DIFFERENCES IN ACADEMIC ACHIEVEMENT BY GRADE SPAN CONFIGURATION: A TEXAS STATEWIDE STUDY

A Dissertation

Presented to

The Faculty of the Department of Educational Leadership

Sam Houston State University

In Partial Fulfillment

of the Requirements for the Degree of

Doctor of Education

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by

Carolyn F. Fiaschetti

August, 2016

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Carolyn F. Fiaschetti

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APPROVED:

_____
Dr. John R. Slate
Dissertation Chair

_____
Dr. George W. Moore
Committee Member

_____
Dr. Cynthia Martinez-Garcia
Committee Member

Approved:

_____
Dr. Stacey L. Edmonson
Dean, College of Education

DEDICATION

It is with great honor that I dedicate my dissertation to my husband, Michael Fiaschetti, and my daughters, Kyndall and Isabella Fiaschetti. These three individuals are my world and I am grateful to all of them for their love and dedication. The three of them have made numerous sacrifices throughout the three year long process and have frequently had to be independent as I spent time writing. Their selflessness and support was the only way that I was able to complete such a monumental task. I genuinely hope that through this process they realize that they can do anything in life that they desire long as they have a strong will, perseverance, and a loving support system.

I want to thank my family (Fiaschetti, Forbes, Smith, Forte, Jara), friends, and coworkers who supported me through a long distance word of encouragement, coverage of after school administrative duties, hours of proofreading, presence at my proposal, transporting of my children to various activities, and more! I thank them all for being such a generous group of family and friends! They all deserve more than a line in a dedication and I hope that they always know how much they were appreciated!

I thank Dr. Rees who continually shared with me the importance of "finish not famous," which kept me grounded throughout the doctoral program. He gave me numerous leadership opportunities in Montgomery ISD for which I will always be grateful. I thank Beth Klammer, Michele Salter, Linda Crews, Kristin Curtiss, Sonja Lopez, and Eddie Lopez who were my cheerleaders throughout this process and assisted me in so many ways! I thank my friends in Cohort 30 who experienced the writing process with me for their support! We made it!

ABSTRACT

Fiaschetti, Carolyn F., *Differences in academic achievement by grade span configuration: A Texas statewide study.* Doctor of Education (Educational Leadership), August 2016, Sam Houston State University, Huntsville, Texas.

Purpose

The purpose of this journal-ready dissertation was to examine the extent to which grade span configuration was related to the academic achievement of students in Grades 5 and 6. Specifically, the academic achievement of students in poverty, boys and girls, and students of three ethnic/racial groups (i.e., White, Black, and Hispanic) were examined. Specifically analyzed in these three investigations were the reading and mathematics achievement of these groups of students according to the grade span configuration of their school. The two grade span categories that were compared were a single or double grade level school (i.e., Grade 4-5, 5 only, or 5-6) and a multiple grade level school (i.e., PreK-Grade 6). Each of these three empirical investigations included three years of statewide public school data analyzed. This 3-year analysis of data permitted a determination of the extent to which trends were present in the relationship of grade span configuration with academic achievement of students in Grade 5 and 6 enrolled in Texas public schools.

Method

A causal-comparative research design was used for this study. Archival data were obtained from the Texas Education Agency for three school years (i.e., 2012-2013, 2013-2014, and 2014-2015). Specific information obtained for Grade 5 and 6 students in Texas was: State of Texas Assessments of Academic Readiness Reading and Mathematics passing rates; grade span configuration; economic status; and ethnic/racial

status. Student passing rates were analyzed as a function of grade span configuration by poverty, gender, and ethnic/racial status for Grade 5 and 6 students in Texas.

Findings

Statistically significant results were present for all reading analyses, with multi-grade level grade span configurations having statistically higher passing rates than single/double grade span configurations, and for all but two mathematics passing rates analyses. Higher passing rates were present for students in multi-grade level schools than their peers in single/double grade level schools. Results from this study were congruent with much of the recent empirical literature in that student academic performance is better in settings that have more grade levels than in settings with fewer grade levels. Implications for policy and recommendations for research were provided.

KEY WORDS: Grade span configuration, Academic achievement, Poverty, Gender, Ethnicity, White, Black, Hispanic, Grade 5, Grade 6

ACKNOWLEDGEMENTS

Completing the Doctoral Program in Educational Leadership (K-12) program from Sam Houston State University (SHSU) and earning a doctoral degree has been one of the biggest accomplishments I have ever achieved. The knowledge that I have gained in how to analyze programs, conduct research, complete statistical analyses, and write academically would not have been possible without the classroom instruction, organization, and dedicated instructors in the education department at SHSU. I will forever be grateful for the doors that this program allows to open in my life.

Words or deeds cannot express how grateful I am to my chair, Dr. John R. Slate. He has always been honest, supportive, thorough, and has been more than generous throughout the doctoral classwork and dissertation process. I have never met a person who is more organized, knowledgeable, prompt, driven, and detailed than Dr. Slate. He is one of the most encouraging leaders I have ever met. With his support I have published a chapter in a book; presented in Honolulu, Hawaii; and earned my doctoral degree. Dr. Slate has literally changed my life.

A very special thank you goes to Dr. George W. Moore and Dr. Cynthia Martinez-Garcia. Both of these leaders instructed me in my doctoral classwork and have read and edited hundreds of pages in order for me to complete the dissertation. I hope they know how much I appreciate the integral role they have played in my life and in the lives of those in the doctoral program at SHSU. Lastly, I would like to honor the leaders of Cohort 30. I thank them for their words of wisdom, the wealth of experiences they have shared, and their dedication to the students they serve.

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CHAPTER I

Introduction

Educators spend their professional careers continually seeking teaching methods that will support all learners regardless of their economic status, gender, or ethnicity/race (Hallermann & Larmer, 2011; Mendler, 2012; Schlechty, 2011; Seeley, 2009). Whereas the academic and social issues related to the academic success of students cannot be addressed by any one single strategy, grade span configuration may constitute an important factor for student success (Clark, Slate, Combs, & Moore, 2013). Grade span configuration, or the number of grades within a school setting, is an option that policymakers and school boards can and should consider in serving the academic needs of all students. The public education system in the United States has had a variety of grade span configurations including a one room school house in the mid-1800s, grades 1-8 and 9-12 in the early 1900s, and the introduction of the junior high schools in the mid-1900s (Clark, 2012; Dove, Pearson, & Hooper, 2010; Weiss & Kipnes, 2006). The debate about the single best configuration continues to face educational leaders today. Accordingly, the relationship of grade span configuration and student success must be evaluated to make decisions that will have the greatest educational benefit for students.

Background of the Study

The history of the public school system is filled with a variety of school transitions which were based on the needs of students who attended school and of the community. Clark et al. (2014) conducted a conceptual analysis of grade span configuration including a historical review of public education as it related to the various school settings. As public education began in the 1800s, rural schools primarily

contained all grade levels in one room, whereas, urban school administrators typically divided students into primary schools which housed grades one through eight and secondary schools which housed grades nine through 12 (Clark et al., 2014). Middle or junior high schools developed out of many emotional and societal expectations during the turn of the 20th century (Dove, 2007; Herman, 2004; Pardini, 2002; Schafer, 2010). One societal expectation and legal reason for this change included the fact that child labor laws were passed allowing children to stay in school for a longer period of time, which led to the overcrowding of primary schools. Additionally, a societal expectation for the change included the fact that adolescence was recognized as a period of time with specific needs, and a call was made for a more rigorous education to begin in the seventh grade for students to become prepared for college. Both components contributed to the division of students among primary and junior high schools.

Grade Span Configuration and Economic Status

The U.S. Census Bureau has collected income data for many years. From 1967 to 2013, the income gap between the bottom one fifth and the top one fifth of households has changed substantially. In 2013 dollar equivalents, the income gap between these two groups increased by $77, 531 since 1967 (DeNavas-Walt, Proctor, & Smith, 2013). Reardon (2013) reviewed reasons why this income gap had increased within the past 50 years and how that gap has affected the academic achievement of students in poverty. The economic scene in the United States began to change in the 1970s with minimal existence of manual and service jobs; therefore, the ownership of a college degree was essential in sustaining a family and obtaining financial success (Reardon, 2013). Moreover, children in high-income families are more likely to be raised by two parents

who spend as much as seven times more on their children's development and education than do parents of lower income families (Kornrich & Furstenberg, 2013). This variance in family spending results in an "income-achievement gap" (Reardon, 2013, p. 13) which occurs when students from higher income families perform at a higher level than do students from lower income families.

Researchers have recently analyzed the income-achievement gap in the state of Texas. Lee and Slate (2014) completed a statewide investigation on Grade 11 students in Texas who were economically disadvantaged and who took the 2012 Texas Assessment of Knowledge and Skills (TAKS) English Language Arts and Mathematics exit-level exams. The percentage of students who were economically disadvantaged who met the advanced standard on the test, Commended Performance, was statistically significantly lower in both reading and mathematics than the percentage of students who were not economically disadvantaged and who met the Commended Performance standard. Of note is that the students in their study who were living in or near poverty conditions comprised almost 43% of the sample (Lee & Slate, 2014). The achievement gaps may affect this group of students as they may not have the funds available to attend college, thus, compete for professional, higher-paying jobs.

Grade Span Configuration and Gender

Boys and girls differ in their academic performance (Chrisler & McCreary, 2010; Geary, 2010; Halpern, 2000). As boys proceed from primary grades through postsecondary education, they typically dominate the higher levels of mathematics and science leading to a greater percentage of males in the science, technology, engineering, and mathematics (STEM) fields (Lindberg, Hyde, Petersen, & Linn, 2010). Differences

in the interests and achievement of boys and girls has been referred to as a gender gap. This gender gap documented to be present in early elementary years also exists in professions, income levels, and academics. Wei, Liu, and Barnard-Brak (2015) investigated the gender gap in academic achievement for students in kindergarten through Grade 8, using a national longitudinal data set, the Early Childhood Longitudinal Study-Kindergarten Cohort. Boys demonstrated a faster rate of growth than girls in the area of mathematics from Kindergarten through Grade 8, whereas girls demonstrated a faster rate of growth than boys in reading during this time period.

