

COMPARISON OF GRADE SPAN CONFIGURATIONS AND FIFTH-GRADE
STUDENTS' ACADEMIC ACHIEVEMENT

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Sarah McPhate

Bachelor of Arts, Louisiana Tech University, 2009
Master of Education, Arkansas State University, 2013
Educational Specialist, Arkansas State University, 2014

Dissertation Approval

This dissertation, "Comparison of Grade Span Configurations and Fifth-Grade Students' Academic Achievement," by Sarah Danielle McPhate, is approved by:

Dissertation Chair:

Wayne W. Williams, Ed.D.
Professor of Educational Leadership
Arkansas Tech University

Dissertation Committee

Sarah Gordon, Ph.D.
Professor of Educational Leadership
Arkansas Tech University

Karen Endel, Ed.D.
Principal (Retired)
Butterfield Trail Middle School

Program Director:

John Freeman, Ph.D.
Professor of Educational Leadership
Director of Doctor of Education Program
Arkansas Tech University

Graduate College Dean:

Richard Schoephoerster, Ph.D.
Dean of Graduate College
Arkansas Tech University

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Abstract

There are many aspects of education that may have an effect on students' academic achievement. Among these factors are social/emotional needs, teachers' training and professional development opportunities, and grade span configurations. The decision of choosing the best grade span configurations for students to experience maximum academic achievement is delegated to local school boards and school officials. There is a lack of research regarding the best grade span configuration (elementary school vs. middle school) for fifth-grade students in Arkansas based on academic achievement. The purpose of this casual-comparative study was to determine the effects, if any, grade span configurations have on fifth-grade students' academic achievement. Students attending one of eight schools in the western part of Arkansas were selected as the participant sample. The students included in this study were educated in an elementary school as fourth-graders and in either the same elementary school or a middle school as fifth-graders. The researcher compared ACT Aspire scaled scores in math and reading for fourth-grade students and fifth-grade students to determine if there was any statistical significance between two years of instruction (2017-2018 and 2018-2019). Statistical significance for this study was set at an alpha level of $p < .05$. Data from students were input into IBM Statistical Packages for the Social Sciences Version 25. An independent t -test and a series of dependent t -tests were employed to determine if statistical significance was present for the two different grade span configurations (elementary school vs. middle school). Analysis of the data determined there was statistical significance ($p < .001$) found in the area of math for middle school fifth-grade students.

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CHAPTER 1: INTRODUCTION

Background of the Study

During the 2017-2018 school year, the state of Arkansas served 479, 258 students within 238 school districts and served 478,318 students in 264 school districts (Arkansas Department of Education, 2019c). Each school district is composed of a unique student population, and it is the responsibility of the local school board, district administration, and school officials to discover the best methods of meeting the specific needs of these students. When considering the best practices for each school and the school district, administrators must collaborate to maximize the possibility of student success. Meyer (2014) stated that although much research and discussion has occurred to find the best solution, “one single, quantifiable key to increasing student achievement has not been identified” (p. 47). There are many factors to consider when making this decision for a school district.

Choosing grade span configurations within a school district can be difficult since organizational decisions affect student achievement (Jacob & Rockoff, 2012). There is a large variety of grade span configurations within the school districts in Arkansas (Arkansas Department of Education, 2019c). In some school districts, fifth-grade students are educated in an elementary school; while in others, fifth-grade students are educated in a middle school (Arkansas Department of Education, 2019c). When fifth-grade is included in an elementary school, these students are sometimes the oldest in the school. (Arkansas Department of Education, 2019c). In a middle school, fifth-graders are typically the youngest students (Arkansas Department of Education, 2019c).

In Arkansas, there are multiple grade span configurations for fifth-grade students, but there is little information concerning Arkansas students driving decisions in determining the best placement for these students. Based on the need for research regarding fifth-grade students and grade span configurations, and most of the research related to different grade span configurations tend to center around the fifth-grade, this study will focus on that grade level in comparing two different grade span configurations between elementary school vs. middle school.

Elementary schools have seen many changes over time in the United States. The earliest schools in the United States housed students in one room, and they were educated by teachers who were not properly educated in teaching academics and fundamentals (Chen, 2019). Not all students were able or legally required to attend school until the mid-1800s (Ainsworth, 2013). Through the creation of the United States Department of Education, there have been many reforms and transformations enacted over the years to create the elementary school that exist today (U.S. Department of Education, 2020). In current elementary schools, teachers now receive stronger instruction to build their knowledge of education, all students are included in public education no matter their background, and more individualization is involved in determine the best curriculum for each school (Ainsworth, 2013).

Junior high schools were created in the early 1900s in order to educate students in between elementary age and high school age (Dhuey, 2013). Junior high schools eventually began to be seen as a smaller version of high schools, which was not what they were intended to be when created (Cuban, 1992). In the 1960s, educators began discussing the need for a middle level setting for young adolescents to meet their needs

(Schaefer, Maul & Yoon, 2016). The first middle schools in the United States were created around the same time President Johnson was implementing the Elementary and Secondary Education Act that provided funding for disadvantaged students (Schaefer et al., 2016).

Middle school levels have gone through a variety of reforms since that time to improve education for adolescents (Kipnes & Weiss, 2006). Ensuring student success and achievement is a challenge for every school district, and school districts have to find methods of moving students toward reaching success. Some schools attempt to increase student academic achievement by providing rigorous teacher professional development opportunities to foster better learning experiences for students (Schmitt, 2004). By providing these rigorous professional development opportunities, schools are able to equip educators with valuable skills and strategies needed to increase student's academic achievement (Schmitt, 2004). There are a variety of levels of professional development offered to teachers varying from school district to school district based on various aspects of operating, such as budgets and enrollment (Barton & Klump, 2012). Another factor to consider when attempting to raise student academic achievement is to determine proper grade span configurations (Barton & Klump, 2012).

Examining grade span configurations and changing the way schools are organized and managed could positively impact student achievement (Jacob & Rockoff, 2012). When considering how to group grades together in a school district, those making the decision must weigh the potential positive and negative outcomes. Local school boards and school officials are tasked with determining the best grade span configurations for

their particular population of students after considering the multiple factors to maximize student achievement.

Determining at what age students should transition to middle school is an issue that should be given abundant consideration. Having students transition too young may have an adverse effect on fifth-grade students and the teachers instructing them (Jacob & Rockoff, 2012). Fifth-grade students moving to a new school may transition at a time where they need more one on one attention, not placed in a new school with much older students (Jacob & Rockoff, 2012). This early transition may cause students social anxiety, mental anguish and “may have an effect on academic achievement” (Dove, Hooper, & Pearson, 2010, p. 279).

Schools are continuously searching for ways to measure student achievement and growth. There has been a significant amount of research conducted on student achievement and success based on grade span configurations (Barton & Klump, 2012). One method of gathering data to determine student achievement is accessing summative examination scores. In the state of Arkansas, all public-school students in grades 3-10 are required to be assessed by the ACT Aspire summative examination unless there is a waiver for an alternate assessment (Arkansas Department of Education, 2019b). By analyzing ACT Aspire assessment data for fifth-grade students in a variety of schools in the state, effects of grade span configurations toward students’ academic achievement will be evident.

Statement of the Problem

One decision administrators and school boards have to make within school districts is determining the best grade span configuration based on multiple factors. As

communities and student populations change over time, administrators and school boards are tasked with assessing student needs and the best grade span configurations to meet them (Dove et al., 2010). There are currently 263 school districts within the state of Arkansas composed of 1,053 schools serving approximately 479,432 students (Arkansas Department of Education, 2019c).

Within these school districts throughout the state, there are 20 different grade span configurations containing fifth grade students (Arkansas Department of Education, 2019c). Of these grade configurations, ten are considered elementary schools, five are considered to be middle schools, and five are considered to be middle school/junior high schools (Arkansas Department of Education, 2019c). There is a lack of information available regarding the impact of grade span configurations on fifth-grade Arkansas students' academic achievement. This information would greatly benefit school officials in making sound decisions regarding grade span configurations to best serve students. Because there is little research regarding the effects of grade span configuration on fifth-grade students' academic achievement in Arkansas, more research is needed to help guide decisions when determining grade configurations within school districts.

Purpose of the Study

The purpose of this quantitative, causal-comparative study was to research Arkansas fifth-grade students' academic achievement based on their grade span configuration. This study explored whether fifth-graders' placement in an elementary school or middle school affects their academic achievement as determined by scaled scores received on the ACT Aspire summative assessment in the content areas of math and reading. For this study, academic achievement was operationally defined as earning a

higher scaled score in math and reading on the ACT Aspire summative assessment in fifth-grade than in fourth-grade.

A series of dependent *t*-tests were employed for statistical analysis using SPSS 25 software to identify any academic changes in math and reading scores between the same groups of students who transitioned from elementary fourth-graders to elementary fifth-graders and elementary fourth-graders who transitioned to middle school fifth-graders. An alpha level of $p < .05$ was established to identify statistical significance.

In this study, the independent variables were the two different grade span configurations (elementary school vs. middle school) in which students received instruction. An independent *t*-test was employed to analyze any differences in the math and reading scores of the fifth-graders in the two different grade span configurations. An alpha level of $p < .05$ was used to determine statistical significance. In addition, Effect Size (ES) calculations (Cohen's *d*; Cohen, 1988) were employed to identify the magnitude of differences between the mean scores in reading and math of the two groups of fifth-graders instructed in the two different educational grade span configurations (Cohen, 1988). "Effect size is a measure of how different two groups are from one another – it is a measure of the magnitude of the treatment" (Salkind, 2017, p. 205). (The dependent variables were scaled scores in the content areas of math and reading generated from the ACT Aspire summative examination. This study has provided results that may assist school officials when determining grade span configurations within school districts.

Research Questions

This quantitative, causal-comparative research study was guided by the following research questions:

- RQ1: What effect will different grade span configurations have on the ACT Aspire scaled scores of fifth-grade students in the content area of math?
- RQ2: What effect will different grade span configurations have on the ACT Aspire scaled scores of fifth-graders in the content area of reading?
- RQ3: What effect will different grade span configurations have on the academic achievement in the content area of math between fourth and fifth graders, as measured by the ACT Aspire?
- RQ4: What effect will different grade span configurations have on the academic achievement in the content area of reading between fourth and fifth graders, as measured by the ACT Aspire?

Hypotheses

The following null hypotheses were utilized for this study:

- H_0^1 : The different grade span configurations will have no effect on the academic achievement of fifth-graders in the content areas of math.
- H_0^2 : The different grade span configurations will have no effect on the academic achievement of fifth graders in the content areas of reading.
- H_0^3 : The differences in the grade span configurations will have no effect on the academic achievement in the content area of math between fourth-graders and fifth-graders.

- H_0^4 : The differences in the grade span configurations will have no effect on the academic achievement in the content area of reading between fourth graders and fifth graders.

Definition of Terms

- Fifth grade students: Students placed in a fifth-grade classroom who are enrolled in a public school associated with the Guy Fenter Educational Cooperative.
- Academic Achievement: Rather than identifying the four levels of academic growth, as defined by the Arkansas State Department of Education, this study, operationally defined academic achievement as statistically significant differences between the fourth and fifth graders' ACT Aspire scores in math and reading. Because these were the same students taking the test a year apart, a series of dependent *t*-tests were employed to determine if the differences in scores between the fourth-graders and fifth-graders in the two content areas of math and reading, who experienced two different grade span configurations (elementary school vs. middle school), were statistically significant. For this study, an alpha level of $p < .05$ was used to determine statistical significance.
- ACT Aspire summative examination: This assessment is the summative assessment adopted by the Arkansas State Department of Education during the 2015-2016 school year (Arkansas Department of Education, 2019b). All public schools in Arkansas serving students in grades 3-10 are required to use this assessment to determine students' progress and growth during the spring of each school year.

- Elementary School: For this study, an elementary school is defined as a public school in Arkansas with grade span configurations educating students enrolled in either preschool or kindergarten through sixth-grade. Students are either placed in a self-contained setting where student are educated in the same classroom all day with one teacher or departmentalized where students experience minimum transitions.
- Middle School: For this study, a middle school is defined as a public school in Arkansas with grade span configurations educating students enrolled in grades fifth through eighth. Students' classes are departmentalized, and the students transition to different classes throughout the day to receive instruction from multiple teachers in specific academic areas.

Assumptions

One assumption of this study was that student performance levels would vary throughout the state. It was assumed the ACT Aspire provided valid assessments of students' academic achievement. It was assumed the test was created to adequately assess skills on the appropriate grade level and accurately measure the content areas assessed.

Another assumption of this study was that students who received high scores on tests in the classroom would also receive high scores on the ACT Aspire. The researcher assumed each student performed to the best of his/her ability on the ACT Aspire assessment. It was assumed the ACT Aspire results provided a reasonably accurate indicator of the impact of grade span configurations.

Limitations

One limitation of this study was the diverse backgrounds of the student population whose ACT Aspire scores were used. This study examined students' scores from eight school districts in the western part of the state. All of these schools were affiliated with the Guy Fenter Educational Cooperative. Although these schools are geographically homogeneous, there was diversity in the areas of race, gender, socio-economic status, etc. These factors as a whole or in part may have influenced students' academic performance on the ACT Aspire; therefore, the scores generated from this assessment and the results of this study may not be representative of other school districts within the state of Arkansas that employ similar grade span configurations.

This study investigated academic achievement in only two content areas of math and reading scores generated from the ACT Aspire. No other evaluation of achievement was used to determine whether grade span configuration had an impact on academic achievement. A single assessment in the form of a high stakes standardized test may not show a true representation of students' achievement in the classroom due to outside factors that may cause students' assessment scores to be lower than their capabilities. One of these factors may be students who do not perform well on standardized tests.

The participants of this study were a convenient sample that was representative of eight specific school districts located in western Arkansas. Therefore, any findings or conclusions from this study cannot be generalized beyond the characteristics or demographics of this sample.

