149	50.2%
Female	4,122	49.8%
Ethnicity		
White	6,975	84.3%
Black	451	5.5%
Hispanic	516	6.2%
American Indian	160	1.9%
Asian	116	1.4%
Hawaiian	9	0.1%
Not Specified in Data File	44	0.5%
Low Socio-Economic Status	4,356	52.6%

Table 3. *Frequencies and Percentages for Teacher Degree Variables (n=121)*

Variables	*n*	%
Bachelor's degree in Science	11	9.5%
Master's degree in Science	12	10.3%
Bachelor's degree in Math	22	19.0%
Master's degree in Math	10	8.6%
Bachelor's degree in Literacy	13	11.2%
Master's degree in Literacy	8	6.9%
Master's degree in other area	45	38.8%

Research Question One

The first research question asked if there was a statistically significant difference between the mean scores of students who scored "Ready" or "Exceeding" on the ACT Aspire and were taught by teachers with a subject-content master's degree and the mean scores of students who scored "Ready" or "Exceeding" on the ACT Aspire and were taught by teachers without such degree? To answer this question, an independent sample t-test was used to see if there was a significant difference in students' scores based on

teacher degree level. In addition to the independent sample t-test, a Cohen's d test was run to measure the effect size of any statistical significance detected. The data were analyzed by the three areas in which ninth and tenth grade students are tested on the ACT Aspire: literacy, math, and science. The results suggested different student achievement outcomes based on the subject tested.

The study examined teacher degree level on three variables. The degree levels include a bachelor's degree in content area taught, a master's degree in content area taught, and a master's degree in any area other than the content area. Each variable was analyzed for the three core content areas tested.

Literacy scores. First, literacy data was examined to check for statistical significance. As illustrated in Table 4, there was no statistically significant difference between the mean score of students taught by literacy teachers with a literacy master's degree compared to the mean score of students taught by literacy teachers with master's degrees in other areas.

Table 4. *Master's in Literacy vs. Master's in Other Area*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)
Literacy Master's	1204	433.33	9.901	.285	.348
Other Master's	2611	433.11	9.764	.191	

There was a statistically significant difference in student performance when comparing the mean score of students from classes taught by literacy teachers with content area master's degrees to the mean score of students from classes taught by literacy teachers with only bachelor's degrees (Table 5). However, the d of 0.18 means the difference was trivial.

Table 5. *Master's in Literacy vs. Bachelor's in Literacy*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)	Cohen's d
Literacy Master's	1204	433.43	9.901	.285	.000	.18
Literacy Bachelor's	3066	431.68	9.766	.176	.000	

The last literacy data set analyzed the mean score of students in classes taught by teachers with literacy bachelor's degrees compared to the mean score of students in classes taught by teachers with master's degrees in other areas. Table 6 reveals there was a statistically significant difference in student performance between these two teacher variables; however, the difference of 1.43 was trivial (d=.15).

Table 6. *Master's in Other Area vs. Bachelor's in Literacy*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)	Cohen's d
Other Master's	2611	433.11	9.764	.191	.000	.15
Literacy Bachelor's	3066	431.68	9.766	.176		

Math scores. Next, math student achievement data was examined to check for statistical significance. There was no statistically significant difference between the mean score of students from classes taught by math teachers with a math master's degree compared to the mean score of students from classes taught by math teachers with master's degrees in other areas (Table 7).

Table 7. *Master's in Math vs. Master's in Other Area*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)
Math Master's	1609	427.94	8.386	.209	.704
Other Master's	3201	431.84	8.559	.151	

There was a statistically significant difference in student performance when comparing the mean score of students taught by teachers with math master's degrees to the mean score of students taught by teachers with math bachelor's degrees (Table 8). However, the difference was trivial (d=.09).

Table 8. *Master's in Math vs. Bachelor's in Math*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)	Cohen's d
Math Master's	1609	427.94	8.386	.209	.002	.09
Math Bachelor's	3460	427.18	8.178	.139		

Further analysis examined the mean score of students in classes taught by teachers with math bachelor's degrees compared to the mean score of students in classes taught by teachers with master's degrees in other areas. There was a statistically significant difference in student performance between these two teacher variables, but the difference was trivial (d=.08) as reported in Table 9.