Cornwell, Mustard, and Van Parys (2013) reviewed differences in reading and mathematics scores between boys and girls. They concurred that boys outperform girls in mathematics and science assessment scores, whereas girls outperform boys on teacher grades in mathematics and science. Cornwell et al. (2013) documented the boy/girl gap in reading was over 300% larger than the White/Black ethnicity gap. The gender gap in reading favoring girls was larger than corresponding Black and Hispanic ethnicity gap.

Additionally, Lindberg, Hyde, Petersen, and Linn (2010) conducted a meta-analysis in which they analyzed gender differences in mathematics performance between 1990 and 2007. The analysis included 242 studies with 441 samples representing 1,286,350 people. Lindberg et al. (2010) determined that the strongest predictors of mathematical performance included mother's education, quality of the home learning environment, and elementary school effectiveness. Gender had the smallest effect size as a predictor of mathematical performance.

Additional factors influence how boys and girls are rated in the classroom setting by their teachers including predetermined bias and gender related behaviors. Robinson-Cimpian, Lubienski, Ganley, and Copur-Oencturk (2014) determined that boys were rated higher than girls in proficiency in mathematics; however, teachers rated girls lower in proficiency in mathematics in comparison to boys who had similar performance and behavior. Differences between girls and boys were also present with respect to classroom behavior.

In regard to gender differences in grade reports, girls tend to have higher grades than boys (Duckworth & Seligman, 2006). Even though girls do not outperform boys on intelligence or achievement tests, girls show more self-discipline, which tends to promote greater success in the classroom setting (Duckworth & Seligman, 2006). Duckworth and Seligman (2006) completed a study on an ethnically diverse group of students in Grade 8 at magnet schools participating in the same coursework. Performing well in the classroom and earning higher grades require a greater sustained effort and self-discipline in which girls typically excel. Boys were able to perform well on achievement tests because the assessments required limited sustained concentration. Duckworth and Seligman (2006) noted that gender predicted self-discipline and self-discipline predicted overall grade point average.

Self-discipline and classroom behaviors affect classroom performance. Cornwell et al. (2013) noted that the inconsistency between assessment scores and classroom grades was largely due to noncognitive skills. "Girls are substantially more amenable to the learning process than boys, and that this noncognitive skill is a significant factor in teacher assessments" (Cornwell et al., 2013, p. 239). Noncognitive behaviors that affect

classroom performance are skills such as planning, ability to sustain attention, ability to follow rules, ability to control actions, and ability to remain task and goal oriented (Segal, 2008).

Another nonacademic component of the classroom that has contributed to the advantage of girls over boys includes their ability to form high-quality relationships with teachers. Although boys actually outperformed girls on standardized assessments of mathematics across elementary school, McCormick and O'Conner (2015) attributed the success of girls to their ability to form and maintain closer relationships with their teachers. Hughs, Wu, Kwok, Villarreal, and Johnson (2012) also documented that girls have closer relationships with their teachers than do boys. However, when girls had a conflictual relationship with a teacher, they experienced lower average levels of mathematics achievement than did boys with similar conflictual relationships with teachers (McCormick & O'Conner, 2015).

Additionally, the quality of teacher-student interaction plays a role in the academic achievement of students (Rimm-Kaufman, Baroody, Larsen, Curby, & Abry, 2015). Rimm-Kaufman et al. (2015) analyzed three different forms of data to evaluate the quality of the interactions with the teacher by gender for 387 Grade 5 students in 63 classrooms. Boys demonstrated a higher cognitive and emotional engagement in classrooms that had higher observed classroom organization, whereas girls demonstrated a lower social engagement. Additionally, the boys had higher social engagement in the classrooms that had higher instructional support (Rimm-Kaufman et al., 2015). The girls did exhibit higher levels of engagement for three of the five measured areas: observed behavioral engagement, student-reported cognitive engagement, and student-reported

social engagement. Statistically significant differences were present between boys and girls in self-reported emotional engagement and teacher reported behavioral engagement.

Many educators believe that students in Grade 5 do not need or have grown out of the need for relationships with their teachers. Rimm-Kaufman et al. (2015) shared the importance of "emotionally supportive interactions" (p. 182) between teachers and students even in the late elementary stages. Rather than gender differences, engagement was the factor that enabled the students to be more successful in the Grade 5 mathematics classroom. Reschly and Christenson (2012) stated that engagement is "the glue, or mediator that links important contexts- home, school, peers, and community- to students and, in turn, to outcomes of interest" (p. 3).

In their study regarding the presence of supportive adults and the level of school engagement, Woolley and Bowen (2007) commented that the students who had a self-report with higher presence of supportive adults had higher school engagement. "Such positive adult relationships appear to be most important for students who are at higher levels of risk, who are members of historically discriminated minority groups, and who are male" (Woolley & Bowen, 2007, p. 101). The concept of a strong relationship with adults was reiterated in the work of Bryk and Schneider (2003) and Croninger and Lee (2001) who shared trusting and supportive relationships among school staff have been linked to a student's belief that school is important and positive outcomes. Additionally, Reyes, Brackett, Rivers, White, and Salovey (2012) addressed student engagement in their study on the classroom's emotional climate and academic achievement. Reyes et al. (2012) documented that boys had lower grades and lower ratings of engagement than

girls. In conclusion, the classrooms that scored higher in the emotional climate had a higher rate of student engagement, thus, a higher level of academic performance.

The concept of student engagement and academic achievement has been analyzed and deemed important to the success of all students, regardless of gender. Hadjar, Krolak-Schwerdt, Priem, and Glock (2014) shared,

> School grades and transitions are linked to achievement and ability, they are indicative of a type of success in school that does not necessarily equate to aptitude… for the individual school students, it can be argued that such aspects of educational success are, in reality, even more important than actual ability. (p. 117)

One aspect of transition that plays an important role in the academic achievement of students is the configuration of schools. Kieffer (2013) reviewed the effects on the achievement of Grade 8 students in the area of reading and mathematics who continuously attending a K-8 school, as opposed to transitioning from an elementary to a middle school. Utilizing data from the National Center for Education Statistics, Kieffer (2013) examined academic and behavioral development between K-8 schools and middle schools (i.e., Grades 6-8, 7-8, or 7-9). Students who were enrolled in K-8 schools had higher Grade 8 reading scores than did their counterparts who were enrolled in middle schools. No statistically significant differences were present for the Grade 8 mathematics achievement scores.

Academic achievement and grade span configuration were addressed by Combs, Clark, Moore, Onwuegbuzie, Edmonson, and Slate, (2011) and Clark, Slate, Combs, and Moore (2013) in two recent investigations. In both studies the K-8 configuration was

compared to an alternate grade span (i.e., Grades 6-8 and Grades 5-6). In both investigations, statistically significant differences in reading and mathematics performance were present. Students had higher reading and mathematics scores in the K-8 setting than in the middle school setting.

Combs et al. (2011) reviewed the concept of communities of practice within the study on grade span configuration. Teachers have closer relationships in a K-8 setting and are able to discuss and solve issues, review teaching strategies, and remedy curriculum deficits. Students in a K-8 setting do not have to deal with the change in faculty, a different schedule, and an unfamiliar building layout. All of these factors may assist boys and girls in achieving their highest academic potential.

Additionally, Johnson, Jones, Simieou, Matthew, and Morgan (2012) conducted a study on grade span configuration in Texas. Johnson et al. (2012) analyzed archival data in regard to the science standardized assessment given in Texas as it related to grade span configuration for Grade 5 students in the elementary (PreK-5) and intermediate (5-6) settings. Grade 5 students in the elementary setting had passing scores which were 18% higher than their peers in the intermediate school settings. Their findings were consistent with the notion that Grade 5 students in the elementary setting with more grade levels performed at higher levels than their peers in the intermediate school settings.

Rockoff and Lockwood (2010) documented that students who enter middle schools fell behind their peers in K-8 schools and the disadvantage continued to increase over the course of the middle school years. Absence rates were higher for students in middle schools. Moreover, students believed that the middle schools had less academic rigor, less mature behavior of peers, were less safe, and provided a lower quality of

education than the K-8 or K-6 schools. Researchers and developmental psychologists have recorded changes in attitudes and motivation as students enter adolescence, changes that some individuals hypothesize are "exacerbated by middle-school curricula and practices" (Rockoff & Lockwood, 2010, p. 69).

Students in middle schools tend to have greater anxiety and lower academic achievement than students in the elementary setting. Cullen and Robles-Pina (2009) completed a literature review on numerous studies relating to grade span configuration. In their review, Cullen and Robles-Pina (2009) identified three primary concerns of students who transition from elementary to secondary school: friendship quality, student social concerns, and academic performance. In each study, academic performance was almost always affected by the transition to secondary school.

In an article on the revival of K-8 schools, Herman (2004) shared many concerns with the transition from elementary to middle schools and many benefits of the K-8 school setting. Transition concerns to the middle school setting included the academic demands are greater than elementary school, they tend to be larger than elementary schools, students have a wide variety of teachers in middle schools, students have to adapt to a new social situation, and behavioral standards are different (Herman, 2004). Advantages to the K-8 setting included an increased opportunity to develop relationships over a longer time period, parental involvement increased as more siblings were in one school, the middle school age students took on a role of mentorship to younger students, and a greater opportunity was present for teacher collaboration and internal accountability for children.

Grade Span Configuration and Ethnicity/Race

The issue of segregation, desegregation, equality, and success of all students regardless of ethnicity/race have been an ongoing theme since the onset of public education in the United States. In 1954 the U.S. Supreme Court unanimously ruled

> to separate them [African American school children] from others of similar age and qualifications solely due to their race generates a feeling of inferiority as their status in the community that may affect their hearts and minds in a way unlikely to ever be undone. (Brown versus the Board of Education of Topeka Kansas, 347 U.S. 483, 1954)

Even though this ruling was historical and was intended to integrate children of all ethnic/racial groups into public schools, Kozol (2010) contended that the segregation of public schools is currently at its highest levels since the 1960s.

Many reasons including social, educational, and financial exist to explain why students of different ethnic/racial groups still remain largely separate in public schools. Gandara and Aldana (2014) described how Hispanic students have a triple separation by ethnicity, poverty, and language. By the year 2011, English Language Learners have experienced the greatest impact of segregation with 90-100% of Hispanic students in minority schools with low income students (Gandara & Aldana, 2014). Farkas (2006) reviewed that families closer to the bottom of status hierarchies have weaker networks of social relationships, fewer resources for parenting, and an increased amount of negative stressors in their daily lives. Many stressors including living in poverty, being a single parent, parents' education, parents' home language, and social class are just a few items that contribute to the gap in performance among diverse ethnic/racial groups.