Delimitations

This study and its findings were focused on only fifth-grade students in Arkansas. The summative examination being studied, ACT Aspire, was not administered to students nationwide, so generalizing results to students in other states will not provide accurate comparisons or valid inferences to any other similar population. Also, the researcher gathered data from a certain area of the state based on low-income rates and grade span configurations. To compare similar student populations, the researcher accessed data from school districts with a low-income rate of 70% or more.

The researcher also chose schools based on similar grade span configurations. All elementary schools in this study had configurations of kindergarten through sixth-grade with one school educating pre-school aged students. All middle schools had configurations of fifth-grade through eighth-grade. By choosing schools with these demographics, the researcher was able to compare similar populations and made generalizations based on the data being used. The results of this study may not be generalized to other parts of the state that do not share the same demographics.

Although the ACT Aspire measures five areas of content: English, reading, math, science and writing, this study focused only on the measures in math and reading. Although the research indicates there are other factors that may influence academic achievement: (a) gender, (b) SES, (c) race, and (d) teacher professional development (Schmitt, 2004), there was no attempt to control for these variables in this study. Before this study was conducted, it was yet to be determined if grade span configurations would have an effect on fifth-grade students' academic achievement in Arkansas. Due to these

unknown general results, the researcher did not attempt to control other factors that would influence academic achievement.

Theoretical Framework

When local school boards and school officials are determining the best grade span configurations for their school districts, there are multiple factors to take into consideration. Teachers and administrators are tasked with educating all components of children while they are in the care of the school (Cooper, 2007). The multiple components of the whole child include cognitive abilities, academics, social skills, emotional well-being, and physical safety (Cooper, 2007). When considering the structure of grades within a district, one essential factor to consider is students' cognitive level(s) to learn and function appropriately in their environment.

Jean Piaget conducted vast research in the early 1900s with the focus on children's multiple levels of cognitive abilities and learning (Ghazi, Khan, Shahzada, & Ullah, 2014). Piaget structured his research to determine how and when children form different levels of thought and cognitive processes (Ghazi et al., 2014). He eventually categorized these thought processes into four different stages to create his Theory of Cognitive Development (Ghazi et al., 2014). The four stages of Piaget's theory are: sensory-motor stage (ages birth-2), development of perception (ages 2-7), concrete operations (ages 7-11), formal operations (ages 12-16), and the formal operations continue throughout adulthood (Ghazi et al., 2014).

Students slowly transition from one of these stages to the next throughout their childhood. Students' needs may not be met if they are assigned a placement within a configuration not conducive to their current stage of development. Whole child education

cannot occur without meeting all needs of students within the school (Cooper, 2007). Piaget's work details the importance of students being instructed on a level parallel to their current stage of development to maximize student achievement (Ghazi et al., 2014). Several studies (Ewing, Foster, & Whittington, 2011; Moore, 2012) have been conducted to test Piaget's Theory of Cognitive Development.

Erik Erikson's research parallels Piaget's thoughts on various stages of development for individuals throughout their lifetimes. Erikson's Theory of Psychosocial Development places people into eight different categories at various ages (McLeod, 2013). Individuals in these stages are faced with crises that must be overcome to move on to the next stage of development (Knight, 2017). Erikson's work aligns with Piaget's in the fact that children of a certain age are placed in a category of development that cannot be rushed or changed based on other factors. According to both theorists, children must continue to develop on a cognitive and psychosocial level to move to the next stage of development (Ghazi et al., 2014; Knight, 2017).

Significance of the Study

Many studies have been conducted to determine what, if any, effect grade span configurations have on student academic achievement (Burkam, Michaels, & Lee, 2007; Dove, Pearson & Harper, 2010; Schmitt, 2004; Waters, 2016). The results of these studies have shown conflicting results of the relationship between academic achievement and grade span configurations. Some studies show that various grade span configurations do not have an effect, positive or negative, on students' academic achievement while others determine grade span configuration may have some effect on students' academic achievement.

Burkam et al. (2007) conducted a study to determine whether kindergarten students in pre-primary schools (pre-school and kindergarten ages only) perform at a high level in the areas of literacy and mathematics than kindergarten students in an assortment of other grade span configurations. It was found that although students from various backgrounds were included in the study, students in pre-primary schools did not achieve higher achievement scores throughout the school year than their peers in other grade span configurations (Burham et al., 2007).

Similarly, Dove et al. (2010) collected data to determine whether grade span configurations would be a causal factor in Arkansas sixth-graders reaching higher academic achievement levels. After conducting the study and analyzing the data, the researchers found grade span configurations did not cause these students to achieve higher academic achievement as measured by the Benchmark state summative assessment (Dove et al., 2010).

In 2004, Schmitt sought to determine whether teacher professional development and grade span configurations affected student academic achievement in the Midwest. After conducting her study, she determined there was no statistically significant difference between students' academic achievement due to grade span configurations and teacher professional development (Schmitt, 2004).

In contradiction to those findings, Waters conducted a research study in 2016 to determine whether grade span configurations in a specific school district in Kansas affected sixth-grade students' academic achievement. Waters (2016) used the Kansas state summative assessment to compare students' achievement scores. While there was no statistically significant difference in the area of mathematics, results of the study

determine there was a statistically significant difference in academic achievement regarding the reading assessment administered to sixth-grade students placed in an elementary school rather than middle school (Waters, 2016).

School administrators and school board members charged with determining the best grade span configuration for their school district throughout the state of Arkansas will benefit from the knowledge of this study. Information from this study may aid in reaffirming decisions districts have already made or cause leaders to reevaluate the structure of grades within their school districts.

Although many studies have shown no statistical significance between grade span configurations and academic achievement (Dove, et al., 2010; Burkam, et al., 2007; Schmitt, 2004), more research needs to be conducted to determine if this is true for fifth-grade students in western Arkansas. This study will provide data to determine if there is a possible causal relationship between grade span configurations and fifth-grade Arkansas students' academic achievement. Results of this study will add to the body of knowledge by providing information to assist in decisions concerning grade span configurations being made based on data, not various other factors such as finances.

CHAPTER 2: REVIEW OF THE LITERATURE

Many research studies (Burham et al., 2007; Dove et al., 2010; Johnson et al., 2016; Schmitt, 2004; Waters, 2016) have been conducted exploring the relationship between grade span configurations and students' academic achievement. While many similar studies have been conducted in Arkansas, more information is needed regarding fifth-grade students' placement in an elementary school rather than a middle school.

This study will help shed light on how grade span configurations affect fifth-grade students' academic achievement. The research conducted will specifically focus on students' academic achievement as measured by the ACT Aspire summative examination in the content areas of math and reading. Results of this study will be presented to assist school districts in assessing their current grade span configurations to determine students' level of success. The results of this study may also aid school board members and district level administrators make sound decisions when considering the best grade span configurations for fifth-grade students.

This study focuses on the academic achievement of fifth-grade students, but there are factors other than grade span configurations that may affect students' academic achievement. Students' cognitive abilities may also hinder them from reaching certain academic achievement within their current grade span configurations (Ghazi et al., 2014). Theorists have studied children and their progression of development for years and many have been constructed theories that support children's placement in schools should depend on their current level of cognitive and social functions (Ghazi, et al., 2014). Two prominent theorists who supported these beliefs are Jean Piaget and Erik Erikson (Ghazi et al., 2014; Inhelder & Piaget, 1969; McLeod, 2013; Myers, 2015).

Theoretical Framework

Jean Piaget.

Jean Piaget was a psychologist known for his in-depth studies of children's cognitive development and learning (Ghazi et al., 2014). Piaget's work theorizes that children's mental growth should be regarded as on-going just as their physical growth (Inhelder & Piaget, 1969). Throughout his studies, Piaget focused on children's abilities to form thoughts and grouped these cognitive abilities into categories (Ghazi et al., 2014). Piaget's Theory of Cognitive Development categorizes children's mental development and cognition into four stages: Sensory-Motor, Pre-Operations, Concrete Operations, and Formal operations (Ghazi et al., 2014).

The Sensory-Motor Stage occurs within the first year and half to two years of a child's life, and in this stage, babies begin to build the foundation of cognition that will be used the rest of their lives (Inhelder & Piaget, 1969). Throughout this first stage of cognitive development, children begin to realize they are a being within the universe and begin to be aware of concepts such as space, time, causality, and permanent objects while using natural reflexes (Inhelder & Piaget, 1969).

The second stage in this theory is Pre-Operations, which occurs between the ages of 2-7 (Inhelder & Piaget, 1969). While in this stage, children begin to formulate thoughts through play and exploration of the world around them (Piaget, 1977). Children become more aware of their surroundings and the world in which they live (Piaget, 1977).

The third stage children (ages 7-11) experience is Concrete Operations, and children begin to form more concrete thoughts while in this stage (Piaget, 1977).

Children's thoughts are becoming more logical and abstract, but they are still black and white (Piaget, 1977). Children become more social throughout this third stage and begin to experience feelings of morality and judgment (Inhelder & Piaget, 1969).

The final stage of Piaget's Theory of Cognitive Development, Formal Operations, occurs within children ages 12-16 and continues throughout adulthood (Ghazi et al., 2014). Students in this stage begin to think abstractly and use reasoning to deduct ideas and solutions (Ghazi et al., 2014). Throughout this stage, adolescents are introduced to adult society and begin preparing for the future by using deduction skills gained through life experiences (Inhelder & Piaget, 1969).

Piaget never officially linked his study to students in education, but many researchers have discovered ways to apply this information to teaching (Ghazi et al., 2014). According to this theory, all children experience the same stages of development around the same ages (Ghazi et al., 2014). While enrolled in school, children will transition throughout the four stages as they grow older and should be exposed to curriculum and activities appropriate to their cognitive capabilities to allow academic achievement (Ghazi et al., 2014). Teachers can examine the level of children's cognitive abilities by having a better understanding of the theory's stages and what can be expected of students in each stage of development.

Several studies have been conducted based on Piaget's Theory of Cognitive Development (Ghazi et al., Ewing et al., Moore, 2014). Ghazi et al. (2014) conducted a research study focusing on the learning of mathematics skills for students that fall in Piaget's Formal Operational Stage (ages ranging from ages 12-16). This study was based on information gathered from surveys given to two hundred students falling in this age

range (Ghazi et al., 2014). After survey responses were collected and analyzed by *t*-test, final results showed students were capable of completing work in certain areas of mathematics, such as classifications, ratios and proportions, but lacked knowledge in areas such as factorization (Ghazi et al., 2014). This study revealed students attending schools in urban areas had higher academic achievement than students attending schools in rural areas (Ghazi et al., 2014). The difference in academic achievement between the two sets of students showed socio-economical difference impact students' capabilities within Piaget's stages of cognitive development (Ghazi, et al., 2014).

Ewing, Foster, and Whittington (2011) conducted a research study to determine levels of students' understanding of educational concepts in college level courses based on Piaget's theory. There were six variables introduced in this study (four cognitive and two engagement/questioning) that would determine if Piaget's theory was upheld throughout their implementation (Ewing et al., 2011). The professors who were chosen to participate in this study delivered instruction to college students using questions from the lowest two levels of Bloom's Taxonomy (Ewing et al., 2011). The levels of these questions were far below where college students should be receiving instruction to meet their educational needs and challenge their thinking (Ewing et al., 2011).

The results of this study showed the level of cognition presented by the professors directly affected the students' cognition (Ewing et al., 2011). Based on the instruction students were receiving, they were not able to think critically or on deeper levels (Ewing et al., 2011). Piaget's Theory of Cognitive Development was upheld by the results of this study and students' regression based on the lack of instruction delivered on the level in which they were operating (Ewing et al., 2011).

Moore (2012) took a closer look at students who were pursuing courses of study that fall into the STEM (science, technology, engineering, and/or mathematics) category in comparison to students not pursuing this path. The formal-reasoning levels of students who were not pursuing a path toward STEM, but were enrolled in a higher-level science class were studied (Moore, 2012). Students in this category struggled with reasoning patterns and thinking abstractly in which students in Piaget's formal operation stage should function (Moore, 2012).

The practices of the instructors providing the education to these students were studied to determine whether the level of instruction being provided had any effect on students' performance (Moore, 2012). Practices were changed and interventions were provided to students in order to increase levels of understanding and to raise students to the next level Piaget's Theory of Cognitive Development (Moore, 2012). In the beginning, students not pursuing the STEM track would be classified as learners in the concrete operational stage of Piaget's Theory of Cognitive Development (Moore, 2012). After the implementation of deeper level instruction and various interventions, these students were able to transition more toward the formal operational stage (Moore, 2012).

Piaget's Theory of Cognitive Development informs this study by allowing the researcher to assess fifth-grade students' cognitive abilities. The average age of fifth-grade students is 10-11 years old, which places these children in the concrete operations stage. During this time, students will begin to think logically, but many concepts are still concrete. Fifth-grade students' cognitive capabilities should be taken into consideration when deciding grade configurations. Students in fifth-grade are at the top end of the concrete operations stage, but they have not quite developed cognitively to move on to

the formal operations stage. Understanding the stage of cognitive development in which fifth-graders operate may aid school officials and school board members in determining the best grade span configuration for fifth-grade students.

Erik Erikson.

Erik Erikson was a child psychoanalyst known for his contributions to the area of child development (Myers, 2015). Erikson is responsible for helping shape the way society views human development, especially childhood and adolescence (Douvan, 1997). In this book, *Childhood and Society*, he first revealed his thoughts on what he believed to be the eight stages of psychosocial development (Knight, 2017). Erikson believed an individual's life involves human development that exists within eight stages (Svetina, 2014). Each of these stages involve internal crises that are internally resolved for the individual to eventually move to the next stage of development (Svetina, 2014). The eight stages of Erikson's theory of psychosocial development are: basic trust vs. basic mistrust, autonomy vs. shame and doubt, initiative vs. guilt, industriousness vs. inferiority, identity cohesion vs. role confusion, intimacy vs. isolation, generativity vs. stagnation, and integrity vs. despair (Knight, 2017).