Table 9. *Master's in Other Area vs. Bachelor's in Math*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)	Cohen's d
Other Master's	3201	427.84	8.559	.151	.001	.08
Math Bachelor's	3460	427.18	8.178	.139		

Science scores. Science data was also examined to check for statistical significance in ninth and tenth grade students. As illustrated in Table 10, there was no statistically significant difference between the mean score of students in classes taught by teachers with science master's degree compared to the mean score of students in classrooms taught by teachers with master's degrees in other areas.

Table 10. *Master's in Science vs. Master's in Other Area*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)
Science Master's	1609	427.83	8.884	.221	.074
Other Master's	3201	428.31	8.634	.153	

There was no statistically significant difference in student performance when comparing the mean score of students taught by teachers with content area master's degrees in science to the mean score of students from classes taught by teachers with bachelor's degrees in Science (Table 11).

Table 11. *Master's in Science vs. Bachelor's in Science*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)
Science Master's	1609	427.83	8.884	.221	.390
Science Bachelor's	3460	427.61	8.511	.145	

The last science data set examined the mean score of students from classes taught by teachers with science bachelor's degrees compared to the mean score of students from classes taught by teachers with master's degrees in other areas (Table 12). There was a statistically significant difference in student performance between these two teacher variables; however, the difference was trivial (d=.08).

Table 12. *Master's in Other Area vs. Bachelor's in Science*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)	Cohen's d
Other Master's	3201	428.31	8.634	.153	.001	.08
Science Bachelor's	3460	427.61	8.511	.145		

Research Question Two

The second research question asked, "Is there a significant difference between the mean score of students who scored "Ready" or "Exceeding" on the ACT Aspire and were taught by teachers with a subject-content master's degree and the mean score of students who scored "Ready" or "Exceeding" on the ACT Aspire and were taught by teachers without such degree when analyzed on demographic factors, including students' SES, gender, and ethnicity?"

Literacy scores based on gender. To answer this question, first literacy scores were examined based on gender. As illustrated in Table 13, the mean score of female students from classrooms of teachers with a master's degree in literacy had no statistical significance difference when compared to the mean score of female students from classrooms of teachers who had a master's degree in other areas.

Table 13. *Master's in Literacy vs. Master's in Other Area (Female Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)
Literacy Master's	571	438.23	6.568	.275	.244
Other Master's	1122	437.84	6.458	.145	

There was a statistically significant difference in female students' mean literacy score with teachers who have a master's degree in literacy as compared to female students' mean score with teachers who have a bachelor's degree in literacy (Table 14). However, the d of 0.12 means the difference was trivial.

Table 14. *Master's in Literacy vs. Bachelor's in Literacy (Female Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)	Cohen's d
Literacy Master's	571	438.23	6.568	.275	.001	.12
Literacy Bachelor's	1156	437.07	6.564	.193		

There was a statistically significant difference in mean scores when female students from classrooms taught by teachers with master's degrees in other areas were compared to female students from classes taught by teachers with a bachelor's degree in literacy (Table 15). However, the difference is trivial (d=.18).

Table 15. *Master's in Other Area vs. Bachelor's in Literacy (Female Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)	Cohen's d
Other Master's	1122	437.84	6.458	.193	.005	.18
Literacy Bachelor's	1156	437.07	6.564	.193		

Literacy Scores were examined in male students, as well. As illustrated in Table 16, the mean score of male students from classes taught by teachers with a master's

degree in literacy showed no statistical significance when compared to the mean score of male students from classes taught by teachers who had a master's degree in other areas.

Table 16. *Master's in Literacy vs. Master's in Other Area (Male Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)
Literacy Master's	420	436.72	6.613	.323	.957
Other Master's	962	436.74	6.383	.206	

There was no statistical difference in the mean score of male students from classes taught by teachers who have a master's degree in literacy as compared to the mean score of male students from classes taught by teachers with a bachelor's degree in literacy (Table 17).

Table 17. *Master's in Literacy vs. Bachelor's in Literacy (Male Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)
Literacy Master's	420	436.72	6.613	.323	.091
Literacy Bachelor's	1081	436.09	6.432	.196	

As illustrated in Table 18, there was a statistically significant difference when the mean score of male students from classes taught by teachers with master's degrees in other areas were compared to the mean score male students taught by teachers with a bachelor's degree in literacy. However, the effect size was trivial (d=.18).