Utilizing demographic information of families who participated in the Early Childhood Longitudinal Study-Kindergarten, a nationally representative group of children who began kindergarten in 1998, Farkas (2006) analyzed several social and familial factors which can affect school readiness status. Black students had the highest rate of single parent families at 54%, followed by Hispanic students who had 27%, followed by White students who had 15%, and concluding with Asian students who had 10% of single parent families. These children only had one parent providing attention, interaction, instruction, monitoring, and financial resources devoted to their education. Additionally, Black and Hispanic children had the highest percentage living in poverty, 42% and 37% respectfully. This degree of economic disadvantage results in fewer available resources. Black families had an average of 39.6 children's books in their households and only 32.9% of Black families had a computer. Hispanic families had an average of 52.5 children's books in their households with 41.5% of Hispanic families owning a computer. In contrast, White families had an average of 93.1 children's books in their households with 65.7% of White families owning a household computer. Although owning books and computers is an imperfect measure of school readiness, discrepancies are clearly present in the number of resources available to children of different ethnic/racial groups. Overall, a "performance decrement" (Farkas, 2006, p. 24) is associated with the Black and Hispanic ethnicity/race, with an additional performance decrement of being a second language learner.

Davis-Kean and Jager (2014) utilized the same data set, the Early Childhood Longitudinal Study- Kindergarten, and investigated whether different profiles of reading and mathematics achievement were present within each ethnic/racial group. Davis-Kean

and Jager (2014) documented the presence of students from each ethnicity/race in the highest levels of academic achievement. White and Asian families had a higher percentage of students in the high achieving trajectory than Black and Hispanic families. Every ethnic/racial group had students performing below the population average, however, Black students had the highest percentage of all ethnic groups, 72%, performing below the population average. High performing Black students had scores that were 10 points lower than Hispanic and Asian students, and 20 points lower than White students, demonstrating the presence of an achievement gap among the highest performing students.

The gap among ethnic/racial groups continues to exist as students and their families prepare for high school completion and college entrance. Mangino (2012) reported that White students have less of a need for educational investments because they have many information opportunities available to them which allows for economic success including social networks, and high returns in economic and human capital investments. Mangino (2012) utilized data from the National Longitudinal Study of Adolescent Health and Adolescent Health and Academic Achievement to review ethnic/racial disparities among entering college students. Asian students had the highest percentage attending college, followed by White, Hispanic, and Black students. Hispanic and Black populations, or the "aspiring class" (Mangino, 2012, p. 565), rely on education to improve their standard of living, status, and prestige.

The federal government has attempted to address the academic performance of all students and reduce gaps by implementing a federal law, the No Child Left Behind Act in 2002. The No Child Left Behind Act was designed to hold all schools accountable for

poor students via high stakes testing, introducing competitive choices to opt out of struggling schools, and increasing family involvement (Grogan-Kaylor & Woolley, 2010). Grogan-Kaylor and Woolley (2010) commented that the No Child Left Behind Act has not concentrated efforts on considering societal factors that affect the academic achievement of Black, Hispanic, and students in poverty including parenting styles, neighborhood conditions, school social climate, family economic status, and the school funding system. A school funding system based on property wealth has encouraged the further separation of students based on their economic wealth. Kozol (2005) identified that property value funding leads Hispanic and Black students to experience (a) lower paid teachers, (b) higher teacher-student ratios, (c) older teaching materials, (d) fewer extracurricular activities, (e) poorly maintained school buildings, and (f) less access to critical social services such as nurses and social workers.

An important concept for students of all ethnic/racial groups that may assist in overcoming the deficits they face is the value of school connectedness and parental involvement. School connectedness and school engagement and their effect on academic achievement are concepts that have been investigated by educators and psychologists alike (Benner, Graham, & Mistry, 2008; Carolan & Chesky, 2012). In an examination of the effects of family and school characteristics on school achievement, Benner et al. (2008) utilized a large multiethnic, urban sample of Grade 9 students to determine various ecological structures that have an impact on student academic performance. Student records, family climate, school climate, school belonging, and school interracial surveys were all utilized in this investigation. Benner et al. (2008) shared that differences in ethnicities arose on the items related to school size. Hispanic and Black students

reported that the increased school size was associated with negative perceptions of the academic climate and school achievement level. Additionally, Hispanic and Black families faced hardships that limited school involvement: (a) most were immigrants and spoke a language other than English at home, (b) many had jobs with inflexible hours and/or had multiple jobs, and (c) financial constraints created challenges of transportation to the school. Benner et al. (2008) contended "finding ways to better connect families to schools is imperative for the educational success of these youth" (p. 851).

Numerous avenues exist to encourage parental involvement, school connectedness, and the academic achievement of students of all ethnic/racial groups. One such avenue is the grade span configuration of schools. The breadth of the grades included in a school building can support or depress the social and academic achievement of students in school and encourage or discourage parental involvement.

Abella (2005) investigated the effects of various grade span configurations on the academic performance, discipline, and attendance of students in Grade 6 in K-8 school settings and Grades 6-8 (middle) school settings by administering surveys to parents, teachers, and principals. The majority of the participants were on free or reduced lunch in both settings. In the K-8 setting, the student sample group consisted of 85% Hispanic and the middle school (comparison school) was 78% Hispanic. Abella (2005) analyzed scores in reading and mathematics, attendance rates, and discipline consequences for three years (during the students' sixth, seventh, and eighth grade school years). For each year, students in the K-8 school setting outperformed students in middle school in reading comprehension and mathematics. By Grade 9, both groups of students scored similarly in reading comprehension and mathematics. Additionally, the attendance rate was higher

in the K-8 setting for all years analyzed than in the middle school setting. In regard to discipline consequences, the out-of-school suspension rate was statistically significantly different in the seventh grade year, less than two days of suspensions in K-8 versus seven days of suspension in the 6-8 configuration. By the eighth grade, suspension rates were similar.

In contrast, Wilson and Slate (2014) investigated Grade 6 Hispanic and Black students' academic achievement based on their school's grade span configuration. Hispanic students who were enrolled in Texas middle schools had statistically significant higher mathematics passing rates, 78.43%, than did the Hispanic students enrolled in K-8 schools, 72.17%. Wilson and Slate (2014) commented that their results were contrary to current literature on grade span configuration and academic achievement. As such, they recommended that future researchers analyze individual student level data, rather than the aggregated school level data they analyzed.

The Carnegie Council on Adolescent Development (1989) reported "a volatile mismatch exists between the organization and curriculum of middle grades schools, and the intellectual, emotional, and interpersonal needs of young adolescents" (pp. 8-9). Mizell (2005) shared that a critical requirement for a successful academic outcome for middle school students is a more personalized setting where students are in contact with adults who know them well and provide academic and emotional support. Personalized settings will be more available in smaller elementary configurations versus larger middle school settings. Anderman (2003) also commented that the longer middle school students remained in the Grade 6-8 configuration, their sense of acceptance and school connectedness decreased.

Benner et al. (2008) contended that in the school microsystem, educators need to implement interventions that increase students' feelings of belonging and connectedness which positively influences academic achievement. In the family microsystem level, schools need to intervene to encourage greater levels of parent involvement which is directly related to increased academic performance- higher grades, increased achievement test scores, and increased rating of students' academic attitudes (Benner et al., 2008). Benner et al. (2008) examined relations among family and school characteristics, family and school processes, student school engagement, and academic performance. Benner et al. (2008) clarified that students' engagement in school influences their feelings of belonging, thus, influences their families' involvement in their child's academics. School configurations, relationships with staff, less transitions/adjustments made by students, and the involvement of the parental community are main reasons why a larger grade span configuration may increase the academic performance of students. Abella (2005) noted, "educators and researchers also believe that the beneficial effects of K-8 schools can be attributed to smaller student populations at the schools and to staff being more familiar with students and their parents" (p. 29). The greater the grade span in the school setting, the greater the preponderance of relationship building and feelings of school connectedness for individual students and their families.

Poverty affects the academic success of students. Coley and Baker (2013) reviewed data on the effects of poverty from 2-year olds to the relationships between the SAT critical reading scores and family income. At the age of 2 and 4 years old, differences in achievement existed between children living in poverty and children of average income in regard to listening comprehension, expressive vocabulary, letter

recognition, and identification of numbers and shapes (Coley & Baker, 2013). Children in poverty scored 10 to 27 percentage points below their peers not living in poverty. Coley and Baker (2013) documented that fourth grade and eighth grade students who were eligible for free lunch scored the lowest in the National Assessment of Educational Progress reading assessment as compared to students who were eligible for reduced priced meals and to students who were not eligible for any financial support. Finally, Coley and Baker (2013) reported the College Board statistics (2012) that as family income increased, the scores on the critical reading section of the SAT increased simultaneously.

Students who are economically disadvantaged do not achieve at the same rate as their peers who do not qualify for free or reduced-priced meals under the National School Lunch and Child Nutrition Program. The Texas Education Agency reviewed data in their 2009 annual report on the academic performance of students who were economically disadvantaged. The Texas Education Agency (2010) reported that 57% of the third grade students who took the English version of the TAKS test were economically disadvantaged. For all 27 TAKS subject area tests administered in Grades 3-11 in 2009, students who were economically disadvantaged scored two to 13 percentage points below their peers in every subject area.

Statement of the Problem

Former Secretary of Education, Margaret Spellings, stated that "No Child Left Behind is about a commitment to all children, and of course, it's one that we absolutely must honor if we're going to continue to thrive as the great nation that we are" (United States Department of Education, 2005, p. 1). The objectives of the No Child Left Behind Act are focused on increased accountability and academic achievement for all students. The importance of academic success for all student groups (e.g., economic disadvantaged, ethnicity/race) in all settings has gained and continues to have national recognition (Reyes, 2008). This focus is extremely important due to the fact that by 2042, the population of the United States will become more ethnically/racially diverse with the population of minorities (everyone other than non-Hispanic White) becoming the majority (U.S. Census Bureau, 2010). Black and Hispanic children are being raised in families with fewer resources and in a higher percentage of single parent families than are White and Asian children. As such, Black and Hispanic families typically experience more negative stressors than do White and Asian families. These stressors have assisted in creating large reading, mathematics, and behavioral readiness gaps during preschool years (Farkas, 2006).