According to Erikson, fifth-grade students fall into the fourth stage, industry vs. inferiority, which occurs from five years old to twelve years old (McLeod, 2013). During this stage of development, children learn basics such as reading, writing, and arithmetic (McLeod, 2013). Teachers are very important to the development of children during this stage and play a large role in guiding students into overcoming the crises they encounter during this stage of development (McLeod, 2013). During this stage, children are working toward earning the virtue of competence (Knight, 2017). Children begin to

become confident in themselves and their capabilities to reach success and progress toward the next stage (McLeod, 2013).

Like Piaget, Erikson's theory places fifth-grade students in a category where they are learning about themselves and the world, but they are not quite ready to be independent. According to these two theorists' beliefs, fifth-grade students still need more guidance from adults based on their current level of cognitive development. Placing fifth-grade students in a middle school causes these students to be some of the youngest in the school. Based on their cognitive development levels at ages 10 and 11, fifth-grade students may not be able to successfully navigate a middle school, and they may experience difficulty transitioning to various classes.

Elementary Schools

Throughout the history of formal education, school configurations have shifted to meet the unique needs of students (Manning, 2000). The beginning of formal education was comprised of students being taught in a one-room school, which consisted of a single teacher who instructed students in core academic areas in multiple grade levels (Mydland, 2011). Students were placed in a single classroom where they received more individual attention from their teacher (Herman, 2004). In this setting, students participated in what we now know as cooperative learning where students helped guide each other in their learning through peer tutoring (Herman, 2004).

The first public school paid by taxpayer dollars was opened in 1635 (Chen, 2018). In 1852, the first compulsory law was passed in Massachusetts requiring school-aged students to attend school (Ainsworth, 2013). Around this time, Horace Mann, member of the State Board of Education in Massachusetts, began to convince the public that free

education was the best way to ensure society continues to prosper (Ainsworth, 2013). Mann saw the need for all students to be provided the chance to prosper through free education (Copeland, 2009). He wanted the public to provide opportunities for students by creating schools that were free for everyone (Copeland, 2009).

During the 19th century, public schools were usually composed of students of all ages and levels being taught in one room by the same teacher, usually a young, single woman (Chen, 2019). Resources for these classrooms were limited and educational materials were sparse (Chen, 2018). In the 1800s, public school teachers began to receive formal training to educate students enrolled in public schools (Ainsworth, 2013).

During this time when elementary schools were growing in the United States, the Department of Education was created in 1867 in hopes of creating effective school systems with guidance from the government (U.S. Department of Education, 2020). The purpose of this department was to find best practices in education to pass on to educators and law-makers to make education better in the United States (U.S. Department of Education, 2020). The Department of Education has helped guide modern elementary schools in the United States to be what they are now.

There have been many changes in education throughout the years to create what we now know as modern elementary education. Like the first public schools, today's elementary schools educate students in the areas of academics and fundamentals skills (Ainsworth, 2013). Students are now educated in bilingual settings rather than immersing non-English speakers into English-only classrooms (Ainsworth, 2013). Curricula now used in elementary schools are more differentiated than that of older school configurations and are customized to meet the needs of students (Ainsworth, 2013).

Modern education requires teachers be properly prepared to instruct students with states having the opportunity to choose specific requirements (Ainsworth, 2013).

Junior High School Movement

The traditional one room education model eventually shifted to serving students in grades kindergarten through grade eight (K-8) and separated from grades nine through twelve (Pardini, 2002). This new model required elementary students to transition to a high school setting without any placement in between (Manning, 2000). Schools containing grades K-8 dominated grade span configurations throughout the country until the middle of the 20th century (Pardini, 2002).

In the early 1900s, the United States government determined there was a need to split K-8 elementary schools into two parts: lower elementary grades and upper elementary grades (Dhuey, 2013). At the time, educators believed the developmental needs of students were not being met in the current structure of education (Dhuey, 2013). This separation of elementary schools into different levels led to the creation of junior high schools (Dhuey, 2013). Junior high schools were created to provide students a placement between elementary school and high school (Cuban, 1992). Junior high schools were designed to make transitioning easier on students and to meet their specific needs (Cuban, 1992). In 1909, the first junior high school in the United States was created in Columbus, Ohio (Lounsbury, 2015). Herman (2004) stated that junior high schools were created for the following reasons:

- To provide a transitional period from the elementary school to the high school.
- To ease the difficulty of entering early adolescence, a trying period of growth and development.
- To accommodate the special physical, emotional, and social problems of this age group.

- To foster a gradual development of independence in learning and self-discipline.
- To allow for the exploration of special interests, aptitudes, and abilities, thus aiding the students in vocational and educational planning.
- To help students through counseling and guidance to plan intelligently for adult life.
- To articulate the total 12-year school program by offering the junior high school segment (p. 10).

Middle School Movement

After the implementation of junior high schools, it was determined that many were functioning as high schools with younger students being taught, so there was a need for a different type of configuration to meet students' needs (Cuban, 1992). Over time, leading education influencers determined there was a need for a middle level placement for students beginning with sixth grade (Dhuey, 2013).

Middle schools were first introduced in the 1960s (National Middle School Association, 1995). The National Middle School Association (1995) believed it to be the responsibility of educational institutions to develop "good citizens, lifelong learners, and healthy, caring, ethical, and intellectually reflective individuals" (p. 10). It was deemed necessary to meet young adolescents' needs on their specific cognitive levels to accomplish this mission. There were concerns about the methods junior high schools used to educate young adolescent students to meet their needs (Schaefer, Maul, & Yoon, 2016). Creating middle level settings for these groups of students between elementary and high school age was done so to meet these needs.

According to Herman (2004), students' needs in today's society are far greater than the needs of the past, small, simple public education schools. Middle schools have

undergone an evolution in the years they have been around in the United States. The formation of middle school models in existence today began in 1963 (Schaefer et al., 2016). The details of the middle school movement, such as naming and defining the purpose, began taking place in the early 1970s (Schaefer et al., 2016). Educating young adolescents was one role of middle schools and the primary focus of teachers in the 1980s and 1990s (Gershon, 2017). Many middle schools' goals required teachers to have better relationships with their students and know their students' specific needs more extensively than teachers would in a junior high setting (Gershon, 2017).

The middle school model was criticized in the mid-1990s for not placing enough emphasis on academics and too much emphasis on social/emotional education (Pardini, 2002). However, an anonymous author for *Education Digest* (2018) stated that research (not cited by the *Digest* author) confirmed the middle school model did not meet the social and educational needs of students attending these schools. Implementing middle school also brings about more transitions for students, which may cause grades to decrease and behavior issues to increase (Weiss & Baker-Smith, 2010).

There are a variety of opinions concerning whether or not students should transition to a middle school rather than remain in a K-8 placement. Manning (2000) states that by not providing young adolescents a transition between an elementary setting and high school setting, educational and developmental needs may not be met. Students who are too old to be considered elementary and not old enough to be considered high school require schools and instruction that meets their specific needs (Manning, 2000). Contrary to these beliefs, Eccles, Midgley, Reuman, MacIver, and Feldlaufer (1993) feel as if transitioning to a

middle school can cause some students to lack motivation that causes academic and behavior issues.

There was a push for different school models in the 1960s based on the influx of different grade organizations for mid-level aged students (Alexander, 1968). In 1968, Alexander gathered data from 110 different schools that met the definition of being a middle school to determine whether the middle school model was being successfully implemented. There were a variety of grade span configurations meeting the definition of a middle school used in this study: (a) 66 schools consisting of grades 6-8, (b) 30 schools consisting of grades 5-8, (c) eight schools consisting of grades 4-8, (d) three schools consisting of grades 5-7, (e) two schools consisting of grades 6-9, and (f) one school consisting of grades 4-7 (Alexander, 1968). Surveys were provided to principals to determine how their grade span configurations were determined, and various questions were asked regarding how their schools were different from junior high schools (Alexander, 1968).

The results of this study showed there were many inconsistencies among the schools, and there was not a uniform way of determining configurations or practices within the schools (Alexander, 1968). This study emphasized the need for intense planning to structure middle schools to be less like junior high schools; or the ending result would be the occurrence of another failed “movement.” (Alexander, 1968).

Alspaugh (1998) conducted a study concerning students’ transitions to sixth grade from an elementary school and to high school in ninth grade. The purpose of this study was to determine the level of achievement loss students experienced when transitioning to a different school model and building (Alspaugh, 1998). The participant sample for this study was composed of 3 groups of 16 rural and small-town school districts in Missouri totaling

48 districts in all (Alspaugh, 1998). Alspaugh (1998) accessed archived data to obtain students' achievement scores as measured on the Missouri Mastery and Achievement Tests (MMAT). A two-way ANOVA was used to analyze data for the three groups of students (Alspaugh, 1998).

The results of this study showed students transitioning to a high school from a middle school setting had a greater achievement loss than students transitioning from a K-8 setting (Alspaugh, 1998). Students transitioning to a middle school setting from various elementary schools experienced a greater achievement loss than students moving from a single school to a middle school (Alspaugh, 1998). All students experienced an achievement loss in the transition to high school (Alspaugh, 1998).

Huss and Eastep (2011) conducted a study to gauge teachers' perspectives of the implementation of middle schools in Indiana, Kentucky, and Ohio. A questionnaire, previously created by Florida researcher Paul George, was sent out to over 200 teachers, and 52% of the teachers provided feedback (Huss & Eastep, 2011). The final sample of questionnaires were derived from 67 randomly selected school districts within each state and was composed of a mixture of grade span configurations from urban, rural, and suburban schools (Huss & Eastep, 2011).

After the results of the questionnaires were analyzed, the overall majority of teachers within in the tri-state study determined the middle school model was still effective for their schools and students (Huss & Eastep, 2011). Most teachers found the model to work well as long as the implemented components of a middle school model was strong and effective in the school (Huss & Eastep, 2011). Huss and Eastep (2011) noted the middle school

movement required a strong professional development implementation to sustain the middle school model.

Looking at data provided by Arkansas' Department of Education, it is evident there is not one set grade span configuration or structure for schools to follow (Arkansas Department of Education, 2019c). School districts in the state of Arkansas are allowed to choose their own grade span configurations based on the needs of their particular student population. Choosing grade span configurations is a task that should not be taken lightly by individuals making this decision.

Grade Span Configurations

Grade span configurations within schools refers to the organization of which grades are included within each school (Burkam et al., 2007). Choosing the best grade span configurations within a school can be a daunting task for school officials. This controversial topic has been debated in education for many years (Barton & Klump, 2012). This debate has been centered on many aspects of education such as facilities, school budgets, and students' academic achievement (Barton & Klump, 2012). There are many factors to consider when determining grade spans within schools, and it is a task that should be made through research and great thought.

Throughout history, grade span configurations have evolved to address a multitude of issues within schools including academic achievement and finances (Dove et al., 2010). Another factor to consider is the number of transitions students may experience throughout their school career and how these transitions may affect students socially and academically (Dove et al., 2010). Even considering these factors, schools often choose grade span configurations based on necessities such as space and finances (Burkam et al., 2007).

Many studies have been conducted and debated over the best grade span configurations for students' academic achievement. Schmitt (2004) conducted a three-year longitudinal study regarding student academic achievement based on teacher professional development and grade span configurations in a Midwest state. This study's participant sample was 292 middle level educators from 43 schools (Schmitt, 2004). Schmitt provided teachers with surveys and accessed statewide summative student assessment scores to determine whether the amount of professional development teachers receive and/or grade span configurations had an impact on student academic achievement.

The results of the surveys, along with students' academic achievement based on the state's summative assessment, were used to determine results of the study (Schmitt, 2004). After analyzing the data collected, it was determined the grade span configurations had no statistical significance in students' academic achievement (Schmitt, 2004). Schmitt's findings in the area of academic achievement supports the null hypotheses of this research study in that grade span configurations had no effect on students' academic achievement as reported in her findings.

Johnson, Godwyll, and Shope (2016) conducted a study to explore the grade span configurations throughout Florida and whether the different bands of grades impacted student achievement. After examining grade spans throughout the 74 districts in Florida, the researchers found the most common bands in districts to be P-5, 6-8, and 9-12 (Johnson et al., 2016). These researchers accessed student achievement data from Florida's Department of Education and the National Center of Education Statistics (Johnson et al., 2016). The data gathered showed the majority of schools in the state served three to six grades (Johnson et al., 2016). After analyzing students' scores on the state-mandated summative assessment,

the researchers determined in their findings that broader grade span configurations did not positively or negatively affect students' academic achievement (Johnson et al., 2016).

In 2010, Dove et al. conducted research to determine relationship between sixth-grade Arkansas students' grade span configurations and their academic achievement as measured by criterion-referenced Arkansas Benchmark Examination scores. Students in the state were scoring well in fourth grade on the National Assessment of Educational Progress (NAEP), but it was evident education practices suffered by the students' scores on the same assessment in eighth grade (Dove et al., 2010). This study was created to determine the best grade span configuration for middle level students in Arkansas to increase student performance on standardized assessments (Dove et al., 2010).

The participant sample for this study was 281 schools whose grade span configurations remained the same for three consecutive years and participated in the Arkansas Benchmark Examination (Dove et al., 2010). Scores were accessed online through school report cards posted by the Arkansas Department of Education (Dove et al., 2010). A one-way analysis of variance (ANOVA) was used in this study to analyze results, which showed there was no statistical significance between this sample of sixth-grade students' academic achievement as measured by the Arkansas Benchmark Examination and their current grade span configurations (Dove et al., 2010).

Dove et al.'s research study is parallel to this study due to the participants being Arkansas students and academic achievement being measured by the current summative examination mandated by the state. In both studies, the independent variables were grade span configuration, and the dependent variables were the current state mandated summative assessment. The analysis of the data and findings conducted by Dove et al.

have helped guide the creation of the four null hypotheses presented in chapter one of this study.