Table 18. *Master's in Other Area vs. Bachelor's in Literacy (Male Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)	Cohen's d
Other Master's	962	436.74	6.383	.206	.022	.18
Literacy Bachelor's	1081	436.09	6.432	.196		

Math scores based on gender. Math scores were also examined based on gender. First, female students' mean score was examined based on teacher degree level and content area.

There was no statistical difference between the mean score of female students who were taught by teachers who have a master's degree in math and the mean score of female students who were taught by teachers with a master's degree in other areas (Table 19).

Table 19. *Master's in Math vs. Master's in Other Area (Female Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)
Math Master's	397	425.09	4.593	.231	.617
Other Master's	767	434.94	4.707	.170	

There was also no statistical difference between the mean score of female students who were taught by teachers with a master's degree in math and the mean score of female students who were taught by teachers with a bachelor's degree in math (Table 20).

Table 20. *Master's in Math vs. Bachelor's in Math (Female Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)
Math Master's	397	435.09	4.593	.231	.184
Math Bachelor's	706	434.70	4.597	.173	

As illustrated in Table 21, results showed no statistical difference when the mean score of female students taught by teachers with a master's degree in other areas was compared to the mean score of female students taught by teachers with a bachelor's degree in math.

Table 21. *Master's in Other Area vs. Bachelor's in Math (Female Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)
Other Master's	767	434.94	4.707	.170	.325
Math Bachelor's	706	434.70	4.597	.173	

Male student data was also examined in the area of math. Data was compared for these students based on teacher degree level and content area degree. The results are as follows.

As illustrated in Table 22, there was no statistical difference in the math mean score of male students taught by teachers who have a master's degree in math as compared to the math mean score of male students taught by teachers with a master's degree in other areas.

Table 22. *Master's in Math vs. Master's in Other Area (Male Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)
Math Master's	320	435.32	4.815	.269	.107
Other Master's	636	435.88	5.203	.206	

As illustrated in Table 23, there was no statistical difference in the math mean score of male students taught by teachers who have a master's degree in math as

compared to the math mean score of male students taught by teachers with a bachelor's degree in math.

Table 23. *Master's in Math vs. Bachelor's in Math (Male Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)
Math Master's	320	435.32	4.815	.269	.697
Math Bachelor's	683	435.19	4.807	.184	

As illustrated in Table 24, male students' mean scores showed a statistically significant difference when male students taught by teachers with a master's degree in other areas were compared to male students taught by teachers with a bachelor's degree in math. However, the effect size was trivial (d=.14).

Table 24. *Master's in Other Area vs. Bachelor's in Math (Male Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)	Cohen's d
Other Master's	636	435.88	5.203	.206	.013	.14
Math Bachelor's	683	435.19	4.807	.184		

Science scores based on gender. ACT Aspire data in the content area of science was also examined based on gender. Data analysis looked at both male and female students and how teacher degree level and content area affected student achievement. The following are results of this data analysis.

As illustrated in Table 25, there was no statistical difference in the science mean score of female students taught by teachers who have a master's degree in science as compared to the science mean score of female students taught by teachers who have a master's degree in other areas.

Table 25. *Master's in Science vs. Master's in Other Area (Female Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)
Science Master's	382	435.77	4.063	.208	.598
Other Master's	608	435.91	4.053	.164	

There was no statistical difference in the science mean score of female students taught by teachers with a master's degree in science as compared to the science mean score of female students taught by teachers with a bachelor's degree in science (Table 26).

Table 26. *Master's in Science vs. Bachelor's in Science (Female Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)
Science Master's	382	435.77	4.063	.208	.740
Science Bachelor's	630	435.68	4.424	.176	

There was also no statistical difference in the science mean score of female students taught by teachers with a master's degree in other areas as compared to the science mean score of female students taught by teachers with a bachelor's degree in science (Table 27).

Table 27. *Master's in Other vs. Bachelor's in Science (Female Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)
Other Master's	608	435.91	4.053	.164	.337
Science Bachelor's	630	435.68	4.424	.176	

Male students' results were examined with the same criteria. The results are discussed below.

As illustrated in Table 28, there was no statistical difference in the science mean score of male students taught by teachers with a master's degree in science when compared to the science mean score of male students taught by teachers with a master's degree in other areas.