School district leaders have investigated many methods to improve teaching and learning that have included curriculum changes, implementation of various intervention programs, and variations in class size. Another method district leaders can take to support student success for individuals and across subgroups, gender, and ethnicity/race is the grade span configuration of local school settings (Combs et al., 2011; Fiaschetti & Slate, 2015). The concept of grade span configuration has been extensively reviewed by

educators and researchers in regard to the most appropriate social, emotional, and academically sound placement for students in the middle grades, particularly students in Grades 5 and 6 (Clark et al., 2013; Combs et al., 2011; Dove, 2007; Fiaschetti & Slate, 2015; Johnson, Jones, Simieou, Matthew, & Morgan, 2012; Meyer, 2014; Renchler, 2002; Rockoff & Lockwood, 2010; Wren, 2003).

The concept that has not been addressed in depth in the research literature is the effect of grade span configuration on the academic achievement of students in poverty, by gender, or by ethnicity/race. Particularly not well examined in the extant literature is a comparison of the academic performance of students in poverty, by gender, and by ethnicity/race as a function of grade span configurations of single or double grade levels in comparison to the typical elementary school setting (K-5). As early as the late 1990s, researchers (Cunningham & Stanovich, 1997) confirmed that reading ability in the first grade was a strong predictor of reading success in the eleventh grade, even when measures of cognitive ability were ruled out. The importance of elementary curriculum, the efficacy of instruction, and the consistency of relationships are paramount in the future success of all students.

School boards are making decisions about the makeup of their schools and grade levels therein to meet the demands and rigor of the No Child Left Behind Act expectations without sufficient research. The number of transitions students make in moving from one school to another may influence, negatively, student academic performance. As such, the academic performance of students in a single or double grade level school may be lower than the academic performance of students who remain in a K-5 setting. Additionally, this research investigation will be in an area of need at the state

level due to the fact that most decisions regarding school policies and procedures are made at the state and local level (Howley, 2002).

Purpose of the Study

The purpose of this journal-ready dissertation was to examine the extent to which grade span configuration was related to the academic achievement of students in Grades 5 and 6. Specifically, the academic achievement of students in poverty, boys and girls, and students of three ethnic/racial groups (i.e., White, Black, and Hispanic) were examined. Specifically analyzed in these three investigations were the reading and mathematics achievement of these groups of students according to the grade span configuration of their school. The two grade span categories that were compared were a single or double grade level school (i.e., Grade 4-5, 5 only, or 5-6) and a multiple grade level school (i.e., PreK-Grade 6).

Significance of the Study

As a result of the three studies in this journal-ready dissertation, key information was obtained on the relationship of grade span configuration and academic achievement for three groups: students by economic status, by gender, and by ethnicity/race (i.e., White, Black and Hispanic). The information that was gathered will assist policymakers and educational leaders on the effect of grade span configuration and academic achievement. Policymakers and educational leaders will be able to utilize the findings of all research studies to determine the grade span configuration that works best for their school districts. The findings of this study will have practical application for local school districts because grade span configurations constitute an important topic with respect to improving student academic success.

Theoretical Framework

The theoretical framework most closely linked to grade span configuration is the concept of school connectedness. Klem and Connell (2004) contended that students need to know that teachers know and care about them. With the existence of supportive and caring interpersonal relationships, students are more satisfied, have a positive attitude, and are engaged academically. Klem and Connell (2004) developed the Self-System Process Model where he described the paths among "individual's experience of the social context, their self-system processes, their patterns of action, and actual outcomes of performance" (Klem & Connell, 2004, p. 263). Klem and Connell (2004) implemented the Self-System Process Model and analyzed the results using longitudinal data from the Research Assessment Package for Schools. According to the teachers in the study, students at the elementary level who were highly engaged were twice as likely to have high scores on the performance and attendance index than their peers who were not highly engaged (Klem & Connell, 2004). Similarly, students in middle schools who were highly engaged were 75% more likely to do well on the attendance and performance index than their counterparts who were not highly engaged (Klem & Connell, 2004). Klem and Connell (2004) contended that higher student engagement, higher attendance, and higher academic scores could result through the creation of a more personalized educational environment.

Researchers (e.g., Furrer & Skinner, 2003; Goodenow, 1992; Hamre & Pianta, 2005) have documented that students who feel socially connected to peers and teachers have increased motivation in school, motivation that may last for many months and years. Walton and Cohen (2011) reviewed effective strategies that enhance a student's sense of

social connectedness may raise their motivation and achievement. Asch (1952) wrote, "To be in a social relation, it is necessary to stand on common ground with others and to face daily conditions with shared understanding and purpose" (p. 576). This social connectedness is more likely to occur in a setting with an increased number of grade levels. Students will then be able to form lasting relationships with peers, staff members, and administration which should increase motivation and academic performance.

Definition of Terms

Terms that were important to the three research studies conducted in this journal-ready dissertation are defined below.

AskTED

The Ask Texas Education Directory has a comprehensive listing of all of the schools, districts, and education service centers in the state of Texas listed by their name, county, or region. Additionally, personnel files from all schools in the state of Texas are available including school board members, district staff, and education service center staff. Information on each school district is available from 1999-2016 (Texas Education Agency, 2016c).

Black

Texas Education Agency defines Black or African American as "students having origins in any of the black racial groups of Africa" (Texas Education Agency, 2013a, p. 2).

Economic Disadvantage

This term is used when referring to students who are identified by school districts as having a disadvantage as outlined by federal guidelines. Economic disadvantage

exists when students are eligible for free or reduced-price meals under the National School Lunch and Child Nutrition Program. Additional economic disadvantage:

a) from a family with an annual income at or below the official federal poverty line, b) eligible for Temporary Assistance to Needy Families (TANF) or other public assistance, c) received a Pell Grant or comparable state program of need-based financial assistance, d) eligible for programs assisted under the Title of the Job Training Partnership Act (JTPA), or e) eligible for benefits under the Food Stamp Act of 1977. (Texas Education Agency, 2014, p. 4.117)

Ethnicity

The Texas Education Agency (2013a) has defined ethnicity as students in Texas either being classified as American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; Hispanic; or White, not of Hispanic origin.

Grade Span Configuration

Grade span configuration describes the organization of a school building, specifically, how many and which grades are included within a single school (Burkam, Michaels, & Lee, 2007). Two types of grade span configurations used in this study were multi-grade level span (i.e., Prekindergarten through Grade 6) and single/double grade level span (i.e., Grade 4-5, 5 only, or 5-6).

Hispanic

The Texas Education Agency defines Hispanic/Latino as “students of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race” (Texas Education Agency, 2013a, p. 2).

State of Texas Assessments of Academic Readiness (STAAR)

The Texas Education Agency initiated an assessment that incorporated grade level skills at a greater depth than had been previously assessed called STAAR. The annual assessments began in spring 2012 and are assessed for Reading and Mathematics in Grades 3-8, Writing at Grades 4 and 7, Science at Grades 5 and 8, Social Studies at Grade 8, and End-of-Course assessments for English I, English II, Algebra I, Biology, and U.S. History (Texas Education Agency, 2016a).

Texas Academic Performance Reports (TAPR)

In the state of Texas, school district information is included in an annual report which is published by the Texas Education Agency called the Texas Academic Performance Report (TAPR). "The Texas Academic Performance Reports (TAPR) combine details of district and campus academic performance with financial reports and information about staff, programs, and demographics" (Texas Education Agency, 2016b, para. 1). Prior to 2012-2013, the TAPR was known as the Academic Excellence Indicator System reports.

Texas Education Agency

A. M. Aikin Jr. sponsored the 1949 Gilmer-Aikin Law in which he and the committee required the State Department of Education be transformed into the Texas Education Agency.

> The Texas Education Agency is the state agency that oversees primary and secondary public education. It is headed by the commissioner of education. The mission of TEA is to provide leadership, guidance and resources to help schools

meet the educational needs of all students. (Texas Education Agency, 2015b, para. 1)

White

The Texas Education Agency defines White students as "having origins in any of the original peoples of Europe, the Middle East, or North Africa" (Texas Education Agency, 2013a, p. 2).

Delimitations

The delimitations of this study involved examining the extent to which the grade span configuration of schools was related to the academic performance of students who were economically disadvantaged, by gender, and by ethnicity/race (i.e., White, Black, and Hispanic) in all public schools in the state of Texas. Measures of student academic achievement were based on the reading and mathematics achievement as measured by the state-mandated assessment, STAAR, for students in Grades 5 and 6. Finally, this study involved three years of data: 2012-2013 through the 2014-2015 school year.

Limitations

For the purposes of this journal-ready dissertation, achievement scores from the state-mandated assessment were analyzed for students in Texas by their economic status, by gender, and by ethnicity/race (i.e., White, Black, and Hispanic) in Grades 5 and 6. As such, one threat to the internal reliability of the data obtained could have been evaluation anxiety, whereas, the anxiety may affect scores versus the students' true potential (Onwuegbuzie, 2003). Additionally, the independent variable (i.e., grade span configuration of schools) and the dependent variables (i.e., reading and mathematics achievement) were not controlled due to the causal-comparative nature of the study

(Johnson & Christenson, 2012). As directed by the Texas State Board of Education, the state of Texas implemented new Texas Essential Knowledge and Skills (TEKS), or curriculum standards, in mathematics and incorporated them in the STAAR mathematics assessments during the 2014-2015 school year. The state of Texas did not report student scores because new performance standards for the redesigned STAAR Mathematics assessment in Grades 3-8 had to be established (Texas Education Agency, 2013b).

Assumptions

For the purpose of this journal-ready dissertation, the assumption was made that the achievement and demographic data were reported accurately to the Texas Academic Performance Report system. Additionally, the consistency in which Texas schools collect and report student data was assumed to be accurate and comparable across the state. Finally, the validity and consistency in with the STAAR Reading and Mathematics scores were collected and shared in regard to the rules and regulations of the Texas Education Agency were assumed to be accurate.