Burkam et al. (2007) explored the relationship of kindergarten students' learning of literacy and math and grade span configurations containing kindergarten students. The participants in this study were 24 students per school representing 1,277 counties in the United States (Burkam et al., 2007). The researchers accessed archived data from a previously researched early education longitudinal study through NCES (Burkam et al., 2007). Parents, teachers, and administrators were either interviewed or provided a survey to complete to gather data regarding kindergarten students' experiences within their current grade span configuration regarding literacy and math progress (Burkam et al., 2007). Students used in this study were also provided cognitive assessments to determine current levels of performance (Burkam et al., 2007).

An ANOVA was used to analyze students' test scores, and a hierarchical linear model was used to analyze the interviews and surveys (Burkam et al., 2007). After the analysis of the study was conducted, analytical and descriptive results were available (Burkam et al., 2007). Results showed students who attended a preprimary school entered kindergarten ahead of students who did not, but they made less gains in their education throughout the school year (Burkam et al., 2007). It was shown that teachers' years of experience and level of preparedness had some effect on students' level of performance (Burkam et al., 2007).

The study conducted by Burkam et al. (2007) delves into the research of whether grade span configurations affect the academic achievement of kindergarten students. Although the age of the students in their study were younger than fifth-graders and mixed

methods were used to gather data, this study's attempt to determine the effects of grade span configurations on student achievement still guides the focus of this present study in much of the same manner. The purpose of both studies is to determine whether there is an effect on students' academic achievement based on grade span configurations.

Waters (2016) conducted a study to determine the relationship between grade span configurations and academic achievement of sixth grade students in Kansas. This study reviewed testing scores of sixth grade students on the reading and mathematics state summative assessments administered four consecutive years (Waters, 2016). Waters compared the test scores of sixth-grade students attending an elementary school in 2008-2009 and 2009-2010 to those of sixth-grade students attending a middle school in 2010-2011 and 2011-2012 (2016).

Archived test scores were accessed by Waters after a formal request was submitted and approved (Waters, 2016). One-way and two-way ANOVAs were used to analyze the data in this research study (Waters, 2016). The results showed students' achievement in mathematics was not affected by grade span configurations (Waters, 2016). However, there was a statistically significant difference in the students' reading achievement of the sixth-grade students in this study (Waters, 2016). Sixth-grade students in an elementary school scored statistically higher on the reading assessment than the sixth-grade students placed in a middle school (Waters, 2016). Although Waters' study was conducted in a different state with a different grade of students as the independent variable, this research study is structured in much the same way. This research study is very similar to Waters' study because both used grade span configuration as the

independent variable and state mandated summative examination scores as the dependent variable.

Grade Span Configurations in Arkansas.

There is no set grade span configuration within the public-school systems in Arkansas. The most recent profile for the 2018-2019 school year reports Arkansas hosts 53 different grade span configurations while serving 478,318 students in K-12 public schools (Arkansas Department of Education, 2019c). There are 38,747 fifth grade students being served in 523 elementary public schools and 218 public middle schools in Arkansas (Arkansas Department of Education, 2019c). It is evident from these statistics that most fifth-grade students are provided an education in an elementary setting.

Choosing which grade span in which these students should be educated is determined by each school district. There is no easy way to determine these configurations or what is the best for everyone involved (Howley, 2002). While school officials are tasked with this endeavor, they must also consider and follow mandates and accountability measures put into place by local, state, and federal governments.

Education Accountability

Throughout the history of the United States, the government has become increasingly more involved in the nation's educational system (Dove et al., 2010). Accountability in education has the federal government holding states, school districts, schools, teachers, and students accountable for student performance in public education (Ravitch, 2002). Many programs and assessments have been put into place to hold education to high standards and ensure students are receiving a quality education. Some of the landmark reforms or programs that have been introduced into United States public education

in the last century are: (a) the Elementary and Secondary Education Act, (b) the National Assessment of Education Progress, (c) *A Nation At Risk*, (d) the No Child Left Behind Act, and (e) the Every Student Succeeds Act. These components in public education are landmarks in creating accountability and implementing high standards in education.

Elementary and Secondary Education Act.

After the assassination of President John F. Kennedy in 1963, Vice President Lyndon B Johnson took office. While delivering his State of the Union address in 1964, President Johnson described the “war on poverty” he planned to implement while in office (Hunt, 2010). One of the programs that emerged from this “war on poverty” was the Elementary and Secondary Education Act (ESEA), which was created in large part to help eradicate poverty in the nation (Kilty, 2014).

This mandate brought required evaluations to enhance education and educational practices, and provide funding for students living in poverty (Bissell, 1975). The main purpose of this act was for the federal government to provide \$1 billion in what is now known as Title I funding to help states better educate disadvantaged students (Klein, 2015). President Johnson created this act to help ensure all students in the nation were receiving the same educational opportunities and not missing out on adequate education (Brenchley, 2015). Since ESEA was implemented, resources and funding for education in the United States has continued to increase (Brenchley, 2015).

National Assessment of Educational Progress.

In 1969, a new reform made its way into America’s educational system. The U.S. Commissioner of Education, Francis Keppel, saw a need in the 1960s to implement a national assessment to provide detailed information about students’ educational academic

abilities throughout the nation (National Center for Education Statistics, 2019). Due to this need, the National Assessment of Educational Progress (NAEP) was created to assess and measure students' academic standings (National Center for Education Statistics, 2019). Students in grades 4, 8, and 12 are given assessments in areas which include: literacy, writing, mathematics, technology and engineering, reading, civics, geography, economics, music and visual arts, and U. S. History (National Center for Education Statistics, 2020). Students taking the NAEP assessment are capable of scoring achievement levels as Basic, Proficient, or Advanced (National Center for Education Statistics, 2020). This assessment measures the growth over time for the nation, states, and districts while comparing results for various demographic groups (National Center for Education Statistics, 2020).

The results from the NAEP allow the government to better understand gaps in learning and the best methods to address education needs in the United States (National Center for Education Statistics, 2019). This assessment is still given to students across the nation to determine academic capabilities. The NAEP is administered during the winter, usually beginning in January, and students can expect to receive results within six months of completing the assessment (National Assessment Governing Board, 2020). The NAEP is the only assessment continuously used in the United States allowing educators and government officials to understand what students may or may not know and their level of skill(s) in certain areas (United States Department of Education, 2019b).

A Nation at Risk.

Another educational landmark that has shaped the country's education system was the report *A Nation at Risk*. This report was created and published in 1983 after a

commission of members was appointed by President Ronald Reagan to collect data regarding the country's current education situation (Kamenetz, 2018). This report detailed the decline of education in America and the downward spiral of student achievement in comparison to other countries since the launch of Sputnik (Kamenetz, 2018). With much fanfare, the report went public, and panic spread throughout the nation (Kamenetz, 2018). Calls from politicians and the public went out demanding an increase in efforts to create an educational system that would produce excellence in student achievement (Kamenetz, 2018).

The report put into place the urgency of adopting high stakes standards and professional development for teachers (Graham, 2013). This report caused the government to look deeper into the nation's education system and come up with measures to hold states accountable for student performance. This report ushered in a new round of testing and accountability that is still present in public education today (Kamenetz, 2018).

No Child Left Behind.

In 2002, President George W. Bush signed a new reform of ESEA into law naming it No Child Left Behind Act (NCLB, 2002; Klein, 2015). One of the main focuses of NCLB was for legislation to require schools to implement annual assessments in order to determine which schools are not meeting required annual yearly progress (AYP; Dee & Jacob, 2011). Publicly displaying schools' progress or lack of was believed to be a great motivator for schools to step up school performance (Dee & Jacob, 2011). States were not required to comply with the new act, but by not doing so, they risked losing Title I funds on which many depended (Klein, 2015).

By the 2013-2014 school year, schools were expected to have students performing on the “proficiency” level, with each state given the choice of the assessment used and how to determine proficiency (Klein, 2015). School districts not meeting AYP for two years in a row were potentially in danger of receiving disciplinary action taken against them such as state intervention and loss of Title I funds (Klein, 2015). This act was the first time the reception of funding for schools in the United States was dependent upon the achievement of schools based on summative assessments (Duckworth, Quinn, & Tsukayama, 2012).

Every Student Succeeds Act.

President Barak Obama recognized a number of flaws that were present in NCLB in 2010 (United States Department of Education, 2019a). The Obama Administration set out to create a new reform of NCLB that would adequately prepare students for college and/or career beyond their high school careers (United States Department of Education, 2019a). The most recent reform to the Elementary and Secondary Education Act was signed into law on December 10, 2015 by President Barack Obama and was named Every Student Succeeds Act (ESSA; Peet & Vercelletto, 2016). One major change brought about by this act allowed states to designate funds to be utilized by effective library programs within schools (Peet & Vercelletto, 2016).

The greatest difference between NCLB and ESSA was the shifting of accountability systems to the state level, which allowed states to be in more control of their accountability requirements for school districts (Every Student Succeeds Act, 2019). Under this new reform, districts and schools would have more freedom of choice when making decisions for education (Ujifusa, 2019). With the changes brought about by

ESSA, individual states were allowed to set goals; however, these goals had to be designed to help close the gap for groups of students who were lagging the most in the state (Every Student Succeeds Act: Explained, 2016). The bottom 5% of low performing schools were required to have state intervention to help bring them up and close the performance gap (Every Student Succeeds Act: Explained, 2016).

States are allowed to choose their own accountability system; however, ESSA requires states to use four indicators in the system of their choosing (Every Student Succeeds Act: Explained, 2016). States have the freedom to determine how much each indicator counts toward schools' ratings although academics have a higher weight than other indicators (Every Student Succeeds Act: Explained, 2016). There are a number of factors being used under ESSA to determine school status and accountability, such as absenteeism and graduation rates (Ujifusa, 2019).

Testing Accountability

Standardized assessments are evaluation tools created to have test takers answer the same questions to then be scored for result comparisons (American Speech-Language-Hearing Association, 2020). These assessments are created to be statistically reliable and valid for the purpose of comparing test results among the test takers (American Speech-Language-Hearing Association, 2020). The earliest known standardized examination can be traced back to China where students were assessed on their knowledge of philosophers (Fletcher, 2009).

Experiencing the process of testing accountability is nothing new for students enrolled in a public school in the United States. United States students have been participating in standardized assessments long before the exams were part of the

landscape of the public schools or a requirement for college admissions (Fletcher, 2009). Throughout elementary school to high school graduation, students enrolled in public schools in the United States are very familiar with summative examinations to determine current knowledge and abilities of students. To hold school districts accountable for student success and progress in the state of Arkansas, a series of summative examinations are administered to students at the end of every school year beginning in kindergarten and continuing until eleventh grade (Arkansas Department of Education, 2019b). Standardized examinations are one of the main components of determining whether or not a state and school district is being held accountable for students' progress in their education.

Currently under ESSA, states are required to create and implement their own accountability system holding school districts to a high standard of education for all students (United States Department of Education, 2019a). A portion of the accountability system requires students to participate in a summative examination at the end of every school year. States are tasked with choosing the appropriate summative examination to meet the needs of the students within the state.

The Arkansas Department of Education has created a personalized plan to meet ESSA requirements and has submitted it to United States Secretary of Education, Betsy DeVos, with the last approved amendment being in March 2019 (Arkansas Department of Education, 2020). This plan outlines how the state of Arkansas will meet ESSA requirements and has adopted the ACT Aspire as the state's official summative examination from students in grades 3-10 and the ACT summative examination for all juniors (Arkansas Department of Education, 2019d).

Many examinations have been created and are implemented to provide states resources to meet these requirements (Manhattan Review, 2019a; Manhattan Review, 2019b; Study Point, 2019). These summative examinations address students' applied knowledge as well as prepare students for participating in nationally recognized examination for college admissions. Many universities and colleges still require test scores from a standardized assessment to grant admission to students (Study Point, 2019). The two most common, widely used summative examinations administered to individuals for the purpose of college admissions are the SAT and ACT (Manhattan Review, 2019a; Manhattan Review, 2019b).

History of the SAT.

Originally called the Scholastic Aptitude Test (SAT), this standardized assessment was created to identify students' abilities and create a uniform standard of admissions for colleges (Manhattan Review, 2019b). The SAT was first administered to students in 1926 and claimed to measure aptitude rather than applied knowledge (Manhattan Review, 2019b). The SAT was created by a group of professors determined to generate a standard examination to administer to students prior to admission to universities (Manhattan Review, 2019b).

This group of professors was originally named the College Entrance Examination Board, which is now referred to as the College Board (Manhattan Review, 2019b). In March of 1994, the College Board renamed the SAT the Scholastic Assessment Test when it was determined the SAT could not predict aptitudes or intellect (as was the original intent of its creators (Manhattan Review, 2019b).

The original assessment was composed of nine sections: two focusing on mathematics aptitude and seven focusing on verbal skills (Manhattan Review, 2019b). In the 1960s, the College Board made revisions to the examination and created four sections: reading, writing and language, math, and essay (College Board, 2019). The total of scores for the SAT range from 400-1600, with the range for the essay portion being 2-8 (College Board, 2019).

In 2005, the possible score of the SAT was changed to 2400, but was repealed under the 2016 revisions (Manhattan Review, 2019b). Other changes made with the 2005 revisions were reading passages were changed to better mirror what students may be exposed to in college courses and the elimination of analogies (Manhattan Review, 2019b). The SAT is administered to millions of students yearly in hopes to gaining entrance into the college or university of their choice (Study Point, 2019).

History of the ACT.

The American College Test (ACT) was created in 1959 by Everett Franklin Linquist to compete with the Scholastic Assessment Test (SAT; Test Prep Toolkit, 2019). Linquist created the ACT to measure students' practical knowledge rather than theoretical and aptitude (Manhattan Review, 2019a). The original examination contained four areas in which students were assessed: English, mathematics, social studies (later to be replaced by reading), and natural sciences (later to be replaced with science reasoning; Manhattan Review, 2019a). The current ACT examination is multiple choice and provides scores on a scale of 1 to 36 in all sections with test-takers also receiving a total composite score (Test Prep Toolkit, 2019).