Table 28. *Master's in Science vs. Master's in Other Area (Male Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)
Science Master's	266	436.32	4.367	.268	.416
Other Master's	540	436.04	4.759	.205	

As illustrated in Table 29, there was also no statistical difference in the science mean score of male students taught by teachers with a master's degree in science when compared to the science mean score of male students taught by teachers with a bachelor's degree in science.

Table 29. *Master's in Science vs. Bachelor's in Science (Male Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)
Science Master's	266	436.32	4.367	.268	.298
Science Bachelor's	602	435.97	4.672	.190	

Male students' results showed no statistical difference when the science mean score of male students taught by teachers with a master's degree in other areas were compared to the science mean score of male students taught by teachers with a bachelor's degree in science (Table 30).

Table 30. *Master's in Other Area vs. Bachelor's in Science (Male Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)
Other Master's	540	436.04	4.759	.205	.806
Science Bachelor's	602	435.97	4.672	.190	

Literacy scores based on socio-economic status. Data was also analyzed based on students' socio-economic status (SES). Data was disaggregated for all three categories of the ACT Aspire exam, literacy, math, and science. The following findings reflect the data analysis on low socio-economic students.

Analysis of the literacy portion of the ACT Aspire exam did show a statistical significance in the difference between low SES students' literacy mean score and all other students' mean score. The effect was a medium value (d=.51).

Table 31. *Low SES Students vs. All Other Students (ACT Aspire Literacy)*

Students	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)	Cohen's d
Regular	3972	433.85	9.562	.152	.000	.51
Low SES	3012	427.45	9.863	.180		

As illustrated in Table 32, there was no statistical significance in student performance as measured on the ACT Aspire literacy exam when the mean score of low SES students taught by teachers with master's degrees in literacy was compared to the mean score of low SES students taught by teachers with master's degrees in other areas.

Table 32. *Literacy Master's vs Master's in Other Areas (Low SES Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)
Literacy Master's	334	435.97	6.353	.348	.523
Other Master's	586	435.70	6.029	.249	

There was a statistical significance in student performance as measured on the ACT Aspire literacy exam when the mean score of low SES students taught by teachers with literacy master's degrees was compared to the mean score of low SES students taught by teachers with a literacy bachelor's degree (Table 33). However, the effect size was minimal (d=.16).

Table 33. *Literacy Master's vs. Literacy Bachelor's (Low SES Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)	Cohen's d
Literacy Master's	334	435.97	6.353	.348	.017	.16
Literacy Bachelor's	606	434.97	5.999	.244		

Analysis shows that there was a statistical significance in student performance as measured on the ACT Aspire literacy exam when the mean score of low SES students taught by teachers with a master's degree in other areas was compared to the mean score of low SES students taught by teachers with a bachelor's degree in literacy (Table 34). However, the effect size was trivial (d=.12).

Table 34. *Master's in Other Area vs. Bachelor's in Literacy (Low SES Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)	Cohen's d
Other Master's	586	435.70	6.029	.249	.036	.12
Literacy Bachelor's	606	434.97	5.999	.244		

Math scores based on socio-economic status. Further analysis examined the math portion of the ACT Aspire exam. There was a statistical significance in the difference between the mean score of low SES students' and the mean score of all other students (Table 35). The effect was a medium value (d=.56).

Table 35. *Low SES Students vs. All Other Students (Math ACT Aspire)*

Students	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)	Cohen's d
Regular	3972	429.72	8.419	.134	.000	.56
Low SES	3012	424.06	8.019	.146		

As illustrated in Table 36, there was no statistical significance in student performance as measured on the ACT Aspire math exam when the mean score of low SES students taught by teachers with math master's degrees was compared to the mean score of low SES students taught by teachers with master's degrees in other areas.

Table 36. *Master's in Math vs. Master's in Other Area (Low SES Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)
Math Master's	209	433.62	4.372	.302	.726
Other Master's	343	433.49	4.414	.238	

There was also no statistical significance in student performance as measured on the ACT Aspire math exam when the mean score of low SES students taught by teachers

with math master's degrees was compared to the mean score of low SES students taught by teachers with bachelor's degrees in math (Table 37).