Organization of the Study

In this investigation, three research studies were completed. In the first journal-ready dissertation article, the research questions that were addressed were on the relationship of grade span configuration with academic achievement (i.e., reading and mathematics) of Grade 5 and 6 students who were economically disadvantaged for the 2012-2013 through the 2014-2015 school years. In the second journal-ready article, the research questions that were addressed were on the relationship of grade span configuration with academic achievement (i.e., reading and mathematics) for Grade 5 and 6 boys and girls for the 2012-2013 through the 2014-2015 school years. For the third

journal-ready dissertation article, the research questions that were addressed involved the relationship of grade span configuration on academic achievement (i.e., reading and mathematics) for three ethnic/racial groups (i.e., White, Black, and Hispanic) for Grade 5 and 6 students for the 2012-2013 through the 2014-2015 school years.

Differences in the three research articles were the groups of students about which data were analyzed. In the first study, data were analyzed by student poverty. In the second investigation, student gender constituted the demographic characteristic of interest. In the third study, data were analyzed by student ethnicity/race (i.e., White, Black, and Hispanic). In all three investigations, the independent variable was the grade span configuration grouping and the dependent variables were student reading and mathematics test scores.

In this journal-ready dissertation, five chapters are included. In Chapter I, the background of the study, statement of the problem, purpose of the study, significance of the study, definition of terms, theoretical framework, delimitations, limitations, assumptions and outline of the journal-ready dissertation are present. In Chapter II, the academic achievement of students in poverty was examined by grade span configuration grouping. In Chapter III, the academic achievement of boys and girls within the two grade span configurations was addressed. In Chapter IV, the academic achievement of White, Black, and Hispanic students by grade span configuration grouping was analyzed. In Chapter V, discussion on the analysis of data and importance of findings are present.

CHAPTER II

DIFFERENCES IN ACADEMIC PERFORMANCE AS A FUNCTION OF GRADE SPAN CONFIGURATION FOR STUDENTS IN POVERTY

This dissertation follows the style and format of *Research in the Schools (RITS)*.

Abstract

In this investigation, the degree to which passing rates on the STAAR Reading and Mathematics assessments of Grade 5 and 6 students in poverty in the state of Texas differed as a function of grade span configuration was examined. Data were obtained from the Texas Education Agency for all Grade 5 and 6 students in poverty who were enrolled in single/double grade level (i.e., Grades 4-5, 5 only, or Grades 5-6) or in multi-grade level (i.e., PreK-6) grade span configurations for the 2012-2013 through the 2014-2015 school years. Inferential analyses revealed the presence of statistically significant differences in reading and mathematics passing rates between the two grade span configurations. Grade 5 and Grade 6 students in poverty had statistically significantly higher reading and mathematics passing rates in multi-grade level schools than in single/double grade level schools. Implications for policy and practice are provided.

Keywords: Grade span configuration, Academic achievement, Poverty, Grade 5, Grade 6

DIFFERENCES IN ACADEMIC PERFORMANCE AS A FUNCTION OF GRADE SPAN CONFIGURATION FOR STUDENTS IN POVERTY

Student academic achievement, from toddlers through college-bound students, differs by income and poverty status (Coley & Baker, 2013). Coley and Baker (2013) utilized data from the Early Childhood Longitudinal Study Birth Cohort from 2009, and described the relationship between cognitive skills and poverty. In the area of Listening Comprehension, 39% of the 2-year olds who were at or above the poverty line scored proficient, whereas only 29% of the 2-year olds in poverty scored proficient. The 2-year olds scored similarly for the Expressive Vocabulary assessment: 67% who were at or above the poverty line scored proficient, whereas only 55% of the 2-year olds in poverty scored proficient. A similar relationship existed between poverty and achievement patterns for 4-year olds. In the area of Letter Recognition, 37% of the children at or above poverty scored in the proficient range, whereas only 20% of the 4-year olds in poverty scored proficient. A difference was present in the area of Numbers and Shapes. The 4-year olds at or above the poverty range scored 72% proficient, whereas less than one half, 45%, of the 4-year olds in poverty were proficient.

Poor academic performance by children in poverty continues into the elementary, middle, and high school years. Coley and Baker (2013) reported on the progress measure in reading for students in Grades 4 and 8 who took the National Assessment of Educational Progress. Students in Grade 4 who were eligible for free lunch under the national lunch program had an average scale score of 206, whereas students who were not eligible for free lunch had an average scale sore of 235. The difference in average scale scores for the students in Grade 8 were similar to Grade 4. Students in Grade 8 who

were eligible for free lunch had an average scale score of 250, whereas students who were not eligible had an average scale score of 275. Additionally, Coley and Baker (2013) compiled statistics from the College Board (2012) for SAT reading scores and family income from college bound seniors. Seniors who took the SAT and were from the lowest levels of family income (i.e., less than $20,000/year) scored over 100 points lower than those students from the highest levels of income (i.e., greater than $200,000/year). The relationship between the SAT Critical Reading score and family income had a strong relationship.

Reardon (2013) explained that family income, not ethnicity/race, is more suggestive of educational success in the United States today. As such, this relationship represents a change from the 1950s and 1960s. DeNavas-Walt, Proctor, and Smith (2013) determined that the real median household income in 2012 ($51,017) was 8.0% lower than in 2007 ($55,627) and 9.0% lower than the median household in 1999 ($56,090). The official poverty rate in 2013 was 14.5% or 45.3 million people living in poverty (DeNavas-Walt et al., 2013). Children represented 23.5% of the total population and 32.3% of the people in poverty (about one in five children ages six and under were in poverty in 2013). Finally, more than one-half (55%) of the children ages six and under were in poverty if they were being raised by a female head of house. This statistic was five times more (i.e., 10.2%) than if children ages six and under were being raised by married couples (DeNavas-Walt et al., 2013). Abramsky (2013) stated that with the exception of Romania, the United States had the highest percentage of children living in poverty than any developed country. Of importance for this investigation is that poverty

influences the educational opportunities available to children and the educational outcomes they are likely to achieve (Coley & Baker, 2013).

The economic means of a family have a profound effect on the success of a student in school. Burney and Beilke (2008) noted, "to gain the rigorous academic preparation needed for success, a student must have the opportunity and background preparation to do well, which is often absent in low-income households" (p. 302). Clotfelter, Ladd, and Vigdor (2011) documented the lack of opportunities and background preparation that families in poverty have to face including poor health, limited access to quality preschools, limited summer and after school programs, more movement in and out of schools, and teachers with lower credentials. These examples are all issues with which families in poverty struggle to support their children's education.

Abbott and Joireman (2001), in an analysis of school achievement by ethnicity/race and income levels, documented that income levels have a greater effect on academic achievement than ethnicity/race. Students from high poverty family environments typically have (a) less exposure to parents who model reading, (b) fewer books in their home, (c) few interactions with technology, and (d) differing patterns of interactive reading and conversation within the family unit than students with families of higher education levels (Chatterji, 2006). Moreover, students in poverty may not have the financial means to participate in school-related activities directly correlated to higher achievement (Eccles, Barber, Stone, & Hunt, 2003).

The National Center for Education Statistics gathered data on economic disadvantage and academic achievement. In 2011 Grade 4 and Grade 8 students who

were economically disadvantaged had lower reading and mathematics scores than students who were not economically disadvantaged. The mean difference for the scale score in Grade 4 mathematics between the two groups was 23 percentage points, and the mean difference for Grade 4 reading between the two groups was 27 percentage points. Similarly, the mean difference between the Grade 8 scores of students who were economically disadvantaged and students who were not economically disadvantaged in mathematics was 26 percentage points and 24 percentage points in the area of reading. Presented in the 2009 Comprehensive Annual Report for the Texas Education Agency Grade 10 students who were economically disadvantaged passed the Texas Assessment of Knowledge and Skills (TAKS) Mathematics assessment and the Algebra I assessment at a rate of 44% which was 17% points lower than those students who were not economically disadvantaged who scored 61%. Students who were economically disadvantaged scored 21 percentage points lower (51%) than those students who were not economically disadvantaged (72%) in Geometry (Texas Education Agency, 2010).

Numerous authors (e.g., Abbott & Joireman, 2001; Burney & Beilke, 2008; Chatterji, 2006) have documented that students in poverty come to school with deficits that affect their academic achievement. In addition to deficits, students and families in poverty are subject to inaccurate stereotypes; ones that Gorski (2012) rebutted with facts and figures. For example, the stereotype that poor people are lazy was invalidated with the fact that many poor people work over 2,500 hours per year-equivalent to 1.2 full time jobs. These positions require the most intense manual labor and have virtually no benefits (Gorski, 2012). The idea that poor people do not value education was expounded upon with the concept that class specific barriers that inhibit school

involvement included the ability to afford to take off from wage work, the ability to afford child care, and the ability to afford public transportation (Gorski, 2012). "Stereotypes can misdirect efforts to implement effective policies for eliminating socioeconomic inequities in schools" (Gorski, 2012, p. 313).

Under the mandates of the No Child Left Behind Act (2002), educators are held responsible for the academic success of all students. As such, the academic achievement of students who are economically disadvantaged, as well as the academic achievement of students who are not economically disadvantaged, is salient for educational leaders. One school characteristic, relevant to this article and to student achievement, is grade span configuration of schools. Renchler (2002) contended that grade span configuration may have a tremendous influence on student success; however, only a few research studies have been conducted in this area.

In one such investigation, Wren (2003) compared the academic achievement of Grade 6, 7, and 8 students in middle schools and K-8 public schools and determined that students had higher academic achievement test scores in the K-8 setting than in the middle school settings. Clark (2012) established that students who were enrolled in K-8 schools had a higher passing rate on state assessments than students enrolled in middle schools. In her study of the most effective grade span configuration for Grade 5 students in meeting the benchmark standards of the No Child Left Behind Act, Comer (2006) determined that the elementary school configuration had the highest percentage of students meeting the academic standards. Of interest is that the grade span configuration that had the least educational benefit was the K-12 grade span schools. With reference to Texas, the state of interest in this investigation, Clark et al. (2013) analyzed the extent to

which differences were present in reading and mathematics performance on state assessments of students in K-8 schools versus middle schools for five school years. For all five years, students who were enrolled in a K-8 grade span configuration had higher passing rates in reading and mathematics than their counterparts who were enrolled in a 6-8 grade span configuration. As the number of grade levels increase in a school setting (i.e., a greater span of grades within a school setting), the academic achievement of students increases simultaneously (Wren, 2003).

Rockoff and Lockwood (2010), in an analysis of data on students who transitioned from an elementary school to a middle school, documented the presence of a 0.15 standard deviation decrease in reading and mathematics performance after the transition occurred. They contended that when students are combined from additional elementary settings into one large cohort in the middle school many issues can arise. Middle school students can be difficult to educate due to low self-esteem, increasing negativity, and an increased inability to judge risks and consequences of their actions (Rockoff & Lockwood, 2010).