Currently, the ACT examination is used more often for college admissions than the SAT (Lindsay, 2015). Like any examination, the ACT has strengths and areas of growth. One strength of the ACT is it closely mirrors the SAT in the areas assessed and content found on the examination (U. S. News, 2019). Another strength is the majority of the questions are straightforward and takes the test taker less time to determine how to best answer them (Study Point, 2020).

One flaw of the ACT examination is the achievement gap for minority students and students in poverty (Lindsay, 2015). Asian and Caucasian students score significantly higher on the ACT examination than African American students (Lindsay, 2015). Another aspect of the ACT that could be seen as a flaw is it requires test takers to answer 61 more questions than is required by the SAT (U. S. News, 2019). The ACT is recognized and accepted by all major colleges and universities in the United States (Arkansas Department of Education, 2019a). In the state of Arkansas, the standardized assessment that is commonly used for college admissions is the ACT (Arkansas Department of Education, 2019a).

The ACT in Arkansas.

All students in the state of Arkansas are administered the ACT in the spring of their junior year in high school (Arkansas Department of Education, 2019a). This assessment is administered to all high school juniors across the state to provide more opportunities for students to be admitted into colleges and possibly receive scholarships (Arkansas Department of Education, 2019a). The Arkansas Department of Education believes having all juniors participate in this examination will provide students better

opportunities to enhance their personalized education and create paths of success for their futures (2019).

This summative examination is administered in two forms: paper and electronically (Arkansas Department of Education, 2019a). Students are allowed specific accommodations on the examination if the correct steps are taken submit a request (ACT, 2019a). The official ACT examination administered to high school juniors is done so in February (Arkansas Department of Education, 2019a). To better prepare students for the ACT examination, the ACT Aspire is a summative examination that is administered to students in grades 3-10 and closely resembles the ACT (ACT, 2019b).

History of the ACT Aspire.

The ACT Aspire is a summative examination created to closely parallel the ACT (ACT, 2019b). This examination is linked to Common Core State Standards and structured similar to the ACT (ACT, 2019b). Common Core State Standards are learning goals created in math and English language arts (ELA) to outline what students should be learning every year and what they should be able to accomplish at the end of each grade (Common Core State Standards Initiative, 2020). Forty-one states in the United States have adopted these standards causing the majority of students across the nation to be educated using the same standards (Common Core State Standards Initiative, 2020).

The ACT Aspire is created for students in grades three through eight and is composed of five sub-sections: English, reading, mathematics, science, and writing (ACT, 2019b). Results from this examination predict what students may expect to score on the ACT examination (ACT, 2019b). Interim assessments are also available for school districts to use to prepare students for the end of the year summative examination (ACT,

2019b). To better prepare students for the upcoming ACT examination, the Arkansas Department of Education has implemented the ACT Aspire as the summative examination used to assess students' knowledge and progress in grades 3-10 (Arkansas Department of Education, 2019b).

The ACT Aspire in Arkansas.

Arkansas schools are required by law to administer a summative examination to all students in public schools (Arkansas Department of Education, 2019b). In order to meet the ESSA requirement of states choosing a summative examination, the ACT Aspire summative examination was adopted by the Arkansas Department of Education as the official assessment for public students in Arkansas beginning in the 2015-2016 school year (Arkansas Department of Education, 2019b). All students in grades 3-10 are required to participate in this examination unless students are expected to participate in the alternate assessment for students with exceptional needs (Arkansas Department of Education, 2019b). Individual schools are allowed to choose when students are administered the examination, with the testing window spanning five weeks in April and May (Arkansas Department of Education, 2019b). Students in grades 9 and 10 receive an ACT predictor score with their examination results (Arkansas Department of Education, 2019b). The predictor score allows students some idea of how they will perform on the ACT, and can help them better prepare for taking the ACT in the future.

Summary

This chapter provided a review of the literature relevant to this research study. It began by discussing the increasing involvement of the government in education (Dove et al., 2010). It discussed various education mandates put into place by the government with

one being President Johnson's Elementary and Secondary Education Act (ESEA) (Kilty, 2014). Based on needs seen by Francis Keppel, the NAEP (National Assessment of Education Progress) was created to assess students' academic performance (National Center for Education Statistics, 2019).

Multiple educational mandates were created after *A Nation at Risk* was published in 1983 after President Reagan created a commission to evaluate America's education system (Kamenetz, 2018). Panic was widespread throughout the nation, and reforms such as high-stake standards and teacher professional development was created to reform the nation's education system (Graham, 2013).

The review of the literature addressed existing research in determining the effects, if any, grade span configurations have on students' academic achievement. Schmitt (2004) conducted a research study and results showed grade span configurations had no statistical significance when considering students' academic achievement. Another study found that students in a larger grade span configuration did not achieve better or worse than smaller grade span configurations (Johnson et al., 2016).

The last section of the chapter discussed the theoretical underpinning of this research study. The theoretical framework of this study is Jean Piaget's Theory of Cognitive Development. This theory breaks down children's cognitive development into four categories (Ghazi et al., 2014). These categories are: Sensory-Motor, Pre-operations, Concrete Operations, and Formal operations (Ghazi et al., 2014). These stages can help provide educators better understand children's cognitive abilities at certain ages and how to best serve students based on these abilities.

Erik Erikson's theory of psychosocial development was discussed to confirm the level of cognitive development of fifth-grade students may not as advanced as a middle school setting may warrant. Erikson places fifth-grade students in the industry vs. inferiority stage where students range from ages five through twelve (McLeod, 2013). Children in this stage are learning specific skills and social groups begin to play a large role in their lives (McLeod, 2013). Children in this fourth stage strive toward becoming competent in their skills and knowledge (McLeod, 2013). Piaget and Erikson may have different views of human development, but both agree fifth-grade students are placed in a stage of development that may not fully support the expectations of middle school students (Knight, 2017; McLeod, 2013).

CHAPTER 3: RESEARCH METHODOLOGY

This chapter will provide the methodology that was used in this study. The purpose of this study was to determine whether different grade span configurations (elementary school vs. middle school) have an effect on fifth-grade students' academic achievement. For this study, there were comparisons of ACT Aspire scaled scores (math and reading) of fifth-grade students educated in two different grade span configurations: elementary schools and middle schools. Archived data were utilized in this study to compare the ACT Aspire scores of fifth-grade students educated in an elementary school to fifth-grade students educated in a middle school. This study was conducted to determine if students in one grade span configuration display higher academic achievement in math and reading than the other.

This study also compared academic changes as measured by the ACT Aspire scaled scores in the areas of math and reading between fourth-grade and fifth-grade. Scaled scores in math and reading of fourth-grade students placed in an elementary school were compared to scaled scores in math and reading of the same students who continued to be educated in an elementary school as fifth-graders. Scaled scores in math and reading of fourth-grade students placed in an elementary school were compared to scaled scores in math and reading of the same students who transitioned to a middle school as fifth-graders. Comparing ACT Aspire scaled scores in math and reading were selected to help determine the impact that grade span configurations may have on students' academic achievement. The results of this study may aid school boards and school administrators to determine the best grade span configurations for fifth-grade students to allow maximum academic achievement.

Participant Sample

This study examined the relationship between fifth-grade students' academic achievement on the ACT Aspire summative examination and grade span configurations. The participants in this study were chosen using convenience sampling. Convenience sampling occurs when a researcher utilizes populations already available (Gay, Mills, & Airasian, 2012).

The students included in this study were enrolled in an urban elementary school during the 2017-2018 school year and in either an urban elementary school or middle school during the 2018-2019 school year. All students included in this study attended a school affiliated with the Guy Fenter Educational Cooperative located in Branch, Arkansas. The Guy Fenter Educational Cooperative is one of 15 educational cooperatives in current operation throughout the state of Arkansas (Arkansas Department of Education, 2019c). There are currently 22 school districts in the western portion of the state who have a contract with this cooperative. There are a variety of demographics and grade span configurations among the schools affiliated with this cooperative (See Table 1).

Table 1

*Demographics of School Districts Affiliated with Guy Fenter Educational Cooperative
for the 2018-2019 School Year*

School District	Total Student Enrollment	Low Income	Special Education	English Learners	Grade Span Configurations
Alma	3,244	48%	13%	1%	K-2, 3-5, 6-8, 9-12
Booneville	1,183	72%	13%	0%	Pre-K-6, 7-9, 10-12
Cedarville	745	72%	20%	0%	K-4, 5-8, 9-12
Charleston	902	48%	12%	0%	K-6, 7-12
Clarksville	2,530	71%	14%	25%	K-1, 2-4, 5-6, 7-9, 10-12
County Line	488	72%	12%	2%	K-6, 7-12
Fort Smith	14,119	72%	13%	23%	K-6, 7-9, 10-12
Future School	225	69%	11%	16%	9-12
Greenwood	3,778	34%	14%	2%	K-4, 5-6, 7-8, 9, 10-12
Hackett	756	70%	14%	1%	K-6, 7-12
Lamar	1,359	68%	16%	2%	K-3, 4-7, 8-12
Lavaca	820	54%	16%	3%	K-4, 5-8, 9-12
Magazine	520	81%	18%	1%	Pre-K-6, 7-12
Mansfield	779	71%	15%	2%	K-4, 5-8, 9-12
Mountainburg	615	73%	18%	0%	K-4, 5-8, 9-12
Mulberry/Pleasant View Bi-County	410	75%	19%	2%	K-4, 5-8, 9-12
Ozark	1,789	52%	11%	1%	Pre-K, 1-5, 6-7, 8-9, 10-12
Paris	1,029	75%	11%	2%	Pre-K-4, 5-8, 9-12
Scranton	424	56%	13%	2%	K-6, 7-12
Van Buren	5,732	59%	13%	10%	K-5, 6-8, 9, 10-12
Waldron	1,435	75%	13%	9%	K-4, 5-8, 9-12
Westside	634	76%	18%	1%	K-6, 7-12

For this study, student data from four schools educating fifth-grade students in an elementary school and four schools educating fifth-grade students in a middle school

were chosen based on current low-income rates and grade span configurations. Each school chosen for this study had a low-income rate of 70% or greater at the time of the study. The students included in this study received fourth-grade instruction and were administered the ACT Aspire summative examination while enrolled in an elementary school during the 2017-2018 school year. The same students received fifth-grade instruction and were administered the ACT Aspire summative examination while enrolled in either the same elementary school as the 2017-2018 school year or transitioned to a middle school during the 2018-2019 school year. These different settings were based on the grade span configurations for the school district in which the students were enrolled.

The researcher compared demographic data from all schools affiliated with the Guy Fenter Educational Cooperative. Initially all schools within this cooperative with a 70% or low-income rate were considered for this study. Over half of the schools affiliated with the Guy Fenter Educational Cooperative have at least a 70% low-income rate. After eliminating schools not meeting this criterion, the researcher then examined the grade span configurations of the remaining schools. There were eight schools, four elementary and four middle, whose grade span configurations were very similar. The researcher chose to use the ACT Aspire scaled scores from students enrolled in these eight schools based on the schools meeting the desired demographics set by the researcher.

The four elementary schools included in this study have grade span configurations of kindergarten through sixth-grade with the exception of one school containing pre-school aged students. The four middle schools included in this study have grade span configurations of fifth-grade through eighth-grade. This research study utilized ACT

Aspire scaled scores (math and reading) of students who were enrolled in these school districts for fourth-grade during the 2017-2018 school year and fifth-grade during the 2018-2019 school year. Students who completed the Arkansas Alternate Assessment during one or both of the chosen school years were not included in this study.

Research Design

This was a quantitative, causal-comparative research study. The purpose of this study was to determine the effect grade span configurations have on fifth-grade students' academic achievement. The study was designed to determine if there is a difference in academic achievement between fifth-graders who received instruction in an elementary setting and fifth-graders who received instruction in a middle school setting. Archived data generated from the ACT Aspire were gathered and analyzed to determine if different grade span configurations have an effect on the academic achievement of fifth-grade students in the content areas of math and reading on the ACT Aspire. This effect of grade span configuration was determined and analyzed through the employment of an independent *t*-test.

Changes in academic achievement in the areas of math and reading were compared between the two groups of students who moved from fourth-grade into fifth-grade elementary settings and fourth-graders who transitioned into fifth-grade middle school settings. Because these were the same students moving from one grade to another, any academic changes in the two content areas of math and reading were identified and analyzed through the use of dependent *t*-tests.

Gay et al. (2012) have determined quantitative research as being “the collection and analysis of numerical data to describe, explain, predict, or control phenomena of

interest” (p. 7). According to Creswell and Creswell (2008), quantitative research studies are conducted to explore relationships among variables. The purpose of conducting causal-comparative studies is to “determine the cause, or reason, for existing differences in the behavior or status of groups of individuals” (Gay et al., 2012, p. 10). This research study involved gathering numerical data to analyze and determine if a causal association between grade span and academic achievement did manifest itself statistically (Creswell & Creswell, 2018).

This study is quantitative in nature due to the use of numerical data retrieved from the Arkansas Department of Education’s Data Center. A casual-comparative model was used in this study in order to determine whether a causal relationship exists between grade span configurations and fifth-grade students’ academic achievement. The results of this study operationally define students’ academic achievement inferentially by statistically analyzing and comparing their achievement scores in math and reading, as generated by the ACT Aspire during their fourth-grade year and their fifth-grade year.

Procedures

All school districts in Arkansas administered the ACT Aspire statewide summative assessment in spring of 2017 and 2018. This assessment is state mandated, and all school districts are required to administer the ACT Aspire to students in grades 3-10. Students complete testing in five areas to help inform students, parents, and teachers of students’ strengths and/or areas of growth (Arkansas Department of Education, 2019b). When results are made available to parents and schools, there are four performance level indicators presented: (a) in need of support, (b) close, (c) ready, and (d) exceeding (Arkansas Department of Education, 2019b). These indicators are based on

how students perform using the ACT Readiness Benchmark as the standard (Arkansas Department of Education, 2019b).