Table 37. *Master's in Math vs. Bachelor's in Math (Low SES Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)
Math Master's	209	433.62	4.372	.302	.812
Math Bachelor's	345	433.54	3.958	.213	

As illustrated in Table 38, there was no statistical significance in student performance as measured on the ACT Aspire math exam when the mean score of low SES students taught by teachers with master's degrees in other areas was compared to the mean score of low SES students taught by teachers with bachelor's degrees in math.

Table 38. *Master's in Other Area vs. Bachelor's in Math (Low SES Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)
Other Master's	343	433.49	4.414	.238	.877
Math Bachelor's	345	433.54	3.958	.213	

Science scores based on socio-economic status. In an analysis of the science portion of the ACT Aspire exam, a statistical significance was found in the difference between low SES students' means score and all other students' mean score (Table 39). The effect was a medium value (d=.52).

Table 39. *Low SES Students vs All Other Students (Science ACT Aspire)*

Students	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)	Cohen's d
Regular	3972	430.3	8.150	.129	.000	.52
Low SES	3012	425.27	8.029	.146		

As illustrated in Table 40, there was no statistical significance in student performance as measured on the ACT Aspire science exam when the mean score of low SES students taught by teachers with science master's degrees was compared to the mean score of low SES students taught by teachers with master's degrees in other areas.

Table 40. *Master's in Science vs. Master's in Other Area (Low SES Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)
Science Master's	199	434.76	4.054	.287	.412
Other Master's	344	435.06	4.122	.222	

There was also no statistical significance in student performance as measured on the ACT Aspire science exam when the mean score of low SES students taught by teachers with science master's degrees was compared to the mean score of low SES students taught by teachers with science bachelor's degrees (Table 41).

Table 41. *Master's in Science vs. Bachelor's in Science (Low SES Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)
Science Master's	199	434.76	4.054	.287	.638
Science Bachelor's	336	434.59	4.009	.219	

As illustrated in Table 42, there was no statistical significance in student performance as measured on the ACT Aspire science exam when the mean score of low

SES students' taught by teachers with master's degrees in other areas was compared to the mean score of low SES students taught by teachers with bachelor's degrees in science.

Table 42. *Master's in Other Area vs. Bachelor's in Science (Low SES Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)
Other Master's	344	435.06	4.122	.222	.133
Science Bachelor's	336	434.59	4.009	.219	

Literacy scores based on ethnicity. Data was further analyzed to look for statistical significance in the effect of degree level and content area on student performance when student ethnicity was considered. The study compared white students to non-white students. The results of the study are as follows.

White students out performed their non-white counterparts on the literacy portion of the ACT Aspire exam. As illustrated in Table 43, there was a statistical significance in the difference between white students' mean score and non-white students' mean score. There was a medium effect size (d=.53).

Table 43. *White Students vs. Non-White Students (English ACT Aspire)*

Students	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)	Cohen's d
White	5807	433.03	9.800	.129	.000	.53
Non-White	348	427.82	8.691	.466		

As illustrated in Table 44, there was no statistical significance when the mean score of non-white students taught by teachers with literacy master's degrees was

compared to the mean score of non-white students taught by teachers with master's degrees in other areas.

Table 44. *Master's in Literacy vs. Master's in Other Area (Non-White Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)
Literacy Master's	39	435.05	5.424	.869	.257
Other Master's	67	433.87	5.003	.611	

As illustrated in Table 45, there was also no statistical significance when the mean score of non-white students taught by teachers with literacy master's degrees was compared to the mean score of non-white students taught by teachers with bachelor's degrees in literacy.

Table 45. *Master's in Literacy vs. Bachelor's in Literacy (Non-White Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)
Literacy Master's	39	435.05	5.424	.869	.118
Literacy Bachelor's	91	433.41	5.479	.574	

There was again no statistical significance when the mean score of non-white students taught by teachers with master's degrees in other areas was compared to the mean score of non-white students taught by teachers with bachelor's degrees in literacy (Table 46).

Table 46. *Master's in Other Area vs. Bachelor's in Literacy (Non-White Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)
Other Master's	67	433.87	5.003	.611	.590
Literacy Bachelor's	91	433.41	5.479	.574	

Math scores based on ethnicity. White students out performed their non-white counterparts on the math portion of the ACT Aspire exam, as well. Table 47 illustrates there was a statistical difference between white students' mean score and non-white students' mean score on the ACT Aspire math exam. The effect size was medium (d=.60).