In a recent investigation about grade span configuration and academic achievement of middle level students, Meyer (2014) analyzed the academic achievement of Grade 5 students in Texas on the statewide assessments in reading, mathematics, and science during the 2006-2011 school years. After analyzing every possible grade span configuration, Meyer (2014) documented that Grade 5 students in a K-5 or K-6 grade span configuration outperformed Grade 5 students in any other grade span settings. The lowest academic performance was obtained by students who were enrolled in an EE-12 grade setting. In an additional layer of the study, Meyer (2014) reviewed the effects of

economic status on the academic achievement of fifth graders. Grade 5 students who were not economically disadvantaged had a higher passing rate for every subject area on the statewide examinations. Students receiving reduced prices in lunch had the next highest passing rates, and the lowest passing rates came from the students receiving free lunch. In every case the difference between the highest passing rates and lowest passing rates was a difference of 20% points or more (Meyer, 2014).

An even more recent study completed on Texas Grade 5 and 6 students in poverty was conducted by Fiaschetti and Slate (2015). They analyzed the academic achievement of Grade 5 and Grade 6 students on the Texas statewide assessment, in the areas of reading and mathematics. Students were grouped according to the grade span configuration of their school, either PreK-5/6 or single/double grade level configurations (i.e., Grades 4-5, 5 only, or 5-6). Statistically significant differences were present in the reading scores of students who were economically disadvantaged in the multilevel grade span versus the single/double grade span configuration. Reading scores for students in Grades 5 and 6 were almost 2% higher in the multilevel schools than in the single or double grade level schools.

Within the last 15 years, researchers (e.g., Dove, 2007; Howley, 2002; Weiss & Kipnes, 2006) have completed studies in which they concluded transitions and grade span configurations were not the primary reasons for student success in school. Dove (2007) examined the mathematics and literacy achievement of three different groups of students in Grade 6 dependent upon their transitions (i.e., grade span) over a 3-year time period. Dove (2007) noted that grade span configuration alone did not account for negative achievement scores in the middle grades on the Arkansas Benchmark Examination. Huss

(2004) completed a descriptive study about the perceptions on middle schools including their organization, grade span, teacher licensure, and curriculum studies, based on the responses of middle level teachers in elementary, middle, and junior high settings. Huss (2004) determined that no matter what grade span configuration, teachers who teach middle grades have attempted to meet the specific needs of adolescent students in terms of the middle school philosophy including a "shared vision, educators committed to young adults, positive school climate, and an adult advocate for every child, family and community partnerships, high expectations for all students, buttressed by an integrative, exploratory curriculum" (p. 1).

In research studies on grade span configuration, including investigations involving students who were economically disadvantaged, no conclusive evidence exists that grade span configuration is the key to academic achievement. Researchers must continue to analyze this topic and add to the body of research on the effects of grade span configuration on the academic achievement of students in poverty. It is imperative that researchers continue to support this population in providing every opportunity available for them to achieve academic success.

Statement of the Problem

Former Secretary of Education, Margaret Spellings, stated that "No Child Left Behind is about a commitment to all children, and of course, it's one that we absolutely must honor if we're going to continue to thrive as the great nation that we are" (USDE, 2005, p. 1). The objectives of the No Child Left Behind Act are focused on increased accountability and academic achievement for all students. The importance of academic success for all student groups in all settings is getting national recognition (Reyes, 2008).

The No Child Left Behind Act has been a stimulus in intervening with students who are not making progress (individually and across subgroups) and has improved teaching and learning (Jorgenson, 2012). School district leaders have investigated many methods to improve teaching and learning that have included curriculum changes, implementation of various intervention programs, and variations in class size. Another method district leaders can take to support student success for individuals and across subgroups is the grade span configuration of local school settings (Combs et al., 2011; Fiaschetti & Slate, 2015). The concept of grade span configuration has been extensively reviewed by educators and researchers in regard to the most appropriate social, emotional, and academically sound placement for students in the middle grades, particularly students in Grades 5 and 6 (Clark et al., 2013; Combs et al., 2011; Dove, 2007; Fiaschetti & Slate, 2015; Johnson, Jones, Simieou, Matthew, & Morgan, 2012; Meyer, 2014; Renchler, 2002; Rockoff & Lockwood, 2010; Wren, 2003).

The concept that has not been addressed in depth in the research literature is the effect of grade span configuration on the academic achievement of students in poverty. Particularly not well examined in the extant literature is a comparison of the academic performance of students who are economically disadvantaged as a function of grade span configurations of single or double grade levels in comparison to the typical elementary school setting (K-5). As early as the late 1990s, researchers (Cunningham & Stanovich, 1997) confirmed that reading ability in the first grade was a strong predictor of reading success in the eleventh grade, even when measures of cognitive ability were ruled out. The importance of elementary curriculum, the efficacy of instruction, and the consistency of relationships are paramount in the future success of all students, particularly students

of economic disadvantage. School boards are making decisions about the makeup of their schools and grade levels therein to meet the demands and rigor of the No Child Left Behind Act expectations without sufficient research. The number of transitions students make in moving from one school to another may influence, negatively, student academic performance. As such, the academic performance of students in a single or double grade level school may be lower than the academic performance of students who remain in a K-5 setting. Additionally, this research investigation will be in an area of need at the state level due to the fact that most decisions regarding school policies and procedures are made at the state and local level (Howley, 2002).

Purpose of the Study

Given the emphasis on all students being academically successful, efforts are needed to support the academic achievement of students who are economically disadvantaged. The purpose of this study was to examine the relationship of two specific grade span configurations to the reading and mathematics achievement of students in poverty for the 2012-2013 through the 2014-2015 school years. Specifically, the academic achievement of students in Grade 5 and 6 for students in poverty were examined separately with respect to the grade span configuration of the school in which they were enrolled. As such, the extent to which grade span configuration was related to academic achievement was determined separately for students in a PreK-6 grade campus and for students in single or double grade campuses (Grades 4-5, 5 only, or Grades 5-6).

Significance of the Study

Wren (2003) commented that if grade span configuration does make a difference in the achievement of students, then school administrators should give serious

consideration regarding the configurations of their schools. Renchler (2002) contended that grade span configuration may have a tremendous influence on student success, however, only limited research exists on this topic, specifically for students of poverty. Through this study valuable information was obtained on the relationship of grade span configuration with the academic achievement (i.e., reading and mathematics) of students in poverty within multi-grade level or single/double grade span configurations. The information gathered by this research will provide educational leaders and policymakers with credible data regarding the extent to which grade span configuration is related to student academic performance. Furthermore, the extent to which students in poverty have differences in their reading and mathematics achievement as a function of grade span configuration was determined. Accordingly, policymakers and educational leaders may utilize this information to determine how to configure their school settings to obtain the highest academic achievement for all students.

Research Questions

The following research questions were addressed in this study: (a) What is the difference in reading achievement as a function of grade span configuration for Grade 5 students in poverty?; (b) What is the difference in mathematics achievement as a function of grade span configuration for Grade 5 students in poverty?; (e) What is the difference in reading achievement as a function of grade span configuration for Grade 6 students in poverty?; (e) What is the difference in mathematics achievement as a function of grade span configuration for Grade 6 students in poverty? All four research questions were examined for three school years of data (i.e., 2012-2013, 2013-2014, and 2014-2015).

Following the statistical analyses, the extent to which trends were present in reading and in mathematics achievement were determined for each grade span configuration.

Method

Research Design

The archival data that were utilized herein represent past events (Johnson & Christensen, 2012), therefore, a non-experimental causal-comparative research design (Creswell, 2009; Johnson & Christensen, 2012) was utilized for this study. In non-experimental, causal-comparative research, no manipulation of the independent variable occurs. Due to the design of the study, the independent variables had already occurred and extraneous variables were not controlled. The independent variable involved in this research article was grade span configuration (i.e., multi-grade level schools or single/double grade level schools). For each grade span configuration, the dependent variables were the State of Texas Assessments of Academic Readiness (STAAR) Reading and Mathematics passing rates. The samples of students whose data were analyzed were students who met the state criteria for being economically disadvantaged. Economic disadvantage exists when students are eligible for free or reduced-price meals under the National School Lunch and Child Nutrition Program. Additional economic disadvantage criteria include: (a) families with an annual income at or below the official federal poverty line; (b) families eligible for Temporary Assistance to Needy Families (TANF) or other public assistance; (c) families that have received a Pell Grant or other state program of need based on financial assistance; (d) families eligible for programs assisted under the Title of the Job Training Partnership Act (JTPA); or (e) families eligible for benefits under the Food Stamp Act of 1977 (Texas Education Agency, 2014).

Participants and Instrumentation

Archival data were obtained for the 2012-2013 through the 2014-2015 school years from the Texas Education Agency AskTexas Education Directory (Texas Education Agency, 2016) and Texas Academic Performance Reports system for all Grade 5 and 6 students. Test scores for Grade 5 and 6 students in poverty and the grade span configuration in which students were enrolled were obtained from the Texas Academic Performance Reports and AskTexas Education Directory. All school campuses and school districts are mandated by the Texas Education Agency to report student demographic characteristics, along with other salient information. Each spring students take the state-mandated assessments and the scores are provided to the Texas Education Agency.

Specific data downloaded from the Texas Education Agency Academic Performance Reports were: (a) grade span configuration of the school in which each student was enrolled; (b) student demographic characteristics; and (c) reading and mathematics achievement passing rates. Readers are referred to the Texas Education Agency website for more detailed information about the data they require school campuses and school districts to provide; for the auditing procedures used to ensure accuracy of the data; and for the technical manuals on the score reliabilities and score validities of the STAAR Reading and Mathematics tests.

Results

Prior to conducting inferential statistics to determine whether differences were present between single/double and multi-grade level schools in the academic achievement of students who were economically disadvantaged, checks were conducted to determine

the extent to which these data were normally distributed (Onwuegbuzie & Daniel, 2002). Although some of the data were not normally distributed, a decision was made to use parametric independent samples *t*-tests to answer the research questions. For results that were statistically significant at the .05 level, the effect size (i.e., Cohen's *d*) was calculated. Statistical results will now be presented by academic subject area.