For the purpose of this study, these performance level indicators were not used to measure the academic achievement of its participants. Rather academic achievement was operationally defined as differences in mean scores in math and reading generated by the fourth and fifth grade participants in different educational settings (elementary vs. middle school). These differences were statistically analyzed through the use of dependent *t*-tests (same group of fourth graders who transitioned into an elementary setting as fifth graders and the same group of fourth graders who transitioned into a middle school setting). An independent *t*-test was employed to identify the differences in mean scores of math and reading between those fifth graders who moved into an elementary setting and those fifth graders who moved into a middle school setting.

As a baseline, all the participants received instruction in an elementary setting as fourth graders during the 2017-2018 school year. For fifth-grade instruction, these same students either remained in the same elementary school or transitioned to a middle school during the 2018-2019 school year. The ACT Aspire scaled scores in reading and math for fifth-grade students enrolled in an elementary school were compared to the scores of fifth-grade students enrolled in a middle school. The mean scores in math and reading for fifth-grade students were compared to determine whether the placement had an effect on academic achievement.

The students' scaled scores from their fourth-grade year were compared to their scaled scores from their fifth-grade year. Fourth-grade math and reading scores were compared to the scores of the same students who remained in an elementary school for

fifth-grade. After this, fourth-grade math and reading scores were compared to the scores of the same students who had transitioned to a middle school for fifth-grade instruction. The comparison allowed the researcher to determine whether the different grade span configurations among fifth-grade students had an effect of the students' academic achievement from their fourth-grade to fifth-grade year.

Permission was gained from all eight superintendents whose students' ACT Aspire data was accessed for this study. After doing so, the researcher submitted a formal request to the Arkansas Department of Education's Data Center. Archived ACT Aspire scaled scores for students meeting the criteria was requested, and this information was presented to the researcher in an Excel spreadsheet. The individual student names were replaced with numerical identifiers by the Data Center. This approach was completed to ensure the identities of individual students are not present. Data from the schools were grouped together with individual school names removed and given a pseudonym. The information in the spreadsheet was then transferred to SPSS, and an independent *t*-test and a series of dependent *t*-tests were conducted.

Research Questions

This quantitative, causal-comparative research study was guided by the following research questions:

- RQ1: What effect will different grade span configurations have on the ACT Aspire scaled scores of fifth-grade students in the content area of math?
- RQ2: What effect will different grade span configurations have on the ACT Aspire scaled scores of fifth-graders in the content area of reading?

- RQ3: What effect will different grade span configurations have on the academic achievement in the content area of math between fourth and fifth graders, as measured by the ACT Aspire?
- RQ4: What effect will different grade span configurations have on the academic achievement in the content area of reading between fourth and fifth graders, as measured by the ACT Aspire?

Hypotheses

This quantitative, causal-comparative research study was guided by the following null hypotheses:

- H_0^1 : The different grade span configurations will have no effect on the academic achievement of fifth-graders in the content areas of math.
- H_0^2 : The different grade span configurations will have no effect on the academic achievement of fifth graders in the content areas of reading.
- H_0^3 : The differences in the grade span configurations will have no effect on the academic achievement in the content area of math between fourth-graders and fifth-graders.
- H_0^4 : The differences in the grade span configurations will have no effect on the academic achievement in the content area of reading between-fourth graders and fifth-graders.

Measurement

Prior to gathering data for this study, the researcher obtained approval from Arkansas Tech University's Institutional Review Board (IRB) to research this topic. The superintendents of the students' whose ACT Aspire scaled scores were included in this

study were contacted. The researcher requested permission to access the data prior to the application submission to the IRB. Each superintendent granted the researcher permission to access their students' ACT Aspire scaled scores through the Arkansas Department of Education Data Center. Signed letters of consent from the eight superintendents were included in the IRB application.

The researcher gathered demographic information pertaining to each school district from the Arkansas Department of Education. ACT Aspire scaled scores were requested from the Arkansas Department of Education Data Center. An excel spreadsheet was created by the Arkansas Department of Education Data Center to organize the data obtained by the researcher. Students' names were replaced with a numerical identifier to protect students' privacy and ensure confidentiality.

Arkansas law requires all public-school students participate in a statewide summative examination at the end of every school year (Arkansas Department of Education, 2019b). The Arkansas State Board of Education adopted the ACT Aspire summative assessment with the first administration of this assessment in spring 2016 (Arkansas Department of Education, 2019b). This assessment is used for all students in grades 3-10.

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

ACT Aspire utilizes multiple choice items (MC) which require the examinee to select a single response; constructed response tasks (CR) require examinees to generate

their own response, and technology enhanced (TE) items and tasks incorporate computer interfaces to ask questions and pose scenarios that are not possible with the paper-based assessment (ACT Aspire, 2017, p. 30).

The ACT Aspire scale was developed under the framework of the unidimensional item response theory (IRT) models, which involves statistical models that can be used to obtain estimate of scale score reliabilities and conditional standard errors of measurement (CSEMs) (ACT Aspire, 2017, para. 1).

Reliability coefficients are estimates of the consistency of test scores. They typically range from zero to one, with values near one indicating greater consistency and those near zero indicating little or no consistency. The standard error of measurement (SEM) is closely related to test reliability. The SEM summarizes the amount of error or inconsistency in scores on a test (ACT Aspire, 2017, para. 3). The scale score reliabilities and standard error of measurement (SEM) for Mathematics and reading derived from the spring 2014 operational data at the third-grade level are as follows:

- Mathematics reliability .80; SEM 1.82
- Reading reliability .85; SEM 2.04

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

Validity support for ACT Aspire is organized into six areas; content-oriented evidence, cognitive processes, internal structure, relationships to other constructs, relationships with criteria, and consequences (ACT Aspire, 2017, p. 17.1). Because ACT Aspire is relatively new, the body of evidence is still being established.

Statistical Analysis

To address the four research questions and test the four null hypotheses of this study (see Table 2), statistical analysis was generated using IBM Statistical Packages for the Social Sciences Version 25 (2019). After gathering archived data from the eight school districts used in this study, the researcher ensured enough data is present for this study. To identify differences in academic achievement, an independent *t*-test and a series of dependent *t*-tests were run for this study.

Table 2

Research Questions and Hypotheses

Research Question	Hypothesis	Variables	Statistical Test
RQ1: What effect will different grade span configurations have on the ACT Aspire scaled scores of fifth-grade students in the content area of math?	The different grade span configurations will have no effect on the academic achievement of fifth-graders in the content area of math.	IV- fifth-grade students enrolled in an elementary school and middle school DV- ACT Aspire scaled math scores	Independent <i>t</i> -test
RQ2: What effect will different grade span configurations have on the ACT Aspire scaled scores of fifth-grade students in the content area of reading?	The different grade span configurations will have no effect on the academic achievement of fifth-graders in the content area of reading.	IV- fifth-grade students enrolled in an elementary school and middle school DV- ACT Aspire scaled reading scores	Independent <i>t</i> -test
RQ3: What effect will different grade span configurations have on the academic achievement in the content area of math between fourth and fifth graders, as measured by the ACT Aspire?	The differences in the grade span configurations will have no effect on the academic achievement in the content area of math between fourth-graders and fifth-graders.	IV- fifth-grade students enrolled in an elementary school and middle school DV- ACT Aspire scaled math scores (fourth-grade and fifth-grade)	Dependent <i>t</i> -test
RQ4: What effect will different grade span configurations have on the academic achievement in the content area of reading between fourth and fifth graders, as	The differences in the grade span configurations will have no effect on the academic achievement in the content area of reading between fourth-graders and fifth-graders.	IV- fifth-grade students enrolled in an elementary school and middle school DV- ACT Aspire scaled reading scores (fourth-grade and fifth-grade)	Dependent <i>t</i> -test

To determine the possible effect of different grade-span configurations on the academic achievement of fifth-grade students in the areas of math and reading, an independent *t*-test was employed using the data generated from the ACT Aspire. This *t*-test compared mean math and reading scores of fifth-grade students enrolled in an elementary school to mean math scores and mean reading scores of fifth-grade students enrolled in a middle school. An alpha level of $p < .05$ was established to determine statistical significance. Cohen's *d* (Cohen, 1988), to determine possible effect size (ES) differences, was also calculated. This statistic indicated the magnitude of any differences between the mean scores in math and reading between the two groups of fifth-graders who received instruction in two different grade span configurations (elementary school vs. middle school).

The first dependent *t*-test was employed to compare the same students between their reading scores and math scores as fourth-graders to their reading scores and math scores as fifth-graders who received fifth-grade instruction in an elementary school. The next dependent *t*-test was employed to compare the same students between their reading scores and math scores as fourth-graders to their reading scores and math scores as fifth-graders who received fifth-grade instruction in a middle school. The results of these two tests are presented in Chapter 4: Findings.

Research Ethics

The eight superintendents from the school districts included in this study were contacted and informed of the nature of this study. A letter was presented to the

superintendent of each district to sign verifying the details of this study are known and granting permission to access their students' archived ACT Aspire scaled scores. These letters were included in the researcher's application to Arkansas Tech University's Institutional Review Board (IRB) as part of the Human Subjects review process. Individual student names were removed from the data provided by the Arkansas Department of Education Data Center and replaced with numerical identifier. This approach protects all students included in this study from being identified in any manner other than being enrolled in and receiving educational instruction in a school district associated with the Guy Fenter Educational Cooperative. The names of the school districts were removed and provided a pseudonym to keep the identity of each school private.

The data/scores from this study were archived from the two previous years (2017-2018 and 2018-2019), and all information representing the students was removed. Anonymity of the students was protected at all times. The researcher never possessed access to specific information regarding the participants as the names were removed and replaced with a numerical identifier by the Arkansas Department of Education Data Center. Because the data were archived, there was no need for consent forms from the participants, nor assent forms from their parents. No risk to the students was involved in the gathering of the data or running the series of tests.

Summary

Arkansas's Department of Education does not require specific grade span configurations for school districts within the state. Individual districts are allowed to determine the best configuration to meet their students' needs. It was reported that during

the 2018-2019 school year, there were 278 school districts serving 476,611 students throughout the state (Arkansas Department of Education, 2019c). During that school year, there were 20 different grade span configurations containing fifth-grade students (Arkansas Department of Education, 2019c). Determining where to house each grade of students can be a challenge for district school boards and district administration. To best meet all needs of all students, information about the effects of grade span configurations should be available to provide research on the matter.

Many research studies have been discussed concerning the research of the effects of grade span configurations (Burkam et al., 2007; Dove et al., 2010; Johnson et al., 2016; Schmitt, 2004; Waters, 2016). A couple of these studies (Burkam et al., 2007; Water, 2016) showed how grade span configurations may affect students' academic achievement. The study conducted by Burkam et al. (2007) explored the relationship between kindergarten students' learning of literacy and math based on grade span configurations. The results of this study determined that students attending a preprimary school prior to kindergarten had more knowledge when beginning school, but these students did not grow as much as students who did not (Burkam et al., 2007). In this study, it was evident that students' academics were affected by being placed being in different grade span configurations.

The study conducted by Waters (2016) focused on Kansas students' grade span configurations and how this may affect their academic achievement. The focus of this study was results of the summative assessment students were required to participate in every spring (Waters, 2016). The results of this study showed that students' over all achievement was not affected by grade span configurations; however, there was a

statistical significance in sixth-graders' reading scores when looking at the different grade span configurations (Waters, 2016).

Some of the studies discussed did not find any statistical significance in the relationship between grade span configurations and students' achievement. Dove et al. (2010) determined there was no statistical significance in the relationship between grade span configurations of Arkansas 6th grade and summative assessment achievement scores on the Arkansas Benchmark Examination. This study involved 281 schools throughout the state of Arkansas, and it was determined that grade span configurations do not have a significant effect on students' achievement (Dove et al., 2010).

Another study determining there is no statistical significance in grade span configurations and achievement was conducted by Johnson et al. (2016). This study included students in Florida who participated in state-mandated summative assessment (Johnson et al., 2016). Results of this study determined different grade span configurations throughout the state of Florida did not have any effect on students' academic achievement on the summative assessment (Johnson et al., 2016).

This quantitative, casual-comparative study was conducted to determine the effects grade span configurations have on fifth-grade students' academic achievement based on ACT Aspire summative examination scores. There is limited research on the effect of grade span configurations on academic achievement regarding this particular population in Arkansas. This topic needs more research to determine the best practices for choosing grade span configurations for students. Information gathered from this study may aid school boards and school district administrators determine the best placement for fifth-grade students.

For this research study, ACT Aspire scores were accessed for the participating schools and school districts. The scores of fifth-grade students placed in an elementary school will be compared to scores of fifth-grade students placed in a middle school setting. The scores of fourth-grade students will be compared to fifth-grade scores of the same students who are enrolled in different grade span configurations (elementary school vs. middle school). By comparing these scores, it can be determined whether grade span configurations have any effect on western Arkansas fifth-grade students' academic achievement.

The researcher used convenient sampling to gather data for this study. The participants for this study were fourth-grade students who were enrolled in an elementary school during the 2017-2018 school year. These same students were enrolled in an elementary school or transitioned to a middle school as fifth-graders during the 2018-2019 school year. All students included in this study were enrolled in a school district affiliated with the Guy Fenter Educational Cooperative. Students from four elementary schools housing fifth-grade students and four middle schools housing fifth-grade students were chosen for this study. All eight schools used in this study had a low-income rate of 70% or more.