Table 47. *White Students vs Non-White Students (Math ACT Aspire)*

Students	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)	Cohen's d
White	5807	428.88	8.164	.107	.000	.60
Non-White	348	423.94	7.243	.388		

As illustrated in Table 48, there was no statistical significance when the mean score of non-white students taught by teachers with math master's degrees was compared to the mean score of non-white students taught by teachers with master's degrees in other areas.

Table 48. *Master's in Math vs. Master's in Other Area (Non-White Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)
Math Master's	19	434.00	2.028	.465	.467
Other Master's	29	433.48	2.668	.495	

There was also no statistical significance when the mean score of non-white students taught by teachers with math master's degrees was compared to the mean score of non-white students taught by teachers with bachelor's degrees in math (Table 49).

Table 49. *Master's in Math vs. Bachelor's in Math (Non-White Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)
Math Master's	19	434.00	2.028	.465	.416
Math Bachelor's	39	433.44	2.644	.423	

As illustrated in Table 50, there was again no statistical significance when the mean score of non-white students taught by teachers with master's degrees in other areas was compared to the mean score of non-white students taught by teachers with bachelor's degrees in math.

Table 50. *Master's in Other Area vs. Bachelor's in Math (Non-White Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)
Other Master's	29	433.48	2.668	.495	.943
Math Bachelor's	39	433.44	2.644	.423	

Science scores based on ethnicity. White students also out performed their non-white counterparts on the science portion of the ACT Aspire exam. Table 51 shows there was a statistical difference between white students' mean scores and non-white students' mean scores on the ACT Aspire science exam. The effect size was large (d=.63).

Table 51. *White Students vs. Non-White Students (Science ACT Aspire)*

Students	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)	Cohen's d
White	5807	429.07	8.410	.110	.000	.63
Non-White	348	423.74	7.890	.423		

As illustrated in Table 52, there was no statistical significance when the mean score of non-white students taught by teachers with science master's degrees was compared to the mean score of non-white students taught by teachers with master's degrees in other areas.

Table 52. *Master's in Science vs. Master's in Other Area (Non-White Students)*

Degree	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)
Science Master's	16	435.69	2.960	.740	.079
Other Master's	34	431.59	8.860	1.519	

There was statistical significance when the mean score of non-white students taught by teachers with science master's degrees was compared to the mean score of non-white students taught by teachers with science bachelor's degrees (Table 53). However, the effect size was small (d=.19)

Table 53. *Master's in Science vs. Bachelor's in Science (Non-White Students)*

Teacher	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)	Cohen's d
Science Master's	16	435.69	2.960	.740	.009	.19
Science Bachelor's	43	429.30	9.172	1.399		

Finally, as illustrated in Table 54, there was no statistical significance when the mean score of non-white students taught by teachers with master's degrees in other areas

was compared to the mean score of non-white students taught by teachers with science bachelor's degrees.

Table 54. *Master's in Other Area vs. Bachelor's in Science (Non-White Students)*

Teacher	N	Mean	SD	Std. Error Mean	Sig. (2-tailed)
Other Master's	34	431.59	8.860	1.519	.274
Science Bachelor's	43	429.30	9.172	1.399	

All of the data analyzed shows different statistical significance depending on content and degree level of teachers as well as student demographics. However, in almost all of the data displayed, there was very little effect size based on teacher degree level when comparing classes taught by teachers with master's degrees in content area to classes taught by teachers with bachelor's degrees in content area or teachers with master's degrees in other areas. The study indicates that content area master's degrees do not positively affect a teacher's quality enough to improve student performance on the ACT Aspire exam in the areas of literacy, math, and science.

Chapter V: Summary, Discussion, and Recommendations

A focus on improving student achievement is a driving force in education. As a whole, the students in Arkansas schools are struggling to succeed in the core subjects of math, language arts, reading, and science (ADE, 2018b). Therefore, it is vital educators, administrators, and policy makers find ways to best help students achieve higher success rates. Teacher quality has been shown to be the most influential factor on student achievement (Bahar, 2016; Gere & Berebitsky, 2009; McCaffrey et al., 2004; Reynolds et al., 2014; Sirait, 2016; Stronge et al., 2011; Townsend 1997; Woolley et al., 2010; Yetisir, 2014). However, the question of which factors most improve a teacher's quality has yet to receive a definite answer. This study examined whether obtaining a master's degree in content area taught raises a teacher's quality to the point that it significantly improves student achievement. Ninth and tenth grade students' results on the 2017-18 ACT Aspire exam were analyzed to determine statistical difference between the achievement levels of students taught by teachers with master's degrees in the content area and the achievement levels of students not taught by teachers with content area master's degrees. This study further analyzed how teacher degree level affected students based on gender, race, and socio-economic status. This chapter presents conclusions for each of the two research questions, summarizes the study's findings, and suggests implications and recommendations for school leaders and educational policymakers based on the results.