For the 2012-2013 school year for Grade 5 students, the parametric independent samples *t*-test revealed a statistically significant difference, $t(151.04) = 2.96$, $p = .004$, between single/double grade level schools and multi-grade level schools on the STAAR Reading test passing rates. This difference represented a small effect size (Cohen's *d*) of 0.37 (Cohen, 1988). Grade 5 students in poverty had higher STAAR Reading passing rates in multi-grade level schools by more than 5% than did their peers who were enrolled in single/double grade level schools. Readers are directed to Table 2.1 for the descriptive statistics for this analysis.

Insert Table 2.1 about here

Concerning the 2013-2014 school year for Grade 5 students, the parametric independent samples *t*-test yielded a statistically significant difference, $t(161.67) = 3.57$, $p < .001$, on the STAAR Reading test passing rates as a function of grade span configuration. This difference represented a small effect size (Cohen's *d*) of 0.44 (Cohen, 1988). Congruent with the previous year, Grade 5 students in poverty had higher STAAR Reading passing rates in multi-grade level schools by more than 3% than did

their peers who were enrolled in single/double grade level schools. The descriptive statistics for this analysis are presented in Table 2.1.

With respect to the 2014-2015 school year for Grade 5 students, the parametric independent samples *t*-test revealed a statistically significant difference, $t(581.92) = -3.09$, $p = .002$, on the STAAR Reading test passing rates as a function of grade span configuration. This difference represented a small effect size (Cohen's *d*) of 0.25 (Cohen, 1988). Commensurate with the previous two years, Grade 5 students in poverty had higher STAAR Reading passing rates in multi-grade level schools by more than 2% than did their peers who were enrolled in single/double grade level schools. The descriptive statistics for this analysis are presented in Table 2.1.

Next, the STAAR Mathematics test passing rates were analyzed as a function of grade span configuration for Grade 5 students in poverty. Concerning the 2012-2013 school year, the parametric independent samples *t*-test did not reveal a statistically significant difference, $t(160.74) = 1.43$, $p = .16$, on the STAAR Mathematics test passing rates as a function of grade span configuration. Passing rates on the STAAR Mathematics test were comparable for Grade 5 students in poverty in both grade span configuration groupings. Revealed in Table 2.2 are the descriptive statistics for this analysis.

Insert Table 2.2 about here

Concerning the 2013-2014 school year for Grade 5 students, the parametric independent samples *t*-test did not reveal a statistically significant difference in STAAR

Mathematics passing rates between the two grade span configurations, $t(152.00) = 1.83$, $p = .07$. Although the multi-grade level campuses had slightly higher passing rates on the STAAR Mathematics assessment by two percentage points, the results were not statistically significant at the conventional alpha level of .05. Readers are referred to Table 2.2 for the descriptive statistics for this analysis.

Results of the statistical analyses for Grade 6 students will now be reported. For the 2012-2013 school year, the parametric independent samples *t*-test revealed a statistically significant difference $t(138.36) = 2.97$, $p = .004$, between single/double grade level schools and multi-grade level grade schools on the STAAR Reading test passing rates. This difference represented a small effect size (Cohen's *d*) of 0.39 (Cohen, 1988). Grade 6 students in poverty had STAAR Reading passing rates in multi-grade level schools that were more than 5% higher than their peers who were enrolled in single/double grade level schools. Readers are directed to Table 2.3 for the descriptive statistics for this analysis.

Insert Table 2.3 about here

Concerning the 2013-2014 school year for Grade 6 students, the parametric independent samples *t*-test yielded a statistically significant difference, $t(148.21) = 2.11$, $p = .04$, on the STAAR Reading test passing rates as a function of grade span configuration. This difference represented a small effect size (Cohen's *d*) of 0.27 (Cohen, 1988). Congruent with the previous year, Grade 6 students in poverty had higher STAAR Reading passing rates in multi-grade level schools by more than 3% than did

their peers who were enrolled in single/double grade level schools. The descriptive statistics for this analysis are presented in Table 2.3.

With respect to the 2014-2015 school year for Grade 6 students, the parametric independent samples *t*-test revealed a statistically significant difference, $t(445.06) = -3.89$, $p < .001$, on the STAAR Reading test passing rates as a function of grade span configuration. This difference represented a small effect size (Cohen's *d*) of 0.33 (Cohen, 1988). Commensurate with the previous two years, Grade 6 students in poverty had higher STAAR Reading passing rates in in multi-grade level schools by more than 4% than did their peers who were enrolled in single/double grade level schools. The descriptive statistics for this analysis are presented in Table 2.3.

Next, the STAAR Mathematics test passing rates were analyzed as a function of grade span configuration for Grade 6 students in poverty. Concerning the 2012-2013 school year, the parametric independent samples *t*-test revealed a statistically significant difference, $t(149.81) = 2.83$, $p = .01$, on the STAAR Mathematics test passing rates between the two grade span configurations. The difference represented a small effect size (Cohen's *d)* of 0.36 (Cohen, 1988). Grade 6 students in poverty had higher STAAR Mathematics passing rates in multi-grade level schools by more than 5% than did their peers who were enrolled in single/double grade level schools. The descriptive statistics for this analysis are presented in Table 2.4.

Insert Table 2.4 about here

With respect to the 2013-2014 school year for Grade 6 students, the parametric independent samples *t*-test revealed a statistically significant difference, $t(159.05) = 2.97$, $p = .003$, on the STAAR Mathematics passing rates as a function of grade span configuration. This difference represented a small effect size (Cohen's *d*) of 0.38 (Cohen, 1988). Commensurate with the previous year, Grade 6 students in poverty had higher STAAR Mathematics passing rates in multi-grade level schools by more than 4% than did their peers who were enrolled in single/double grade level schools. The descriptive statistics for this analysis are presented in Table 2.4.

Discussion

In this investigation, the extent to which differences were present in reading and mathematics achievement as a function of grade span configuration for students in poverty in Texas was examined. Three years of Texas statewide data were obtained and analyzed on students in Grades 5 and 6 who were enrolled in either multi-grade level schools (i.e., PreK-6) or in single/double grade level campuses (i.e., Grades 4-5, 5 only, or Grades 5-6). For all three school years analyzed, the passing rates on the STAAR Reading tests for Grade 5 and 6 students in poverty were statistically significantly higher in multi-grade level schools than in single/double grade level schools. Passing rates on the STAAR Mathematics tests for Grades 5 and 6 students in poverty were statistically significantly higher in multi-grade level schools in one of the two school years than in single/double grade level schools.

To determine the magnitude of the differences between the average passing rates for students in poverty attending a single/double grade level configuration or a multi-grade level grade span configuration for each school year, a Cohen's *d* (Cohen, 1988)

was calculated for each subject, school year, and grade level. The array of the Cohen's *d* calculations for both the STAAR Reading and Mathematics analyses was from a low of 0.17 to a high of 0.44, with the range being 0.27 for the three years of data analyzed. Thus, the average degree of practical significance of the statistically significant results was small. Delineated in Table 2.5 are the Cohen's *d* effect size calculations for the STAAR Reading and Mathematics analyses.

Insert Table 2.5 about here

With reference to the STAAR Reading results of Grade 5 students in poverty, Cohen's *d* values ranged from a low of 0.25 to a high of 0.44 for the three years that were analyzed. In comparison, the Cohen's *d* was calculated for the STAAR Reading results of Grade 6 students in poverty which ranged from a low of 0.27 to a high of 0.39 for the same three years that were analyzed. For both grade levels, students enrolled in multi-grade level schools performed at a higher rate on the STAAR Reading assessment than did their peers in single/double grade level schools. Students enrolled in multi-grade level schools had an average passing rate that was 2.67% to 5.42% higher than the average passing rate for students enrolled in single/double grade level schools. Readers are referred to Table 2.5 for these Cohen's *d* calculations.

In regard to the STAAR Mathematics test performance for Grade 5 students in poverty, a Cohen's *d* was calculated to determine the magnitude of difference. Only two years of data were reported for the STAAR Mathematics due to the fact that performance standards were not yet established for the redesigned assessment which included the new

curriculum standards (Texas Education Agency, 2013). The Cohen's *d* difference in STAAR Mathematics passing rates as a function of grade span configuration for Grade 5 students in poverty was from 0.17 to 0.23. The difference of these averages for the two years were 1.93% and 2.6%, respectively. Both of these averages were in favor of students attending multi-grade level schools in comparison to students attending single/double grade level schools. Table 2.5 contains these Cohen's *d* calculations.

Concerning the STAAR Mathematics Assessment for Grade 6 students in poverty, the Cohen's *d* difference in STAAR Mathematics passing rates by grade span configuration for Grade 6 students in poverty ranged from 0.36 to 0.38. The difference in the average passing rates were 5.23% and 4.92%, with both differences being in favor of students attending multi-grade level schools in comparison to students attending single/double grade level schools. Readers are referred to Table 2.5 for these Cohen's *d* calculations.

Grade 5 and Grade 6 students in poverty who were enrolled in multi-grade level schools had higher average passing rates in reading and in mathematics for the 2012-2013, 2013-2014, and 2014-2015 school years than their peers who were enrolled in single/double grade level schools. Readers are referred to Table 2.6 for the mean differences in passing rates between the grade span configurations and the grade span configuration in which students in poverty had the highest average passing rates.

Insert Table 2.6 about here

Connections with Existing Literature

Researchers (e.g., Clark, 2012; Clark et al., 2013; Combs et al., 2011; Fiaschetti & Slate, 2015; Johnson et al., 2012) have examined the relationship of academic achievement with grade span configuration. In this multiyear, statewide investigation, results were congruent with Johnson et al. (2012) wherein students who were enrolled in schools with multi-grade level grade span configurations had higher academic achievement scores than did their peers in schools with single/double grade span configurations. Similarly, results delineated herein were commensurate with Clark (2012) who contended that an optimal grade span configuration for students to be academically successful would have multiple grade levels, specifically K-8, in comparison to a middle school (6-8) grade span configuration.