To address the research questions and test the four null hypotheses, statistical analysis was conducted with an independent *t*-test and a series of dependent *t*-tests using SPSS 25. To determine the possible effect of different grade-span configurations on the academic achievement of fifth grade students in the areas of math and reading, an independent *t*-test was employed using the data generated from the ACT Aspire. An alpha level of $p < .05$ was established to determine statistical significance. Cohen's *d*

(Cohen, 1988) to determine possible effect size (ES) differences was also calculated. This statistic identifies the magnitude of any differences between the mean scores in math and reading between the two groups of fifth graders who received instruction in two different grade span configurations (elementary vs. middle school). These differences indicate a percentage of pooled standard deviations between the two groups (Cohen, 1988).

The first dependent *t*-test compared mean scores in math and reading of fourth-grade students to mean scores in math and reading of fifth-grade students who received instruction in an elementary setting. The next dependent *t*-test compared mean scores in math and reading of fourth-grade students to mean scores in math and reading of fifth-grade students who received instruction in a middle school setting. An alpha level of $p < .05$ was used to determine statistical significance. For this study, academic achievement was operationally defined inferentially. The results of these tests should determine whether grade span configurations have any effect on Arkansas fifth-grade students' academic achievement. The results of these analyses are presented in Chapter 4: Findings: Tables 3, 4, and 5.

CHAPTER 4: FINDINGS

The purpose of this study was to investigate the effect of different grade span configurations (elementary vs. middle school) on the academic achievement of fifth-grade students. For this study, academic achievement was operationally defined as math and reading scores generated from the ACT Aspire standardized test. The researcher attempted to determine if there were statistically significance differences in ACT Aspire scaled scores in the areas of math and reading for students based on two different grade span configurations (elementary school vs. middle school).

Descriptive Statistics

The data for this study were accessed through the Arkansas Department of Education Data Center. The researcher requested archived ACT Aspire scaled scores in the areas of reading and math for the sample population driving this study. The sample population included students enrolled in an urban elementary school in fourth-grade and fifth-grade and students enrolled in an urban elementary school for their fourth-grade year, but transitioned to a middle school for their fifth-grade year. The data provided to the researcher included students enrolled within the same school district for their fourth and fifth grade school years.

All students in the sample population were enrolled in a school affiliated with the Guy Fenter Educational Cooperative in the western part of the state. All students were enrolled in a school with a 70% or higher low-income rate. The elementary schools included in this study had grade span configurations of kindergarten through sixth-grade with one school that included preschool aged students. The middle schools included in this study had grade span configurations of fifth-grade through eighth-grade.

Research Questions and Hypotheses

The following research questions were addressed and the following null hypotheses were tested:

Research Questions.

The research questions for this quantitative, casual-comparative research study were:

- RQ1: What effect will different grade span configurations have on the ACT Aspire scaled scores of fifth-grade students in the content area of math?
- RQ2: What effect will different grade span configurations have on the ACT Aspire scaled scores of fifth-graders in the content area of reading?
- RQ3: What effect will different grade span configurations have on the academic achievement in the content area of math between fourth and fifth graders, as measured by the ACT Aspire?
- RQ4: What effect will different grade span configurations have on the academic achievement in the content area of reading between fourth and fifth graders, as measured by the ACT Aspire?

Hypotheses.

The null hypotheses for this quantitative, casual-comparative research study were:

- H_0^1 : The different grade span configurations will have no effect on the academic achievement of fifth-graders in the content areas of math.
- H_0^2 : The different grade span configurations will have no effect on the academic achievement of fifth graders in the content areas of reading.

- H_0^3 : The differences in the grade span configurations will have no effect on the academic achievement in the content area of math between fourth-graders and fifth-graders.
- H_0^4 : The differences in the grade span configurations will have no effect on the academic achievement in the content area of reading between-fourth graders and fifth-graders.

Data Analysis

Comparison of fifth-grade students in different grade span configurations.

To address the first two research questions and test the first two null hypotheses, ACT Aspire math and reading scaled scores were generated and compared between fifth-graders who attended an elementary school and fifth-graders who attended a middle school. These scaled scores were analyzed using an independent *t*-test employing SPSS to determine if the differences between the mean scaled scores in math and reading of the two groups were statistically significant. For this study, statistical significance was set at an alpha level of $p < .05$. The analysis is presented in Table 3.

Table 3

A Comparison between Fifth-Graders' Math and Reading Scores who Attended an Elementary School or a Middle School

ACT Aspire Scores	Elementary (n= 360)		Middle School (n=522)		<i>t-value</i>	<i>p</i>	ES
	M	SD	M	SD			
Math	415.85	4.57	416.95	4.89	3.376	.001***	.23
Reading	416.63	6.56	416.14	6.62	1.079	.281	.07

Note: Math: $ES = \frac{415.85 - 416.95}{1.1} = .23$ Reading: $ES = \frac{416.63 - 416.14}{6.59} = .07$
 Ave. SD = 1.1 Ave SD = 6.59

The Effect Size of 23% indicates the magnitude of differences in math scores between the two groups would be considered small. (See Cohen, 1988). The Effect Size of 7% indicates the magnitude of differences in reading scores between the two groups would also be considered small. (See Cohen, 1988).

*** $p < .001$ (two tailed test)

The data indicate the differences in the mean math scores between students in an elementary setting ($M = 415.85$) and mean math scores of students in a middle school setting ($M = 416.95$) are statistically significant ($p < .001$). The data indicate the differences between the mean reading scores of students in an elementary setting ($M = 416.63$) and the mean reading scores of students in a middle school setting ($M = 416.15$) are not statistically significant.

The first null hypothesis is rejected. The second null hypothesis is retained. The first two research questions have been addressed. To determine the magnitude of differences between the mean scores in reading and math between the Elementary Setting and the Middle School Setting, an Effect Size (ES) was determined through the calculation of a Cohen's d (Cohen, 1988). This calculation involves dividing the

differences in the mean scores of each group for each content areas by the pooled standard deviation for each group for each content area. Cohen established three estimated Effect Sizes: .20 = small, .50 = medium, .80 = large

The Effect Size of 23% indicates the magnitude of differences in math scores between the two groups would be considered small. (See Cohen, 1988). The 23% indicates there is approximately one fourth of a standard deviation difference between the two scores. The Effect Size of 7% indicates the magnitude of differences in reading scores between the two groups would also be consider small. (See Cohen, 1988).

To address the second two research questions and test the second two null hypotheses, ACT Aspire math and reading scaled scores were generated and compared between those fourth graders who attended an elementary school then attended an elementary school as fifth-graders. The ACT Aspire math and reading scores were also generated between those students who attended an elementary school as fourth-graders then transitioned to a middle school as fifth-graders.

These scaled scores were analyzed using a dependent *t*-test employing SPSS to determine if the differences in the mean scaled scores in math and reading between the fourth-graders and fifth-graders who were taught in the two different grade span configurations (elementary and middle school) were statistically significant. For this study, statistical significance was set at an alpha level of $p < .05$. These analyses are presented in Tables 4 and 5.

Table 4

A Comparison between Fourth-Graders' Math and Reading Scores and Their Fifth-Grade Math and Reading Scores in an Elementary School

ACT Aspire Scores	Fourth Grade Elem (n = 180)		Fifth Grade Elem (n=180)		t-value	p
	M	SD	M	SD		
Math	414.96	4.26	416.74	4.70	7.241	.001***
Reading	415.47	6.36	417.78	6.58	7.040	.001***

*** $p < .001$ (two tailed test)

Table 5

A Comparison between Fourth-Graders' Math and Reading Scores and Their Fifth-Grade Math and Reading Scores in a Middle School

ACT Aspire Scores	Fourth Grade Elem (n = 261)		Fifth Grade MS (n=261)		t-value	p
	M	SD	M	SD		
Math	416.04	4.50	417.85	5.10	9.581	.001***
Reading	414.93	6.20	417.35	6.82	9.887	.001***

*** $p < .001$ (two tailed test)

According to the data presented in Table 4, the differences between the mean math scores of those students who initially attended elementary schools as a fourth-graders ($M = 414.96$) and continued to attend elementary schools as fifth-graders ($M =$

416.74) were statistically significant. The differences between the mean reading scores of those students who initially attended elementary schools as a fourth-graders ($M = 415.47$) and continued to attend elementary schools as fifth-graders ($M = 417.78$) were statistically significant. The third null hypothesis is rejected, and the research question has been addressed.

According to the data presented in Table 5, the differences between the mean math scores of those students who initially attended elementary schools as a fourth-graders ($M = 416.04$) and transitioned to middle schools as fifth-graders ($M = 417.85$) were statistically significant. The differences between the mean reading scores of those students who initially attended elementary schools as fourth-graders ($M = 414.93$) and transitioned to middle schools as fifth-graders ($M = 417.35$) were statistically significant. The fourth null hypothesis is rejected, and the research question has been addressed.

Although both groups of students improved in both content areas, whether they were educated in elementary settings as fifth-graders or middle school settings as fifth-graders, the only statistically significant difference between these two groups (as a whole) was in the content area math (note Table 3).

CHAPTER 5: CONCLUSIONS

The purpose of this study was to investigate whether Arkansas fifth-grade students' academic achievement is affected by different grade span configurations (elementary school vs. middle school). The researcher utilized archived data provided by the Arkansas Department of Education Data Center. The data included ACT Aspire scaled scores in the areas of math and reading for fifth-grade students enrolled in specific schools associated with the Guy Fenter Educational Cooperative (See Table 2). This study was conducted to help aide school boards and school officials in decision making processes for school districts to improve student academic achievement.

For this study, ACT Aspire scaled scores in the areas of math and reading for fifth-grade students enrolled in one of eight school districts affiliated with the Guy Fenter Cooperative were selected. The schools were chosen based on grade span configurations and school low-income rates. Four elementary schools with a 70% or greater low-income rate and educating fifth-grade students in the western portion of the state were selected for this study. Four middle schools with a 70% or greater low-income rate and educating fifth-grade students in the western portion of the state were selected for this study.

The independent variable throughout this study was fifth-grade students either enrolled in an elementary school or middle school. The dependent variable throughout this study was fifth-grade students' ACT Aspire scaled scores in math or reading from the 2017-2018 and 2018-2019 school years. The researcher compared math and reading scaled scores for fifth-grade students in an elementary school to fifth-grade students. The data were uploaded into SPSS and an independent *t*-test and a series of dependent *t*-tests were conducted.

Summary of Results

There is limited data and research regarding how grade span configurations may have an effect on the academic achievement of fifth-grade students in Arkansas. Through this study, the researcher attempted to add to the body of knowledge regarding this topic. A sample population of students enrolled in schools affiliated with the Guy Fenter Educational Cooperative was chosen for this study. After the sample population was identified, the researcher accessed the students' data through the Department of Education Data Center.

An independent *t*-test was conducted to determine whether statistical significance was present in comparing students enrolled in two different grade span configurations (elementary school vs. middle school) during their fifth-grade year. This test compared ACT Aspire scaled scores in the areas of math and reading of fifth-grade students enrolled in an urban elementary school during the 2018-2019 school year to the scores of fifth-grade students enrolled in an urban middle school during the 2018-2019 school year. For this test, the scaled scores of 360 elementary students were utilized, and the scaled scores of 522 middle school students were utilized.

Next, a series of dependent *t*-tests were conducted to determine if there is statistical significance between students' fourth-grade scaled scores to their fifth-grade scaled scores based on their grade span configurations (elementary school vs. elementary school and elementary school vs. middle school). The first test compared scores of students enrolled in an elementary school during fourth-grade (2017-2018) to the same students' scores when their education was continued in the same school during their fifth-grade year (2018-2019). For this test, 180 students' ACT Aspire scaled scores in the

areas of math and reading were used. The second test compared scores of students enrolled in an elementary school during fourth-grade (2017-2018) to the same students' scores from when they were enrolled in a middle school for fifth-grade (2018-2019). For this test, 261 students' ACT Aspire scaled scores in the areas of math and reading were used.

Comparison of fifth-grade students in different grade span configurations.

Research Question 1: *What effect will different grade span configurations have on the ACT Aspire scaled scores of fifth-grade students in the content area of math?*

The first analysis of the data comes from comparing fifth-grade students educated in two different grade span configurations (elementary school vs. middle school). Based on the first research question, the following hypothesis was constructed: the types of grade span configurations will have no effect on the academic achievement of fifth-graders in the content area of math. The alpha level for statistical significance was set at $p < .05$. After running the tests and analyzing the data, there was statistical significance ($p = .001$) present when comparing the mean math scores of fifth-grade students enrolled in an elementary school ($M = 415.85$) compared to the mean math score ($M = 416.95$) of fifth-grade students enrolled in a middle school. The first null hypothesis was rejected based on the results generated from this independent *t*-test. Based on the data analysis, it can be suggested that the grade span configuration for this sample population had a positive effect on students' academic achievement in the area of math. Students will have greater success being placed in a middle school for fifth-grade math instruction.

Research Question 2: *What effect will different grade span configurations have on the ACT Aspire scaled scores of fifth-graders in the content area of reading?*

The next analysis of data in this study is similar to the first with the dependent variable being changed to ACT Aspire scaled reading scores. The second hypothesis based on this research question that guided this study is: the types of grade span configurations will have no effect on the academic achievement of fifth-grade students in the content of reading. When running this test, the alpha level for statistical significance was set at $p < .05$. After attaining the results and analyzing the data, there was no statistical significance present when comparing the mean reading score ($M=416.63$) of fifth-grade students enrolled in an elementary school to the mean reading score ($M=416.14$) of fifth-grade students enrolled in a middle school. Although students in a middle school had a lower mean score, the score was not low enough to warrant statistical significance. The second hypothesis was retained based on this analysis of this data. This finding suggests that different grade span configurations for this sample population did not have an effect on fifth-grade students' academic achievement. Fifth-grade students will experience comparable success in both elementary school and middle school, so there is not only placement better than the other.

Comparison of students' academic achievement from fourth to fifth grade.

Research Question 3: *What effect will different grade span configurations have on the academic achievement in the content area of math between fourth and fifth graders, as measured by the ACT Aspire?*

The next data analysis for this study is the comparison of students' academic achievement in the area of math between fourth-grade and fifth-grade. The third hypothesis addressed in this study was based from the third research question: the

differences in the grade span configurations will have no effect on the academic achievement in the content area of math between fourth and fifth graders.