Research Question One

The first question asked if there was a statistically significant difference in student achievement, as measured on the ACT Aspire exam for ninth and tenth grade students,

when compared based on teacher degree level. Data from six local education agencies (LEAs) was examined to ascertain the effect of teachers with advanced degrees in content area on student achievement. Data from more than 8,000 students and 116 teachers were examined in the state-wide study.

As discussed in Chapter 3, the study examined ninth and tenth grade students' ACT Aspire mean scores to determine whether a statistical significance existed between the scores of students taught by teachers with content area master's degrees, those taught by teachers with only bachelor's degrees, and students taught by teachers with master's degrees in areas other than the subject taught. The ACT Aspire exam is composed of three components- math, science, and literacy. All three parts were examined in the study.

Overall, the study concluded that teacher degree level had very little impact on students' achievement on the ACT Aspire exam. However, there were some slight effects worth discussing. When comparing literacy mean scores, the data showed a statistically significant difference in the mean scores of students taught by teachers with master's degrees in both content area and other areas when compared to the scores of students taught by teachers with only a bachelor's degree. However, the effect size was trivial. An analysis of the math data also showed a statistically significant difference in student outcomes when comparing mean scores of students taught by teachers with a master's degree in both content area and other areas to scores of students taught by teachers with only a bachelor's degree. The effect size was once again trivial, though. Science data led to a different finding. The only statistically significant difference in student achievement was when comparing mean scores of students taught by teachers

with a master's degree in any area other than content area to scores of students taught by teachers with a bachelor's degree in content area. Once again, the effect size was minimal.

These results suggest that a teacher with a master's degree, in content area or otherwise, may have a larger impact on student achievement than a teacher with a bachelor's degree; however, based on the sample in this study, the effect would be small, if any at all.

Research Question Two

The study's second question looked at how teacher degree level affected students based on their gender, ethnicity, and socio-economic status. When analyzing female students' literacy mean scores, there was statistically significant difference in student performance when comparing student scores from classrooms of teachers with a master's degree in content area and a master's degree in other areas to student scores from classrooms of teachers with a bachelor's degree. The study also examined their male counterparts and found that the only statistically significant difference was in students' literacy mean scores when comparing students taught by teachers with a master's degree in some area other than content to students taught by teachers with only a bachelor's degree.

The next data set analyzed were scores based on students' socio-economic (SES) status. First, the researcher analyzed the performance of low SES students on the literacy exam. The study found that when it compared mean scores of low SES students who were taught by teachers with a master's degree in content area or a master's degree in any other area to the scores of low SES students taught by teachers with only a bachelor's

degree, there was a statistically significant difference. However, the effect size was minimal. Examination of low SES students' math and science scores found no statistically significant difference among teacher degree levels.

The last demographic examined in the study was ethnicity. The study analyzed the mean scores of non-white students to look for statistically significant differences among teacher degree levels. The study found there was no statistically significant difference among the literacy mean scores of non-white students taught by teachers with a master's degree, either in content area or otherwise, as compared to the mean scores of non-white students taught by teachers with bachelor's degrees. The same results were found in non-white students' math mean scores. The study did find a statistically significant difference in student performance in science when comparing the mean scores of non-white students taught by teachers with master's degrees in science to the scores of non-white students taught by teachers with a bachelor's degree. Once again, the effect size was minimal.

Based on the findings of Research Question Two, the impact of teacher's degree level on student achievement does not vary greatly based on students' gender, race, or socio-economic status.

Limitations

The demographics of the local educational agencies (LEAs) analyzed in the study were a key limitation to consider. A majority of the schools analyzed had predominantly white student enrollment with very few minority students. A second limitation is the size of the school districts in the study. Arkansas is a rural state with 238 school districts (ADE, 2018a). The study analyzed only larger districts. This was because many of the

smaller rural districts did not have the teacher capacity needed for the sample. Only the larger districts were able to provide a significant number of teachers who held master's degrees in their content area. Thus, many of the schools in Arkansas were never analyzed because of their teacher population.