Addressing this research question required information from two separate tests. The information for the first test was comparing students who were enrolled in the same school for fourth-grade and fifth-grade, receiving fifth-grade instruction in an elementary school. The mean math score ($M=414.96$) for the students' fourth-grade year (2017-2018) was compared to the mean math score ($M=416.74$) for the same students' during their fifth-grade year (2018-2019). After the first dependent t -test was conducted, there was statistical significance ($p=.001$) present when comparing the scaled math scores from the two school years.

The information for the second test used to address the third research question was the comparison of students' scores who were enrolled in an elementary school in fourth-grade (2017-2018), but transitioned to a middle school for fifth-grade (2018-2019) instruction. The mean math score ($M=416.04$) for this group of students during their fourth-grade year was compared to the mean math score ($M=417.85$) during their fifth-grade year. There was also statistical significance present ($p=.001$) for this group of students after the data was analyzed.

Because there was statistical significance present in math for both grade span configurations, the third null hypothesis was rejected. This information suggests the different grade span configurations may be a contributing factor affecting the academic achievement for both groups of fifth-graders in the area of math. This is evidenced by an increase in the overall mean score for both sets of students from their fourth-grade to

fifth-grade year. Both sets of students showed increases in scores between fourth-grade and fifth-grade as measured by the ACT Aspire.

Research Question 4: *What effect will different grade span configurations have on the academic achievement in the content area of reading between fourth and fifth graders, as measured by the ACT Aspire?*

This last research question was addressed the same way as research question 3 with reading scaled scores being compared rather than math. The fourth hypothesis addressed in this study was: the difference in the grade span configurations will have no effect on the academic achievement in the content area of reading between fourth- and fifth-graders. The information for the first test was comparing students who were enrolled in the same school for fourth-grade and fifth-grade, receiving fifth-grade instruction in an elementary school. The mean reading score (415.47) for the students' fourth-grade year (2017-2018) was compared to the mean reading score (417.78) for the same students' during their fifth-grade year (2018-2019). After the first dependent *t*-test was conducted, there was statistical significance (.001) present when comparing the scaled reading scores from the two school years.

The information for the second test used to address the third research question was the comparison of students' scores who were enrolled in an elementary school in fourth-grade (2017-2018), but transitioned to a middle school for fifth-grade (2018-2019) instruction. The mean reading score ($M=414.93$) for this group of students during their fourth-grade year was compared to the mean math score ($M=417.35$) during their fifth-grade year. There was also statistical significance present ($p<.001$) for this group of students after the data was analyzed.

Since there was statistical significance present in math for both grade span configurations, the fourth hypothesis was rejected. This information suggests the different grade span configurations may be a contributing factor affecting the academic achievement for both groups of fifth-graders in the area of reading. This is evidenced by an increase in the overall mean score for both sets of students from their fourth-grade to fifth-grade year. Both sets of students showed increases in scores between fourth-grade and fifth-grade as measured by the ACT Aspire.

Discussion

There were four research questions addressed in this study. Based on the review of the literature, the researcher created null hypotheses that indicated grade span configurations would not have an effect on academic achievement for this sample population. After the findings were presented, three of the four hypotheses were rejected with one being retained.

There were many comparisons conducted in this research study to determine whether students' academic achievement was affected. From this information, it can be determined there are some grade span configurations that are more successful in certain areas. The results listed on Table 3 indicates students educated in a middle school in fifth-grade achieved a higher mean score in the area of math than fifth-grade students educated in an elementary school. It can be concluded that educating fifth-grade students in a middle school is the best placement regarding academic achievement in math.

The results presented on Table 4 and Table 5 indicate that fifth-grade students, on average, experienced academic achievement in both grade span configurations between fourth-grade and fifth-grade. There was statistical significance noted in both math and

reading for both groups of students. Academic achievement growth could not be compared in this study based on the researcher choosing to only explore academic achievement in the areas of math and reading. The ACT Aspire assesses students in the areas of English, science, and writing, but the scores from these areas were not used in this study.

Although academic achievement growth cannot be indicated based on this study, it can be seen that fifth-grade students educated in a middle school had a higher mean score in math ($M = 417.85$) in comparison to the mean math score ($M = 416.74$) of fifth-grade students educated in an elementary school. This may indicate fifth-grade students have greater academic achievement in a middle school instead of an elementary school in the area of math. Many factors may be attributed to this including school districts' freedom in choosing curricula for students. There may be different curricula used to instruct the students included in this study.

Although there was no statistical significance present when comparing fifth-grade students in two different grade span configurations, the mean reading score ($M = 417.78$) for fifth-grade students educated in an elementary school was less than half a point higher than the mean reading score ($M = 417.35$) of fifth-grade students educated in a middle school. This may indicate that fifth-grade students included in this study experienced slightly greater academic achievement in an elementary school. This may be attributed to students being allotted longer periods of time dedicated to reading instruction in an elementary school since classes are self-contained. This is a contrast to middle school where students only have a specific amount of time dedicated to each class period.

Many of the studies, or parts of studies, included in the review of the literature had findings that supported the null hypotheses presented: academic achievement is not affected by grade span configurations (Schmitt, 2004; Dove et al., 2010; Waters, 2016). Schmitt's (2004) three-year longitudinal study found that grade span configurations did not have an effect on middle level students in a Midwest state. Another study conducted by Dove, Pearson, and Hooper's (2010), researched the effect grade span configurations may have on the academic achievement of sixth-grade students in Arkansas. After the results were analyzed, it was noted that there was no statistical significance to indicate different grade span configurations effected academic achievement as measured by the state mandated summative examination (Dove et al., 2010).

In 2016, Waters' research study was conducted to determine the effects grade span configurations may have on sixth-grade students' academic achievement in Kansas. Waters (2016) measured academic achievement by comparing students' scores on the state mandated summative examination. Based on the data analysis, it was concluded that students' academic achievement in the area of math was not affected by grade span configurations (Waters, 2016).

However, there were studies included in the review of the literature that did not support the null hypotheses. Waters' (2016) study found statistical significance in the area of reading indicating students in sixth-grade experienced greater academic achievement when enrolled in an elementary school. Burkam et al. (2007) conducted a research study to determine whether kindergarten students' academic achievement is affected by different grade span configurations. The data provided indicated students who

attended a kindergarten prior to beginning school had an advantage over students who attended school without kindergarten (Burkam et al., 2007).

Implications for Practice

The results of this study show the potential effect(s) that grade span may have on the academic achievement of fifth-grade students in the western part of Arkansas. Based on the comparison of fifth-grade students' ACT Aspire scores in two different grade span configurations (elementary school vs. middle school) it can be determined that students placed in a middle school could experience greater success in academic achievement in the area of math. This can be seen with the statistical significance present when fifth-grade students' scaled scores were compared. One implication here would be for elementary schools to seek paths to increasing student academic achievement such as adopting different curricula or targeting specific needs for students who are not experiencing academic achievement as measure by the ACT Aspire summative examination. Contacting neighboring districts whose students who have achieved great academic achievement may help school officials in increasing elementary fifth-grade students' academic achievement in the area of math.

Another factor that may attribute to middle school fifth-grade students experiencing greater success in math is the delivery of instruction. In an elementary setting, teachers typically teach all subjects to a group of students. This creates more prep time for teachers and a diversion of focus from teachers. In a middle school, teachers generally focus on one or two subject areas in which they should be experts. They do not prepare lessons and instruct students in all subject areas, enabling teachers more

opportunities to sharpen their skills in these areas. This more focused instruction of math may attribute to the statistical significance seen in the area of math.

Based on the same independent *t*-test results, it can be determined that fifth-grade students placed in an elementary school do not experience greater or less academic achievement than fifth-grade students enrolled in a middle school. There was no statistical significance in the area of reading, determining grade span configuration did not have an effect on academic achievement in this area. An implication for this would be for both elementary schools and middle schools to continue with the same practices already in place.

Implications for Future Research

Similar studies to this one could be conducted to determine whether grade span configurations have an effect on students, academically and otherwise. One study would entail a researcher choosing a sample population with more diversity to better help the results be generalized to all areas of the state, not just the western part. The sample population used in this study had little diversity in many areas such as race and low-income rates. This sample was generalized to one area of the state with similar populations: a 70% or greater low-income rate. By choosing a sample population with more diversity, the researcher could also look at different sub-populations to determine if there are other factors among students that may affect academic achievement such as gender or race.

The researcher stated under Delimitations in Chapter 1 that there would be no means to control other factors that may affect grade span configurations such as (a) gender, (b) SES, (c) race, and (d) teacher professional development. This was due to the

lack of information regarding whether grade span configurations would have an effect on students' academic achievement. Now that the findings of this study have been presented, there is a suggestion that students' academic achievement is affected by grade span configurations. A similar study could be conducted by attempting to control these factors to determine if they are contributing to the effects that grade span configurations have on academic achievement. Taking a closer look at these factors may add to the body of knowledge in determining whether certain factors, in addition to fifth-graders' grade span configurations, may affect academic achievement.

True academic achievement growth could not be determined in this study based on the researcher only examining the effects that grade span configurations may have on fifth-grade students' scaled math and reading scores. Additional research could be conducted in a future study to examine effects caused by examining scores in all five areas assessed by the ACT Aspire summative examination. By considering all five areas, a future study could determine if there is true academic growth between elementary school fifth-graders and middle school fifth-graders. Results would potentially determine which grade span configuration would be best for fifth-grade students' overall academic achievement as measured by the ACT Aspire summative assessment.

Another consideration for a change to this study would be to use different dependent variables instead of ACT Aspire scaled scores in the areas of math and reading. Future research could be conducted using scaled scores in the areas of science, social studies, and English/language arts. Another option would be to use different summative examinations, such as the NWEA MAP assessment, as the dependent variable.

The MAP examination is designed to determine student performance, growth, and skills mastery to allow educators the opportunity to set goals for students (NWEA, 2020). NWEA sets target scores for students based on their current grade level and the time of year (fall, winter, or spring) in which a student is being administered the examination (NWEA, 2020). Future research could be conducted to determine whether grade span configuration effects students' academic achievement as measured by a different summative examination.

To accomplish this, the researcher would need to select schools with different grade span configurations, but all use the same summative examination for students. The ACT Aspire is the state mandated summative examination in Arkansas (Arkansas Department of Education, 2019b), so all schools have data regarding results of this assessment. Other summative assessments are chosen by school officials and administrators to best meet their students' needs, so research would need to be conducted to find schools using the same examinations.

This study only considered the academic aspect of fifth-grade students' school experiences that is affected by grade span configurations. An additional study could be conducted to determine whether grade span configurations affect fifth-grade students' social and emotional needs and mental health. By looking at a different aspect of fifth-grade students' school experiences, data can be collected and analyzed to take a look into non-academic influences in which grade span configurations may have on fifth-graders. This data could be collected through different means such as a Likert scale survey, observations, and interviews. A Likert scale survey includes a list of items for participants to rate their level of agreement from very strongly agree to very strongly

disagree (Joshi, Kale, Chandel, & Pal, 2015). Researchers could gather data from students and their experiences to determine this as well as experiences of teachers, administrators, and parents.

Conclusions

After reviewing all data and analyzing results, some conclusions may be drawn from this research study. There are statistical significances presented in this study that favor one grade span over another.

All students in both grade span configurations (elementary school vs. middle school) showed growth from fourth-grade to fifth-grade. It could be argued that fifth-grade students enrolled in an elementary school scored higher, on average, than fifth-grade students enrolled in a middle school. The mean score of elementary students included in this study was higher than middle school students. However, there was no statistical significance in the area of reading to indicate there is a noteworthy difference in mean scores.

From this study one could deduce that fifth-grade students would better benefit from being educated in a middle school. When comparing the two grade span configurations (elementary school vs. middle school) for fifth-grade students, the overall academic achievement in the area of math for middle school students is statistically significant when compared to elementary school students. Students in both grade span configurations increased in mean scores from fourth-grade to fifth-grade. However, the mean score for fifth-grade students enrolled in a middle school was over a point higher than students enrolled in an elementary school.

Choosing the best grade span configuration is one of many aspects of education that may have an effect on students' academic achievement. Although this study only provided information regarding grade span configurations, school officials should consider researching the other factors. One of these factors is fifth-grade students' social and emotional needs. Looking into students' abilities to handle educational situations may help aid school officials in determining the best way to increase students' success. Neglecting to address these needs may have an adverse effect on students' academic achievement.

Determining the best grade span configuration for students in Arkansas is placed in the hands of local school boards and school officials. This research study was conducted to add to the body of knowledge in assisting officials in making the best decision regarding fifth-grade students' grade span configurations to maximize academic achievement. The decision of proper grade span configurations should not be taken lightly. School boards and school officials should look at the population of students educated in their school districts to make the proper decision regarding grade span configuration and how it may affect students' academic achievement.

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APPENDICES

Appendix A



**Office of Sponsored Programs
and University Initiatives**
Administration Building, Room 207
1509 North Boulder Avenue
Russellville, Arkansas 72801

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

September 19, 2019

To Whom It May Concern:

The Arkansas Tech University Institutional Review Board Chair has deemed the IRB application for Sarah McPhate's proposed research, entitled "Comparison of Grade Span Configurations and Fifth-Grade Students' Academic Achievement" to be exempt under category 4. Research activities in which the only involvement of human subjects will be in one of more of the exempt categories defined by the federal regulations are given an exempt determination rather than IRB approval. Thus, no IRB approval number has been assigned to this study. The Chair approves for the researcher(s) to proceed with the study.

Please note that, in the event that any of the parameters of the study change, the researcher may be required to submit an amended IRB application.

Sincerely,

A handwritten signature in cursive script that reads "Gabriel L. Adkins".

Gabriel L. Adkins, Ph.D.
Institutional Review Board Chair
Arkansas Tech University