Recommendations for Further Research

The first recommendation for further research would be to build a larger sample of student and teacher data in only one field of the ACT Aspire, i.e. literacy, to determine if that data produced a different result. This would allow the educational community to truly conclude if there is a benefit to having a master's degree in that specific content area.

A second recommendation would be to perform an isolated study on institutions of higher learning to analyze the effect of specific programs of study. This analysis would allow colleges and universities to examine how effective their process has been in preparing teachers to positively impact student achievement.

The last recommendation would be to consider the statistical significance of teaching experience in improving student achievement. Most states' teacher pay scale is based on two factors: teachers' years of experience and level of degree. Because this study contributes to the literature that advanced degrees do not dramatically increase student achievement, it would be useful to also examine the effect of teachers' years of experience on teaching quality. If studies conclude that experience does not significantly affect student achievement, then teacher pay scales may need to be examined.

All of these recommendations would contribute to the literature on teacher quality.

Final Summary

It is crucial to determine what teaching characteristics are most instrumental in raising student achievement so that higher education institutions can make informed decisions on how best to train prospective teachers, and educational leaders can hire those teachers who will most positively affect student achievement. This study, along with others (Goldhaber, 2016; Klinger et al., 2006; Wayne & Youngs, 2003), concluded that teachers with master' degrees do not have a significantly greater impact on student performance than their colleagues with only bachelor's degrees. Furthermore, having a master's degree in a specific content area does not substantially raise a teacher's quality. Based on these findings, efforts need to be made at every level to improve the methods in which our teachers are being prepared. Raising student achievement should be the top priority in every educator's mind, and the first step toward that goal is to improve teaching quality. It is my hope that the data provided in this study will drive educational leaders and researchers to take a second look at the ways in which our teachers are being prepared, especially at the graduate level, to determine what changes can be made to significantly improve teaching quality, and in turn student achievement.

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Appendix A:

Ethical Consideration

Dear Institutional Review Board:

The purpose of this letter is to inform you that I give *Chris Nail* permission to conduct the research titled *Teacher Degree Attainment and Student* Success. This also serves as assurance that this school complies with requirements of the Family Educational Rights and Privacy Act (FERPA) and the Protection of Pupil Rights Amendment (PPRA) (see back for specific requirements) and will ensure that these requirements are followed in the conduct of this research.

- The right of a parent of a student to inspect, upon the request of the parent, a survey created by a third party before the survey is administered or distributed by a school to a student. Any applicable procedures for granting a request by a parent for reasonable access to such survey within a reasonable period of time after the request is received.
- Arrangements to protect student privacy that are provided by the agency in the event of the administration or distribution of a survey to a student containing one or more of the following items (including the right of a parent of a student to inspect, upon the request of the parent, any survey containing one or more of such items): Political affiliations or beliefs of the student or the student's parent. Mental or psychological problems of the student or the student's family. Sex behavior or attitudes. Illegal, anti-social, self-incriminating, or demeaning behavior. Critical appraisals of other individuals with whom respondents have close family relationships. Legally

recognized privileged or analogous relationships, such as those of lawyers, physicians, and ministers. Religious practices, affiliations, or beliefs of the student or the student's parent. Income (other than that required by law to determine eligibility for participation in a program or for receiving financial assistance under such program).

- The right of a parent of a student to inspect, upon the request of the parent, any instructional material used as part of the educational curriculum for the student. Any applicable procedures for granting a request by a parent for reasonable access to instructional material received.
- The administration of physical examinations or screenings that the school or agency may administer to a student.
- The collection, disclosure, or use of personal information collected from students for the purpose of marketing or for selling that information (or otherwise providing that information to others for that purpose), including arrangements to protect student privacy that are provided by the agency in the event of such collection, disclosure, or use.
- The right of a parent of a student to inspect, upon the request of the parent, any instrument used in the collection of personal information before the instrument is administered or distributed to a student. Any applicable procedures for granting a request by a parent for reasonable access to such instrument within a reasonable period of time after the request is received.

Sincerely,

Shawn Cook
Superintendent Lakeside School District