Readers should recognize, however, that other researchers (e.g., Carolan & Chesky, 2012; Wilson & Slate, 2014) have produced results that are not commensurate with the results of this multiyear, statewide investigation. Carolan and Chesky (2012) and Wilson and Slate (2014) both determined that grade span configuration was not related to the academic achievement of all students in the middle school setting. Carolan and Chesky (2012) analyzed the influence of school attachment on the relationship between grade span configuration and student achievement in reading and mathematics. They contended that getting young adolescents to enjoy school, develop positive adult and peer relationships, and feeling safe were all school attachment factors that played a greater role in increasing student achievement than grade span configuration. Wilson and Slate (2014) investigated grade span configuration and its relationship on student achievement for Grade 6 Hispanic and Black students. They documented that Hispanic

students had statistically significantly higher scores in a traditional 6-8 grade school setting versus a multi-grade level, K-8, school setting. Black students in Grade 6 performed in a similar manner on achievement assessments in the 6-8 and K-8 school settings.

Connection to Theoretical Framework

In this research article, the school connectedness theory (Klem & Connell, 2004; McCormick & O'Conner, 2015; Rimm-Kaufman, Baroody, Larsen, Curby, & Abry, 2015) was utilized as the theoretical framework. As mentioned previously, academic achievement is not only related to grade span configuration but also to school connectedness. The theory of school connectedness encompasses the concept that positive relationships with their teachers and staff members who care about them, will result in a positive attitude, student satisfaction, and higher academic engagement (Klem & Connell, 2004). Results from this particular study are supportive of schools with a multi-grade level span having more student connectedness than single/double grade level schools. Conclusively, students who are able to develop close, positive relationships with the school staff for a greater period of time have higher academic performance.

Implications for Policy and Practice

In this analysis of academic achievement and grade span configuration for Grade 5 and 6 students in poverty, students in schools with multi-grade level configurations had the highest passing rates on the STAAR Reading and Mathematics assessments. Grade span configuration has substantial implications for education policy and practice. First, educational leaders need to examine the current grade span configurations of their schools. If schools within their district that have single or double grade levels are not

performing well with regard to their schools that have multi-grade level grade spans, then the possibility of reconfiguration would merit consideration. Another idea would be for educational leaders to develop communities or families within their schools to create an atmosphere that would enable students to develop closer relationships with staff members. With respect to students in poverty, the United States has the highest percentage of people living in poverty, with nearly 25% of the population consisting of children (Abramsky, 2013). It is critical that school leaders identify factors that support the academic achievement of students in poverty. Educational leaders need to find ways to increase the academic engagement and performance of students in poverty and assist in supporting positive, and caring relationships with staff members that allow students to be connected to their school community. For future school construction, Texas legislators should examine the extant literature on grade span configuration and student performance.

Recommendations for Future Research

For this study, differences in academic achievement as a function of grade span configuration were examined for students in poverty. Given the consistent results that were obtained, researchers should consider extending this study to other groups of students such as at-risk or English Language Learners to determine whether grade span configuration is related to their academic achievement. Because the grade span configuration and academic achievement data analyzed in this study were aggregated data across Texas elementary and middle schools, researchers are encouraged to examine individual student level data from the Texas Education Agency Public Education Information Management System. Individual student level analyses would provide more

detailed results than aggregated school level data. Such individual level analyses could be conducted by ethnicity/race, by student programmatic enrollment, and by school campus level. Furthermore, this study could also be extended to other states. Additionally, an investigation could be conducted analyzing grade span configuration and additional school connectedness variables such as attendance rates, truancy, and misbehaviors.

For purposes of this study, quantitative data were used; therefore, researchers are encouraged to examine qualitative data including perceptions of educational leaders, teachers, and students regarding grade span configuration and its relation to academic achievement. Moreover, the underlying mechanisms by which grade span configuration is related to academic achievement have yet to be determined. As such, researchers are encouraged to conduct studies into the underlying reasons for the relationship between grade span configuration and academic achievement. Finally, a mixed method research study would be beneficial to identify school personnel and student views on school connectedness as it relates to grade span configuration and how their perceptions match the academic achievement data at their schools.

Conclusion

The purpose of this research study was to determine the degree to which differences were present in reading and mathematics achievement as a function of grade span configuration for students in poverty in Texas. Data were analyzed for all Grade 5 and 6 students in poverty who were enrolled in multi-grade level schools (PK-6) and in single/double grade level schools (Grades 4-5, 5 only, or Grades 5-6) in Texas for the 2012-2013 through the 2014-2015 school years. Statistically significant differences were

present in passing rates for Grade 5 students in poverty for reading and Grade 6 students in poverty for reading for all three years analyzed, and statistically significant differences were present for two years for mathematics passing rates for Grade 6 students in poverty. Grade 5 and Grade 6 students in poverty had higher average passing rates for all subject areas for all three years analyzed in a multi-grade level configuration setting than in a single/double grade level setting. Congruent with previous researchers (e.g., Clark, 2012; Johnson et al., 2012), students in poverty who were enrolled in multi-grade level schools had higher levels of academic achievement than did their peers who were enrolled in a single/double level grade setting.

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Table 2.1

Descriptive Statistics for the STAAR Reading Passing Rates by Grade Span Configuration for Grade 5 Students in Poverty for the 2012-2013 Through the 2014-2015 School Years

Grade Span Configuration	*n* of schools	*M*	*SD*
2012-2013			
Single/Double	239	82.01	8.34
Multi-Grade	105	85.79	11.85
2013-2014			
Single/Double	243	80.35	9.02
Multi-Grade	103	84.77	11.11
2014-2015			
Single/Double	241	81.64	9.71
Multi-Grade	394	84.31	11.86

Table 2.2

Descriptive Statistics for the STAAR Mathematics Passing Rates by Grade Span Configuration for Grade 5 Students in Poverty for the 2012-2013 Through the 2014-2015 School Years

Grade Span Configuration	*n* of schools	*M*	*SD*
2012-2013			
Single/Double	239	82.87	9.46
Multi-Grade	106	84.80	12.48
2013-2014			
Single/Double	243	83.18	9.86
Multi-Grade	101	85.78	12.75

Table 2.3

Descriptive Statistics for the STAAR Reading Passing Rates by Grade Span Configuration for Grade 6 Students in Poverty for the 2012-2013 Through the 2014-2015 School Years

Grade Span Configuration	*n* of schools	*M*	*SD*
2012-2013			
Single/Double	200	67.44	10.39
Multi-Grade	100	72.86	16.71
2013-2014			
Single/Double	208	75.54	9.77
Multi-Grade	102	78.86	14.38
2014-2015			
Single/Double	178	72.75	10.47
Multi-Grade	382	76.86	13.83

Table 2.4

Descriptive Statistics for the STAAR Mathematics Passing Rates by Grade Span Configuration for Grade 6 Students in Poverty for the 2012-2013 and the 2013-2014 School Years

Grade Span Configuration	*n* of schools	*M*	*SD*
2012-2013			
Single/Double	200	70.60	11.40
Multi-Grade	102	75.83	16.79
2013-2014			
Single/Double	207	77.44	11.01
Multi-Grade	103	82.36	14.91

Table 2.5

Cohen's d for Differences in the STAAR Reading and Mathematics Passing Rates by Grade Span Configuration for Grade 5 and 6 Students in Poverty for the 2012-2013 Through the 2014-2015 School Years

Grade and Subject	2012-2013	2013-2014	2014-2015
Grade 5			
STAAR Reading	0.37	0.44	0.25
STAAR Mathematics	N/A	0.23	N/A
Grade 6			
STAAR Reading	0.39	0.27	0.33
STAAR Mathematics	0.36	0.38	N/A

Table 2.6

Differences in the STAAR Reading and Mathematics Passing Rates by Grade Span Configuration for Grade 5 and 6 Students in Poverty for the 2012-2013 Through the 2014-2015 School Years

Grade, Subject, and Year	Mean Difference	Grade Span With Highest Passing Rate
Grade 5		
STAAR Reading		
2012-2013	3.78	Multi-Grade Level
2013-2014	4.42	Multi-Grade Level
2014-2015	2.67	Multi-Grade Level
STAAR Mathematics		
2012-2013	1.93	Multi-Grade Level
2013-2014	2.60	Multi-Grade Level
Grade 6		
STAAR Reading		
2012-2013	5.42	Multi-Grade Level
2013-2014	3.32	Multi-Grade Level
2014-2015	4.11	Multi-Grade Level
STAAR Mathematics		
2012-2013	5.23	Multi-Grade Level
2013-2014	4.92	Multi-Grade Level

CHAPTER III

DIFFERENCES IN READING AND MATHEMATICS PERFORMANCE AS A FUNCTION OF GRADE SPAN CONFIGURATION FOR TEXAS BOYS AND GIRLS

This dissertation follows the style and format of *Research in the Schools (RITS)*.

Abstract

In this empirical statewide investigation, the degree to which STAAR Reading and Mathematics passing rates differed as a function of grade span configuration for Grade 5 and 6 boys and girls was examined. Data were obtained from the Texas Education Agency for all Grade 5 and 6 boys and girls who were enrolled in either single/double grade level (i.e., Grades 4-5, 5 only, or Grades 5-6) or multi-grade level (PreK-6) grade span configurations for the 2012-2013 through the 2014-2015 school years. Statistically significant differences were present in reading and mathematics passing rates for Grade 5 and Grade 6 boys and girls by grade span configuration. Average passing rates in reading and in mathematics were higher in the multi-grade level schools than in the single/double grade level schools. Implications for policy and practice are provided.

Keywords: Grade span configuration, Academic achievement, Gender, Grade 5, Grade 6

DIFFERENCES IN READING AND MATHEMATICS PERFORMANCE AS A FUNCTION OF GRADE SPAN CONFIGURATION FOR TEXAS BOYS AND GIRLS

Boys and girls differ in their academic performance (Chrisler & McCreary, 2010; Geary, 2010; Halpern, 2000). As boys proceed from primary grades through postsecondary education, they typically dominate the higher levels of mathematics and science leading to a greater percentage of males in the science, technology, engineering, and mathematics (STEM) fields (Lindberg, Hyde, Petersen, & Linn, 2010). Differences in the interests and achievement of boys and girls has been referred to as a gender gap. This gender gap documented to be present in early elementary years also exists in professions, income levels, and academics. Wei, Liu, and Barnard-Brak (2015) investigated the gender gap in academic achievement for students in kindergarten through Grade 8, using a national longitudinal data set, the Early Childhood Longitudinal Study-Kindergarten Cohort. Boys demonstrated a faster rate of growth than girls in the area of mathematics from Kindergarten through Grade 8, whereas girls demonstrated a faster rate of growth than boys in reading during this time period.

Cornwell, Mustard, and Van Parys (2013) reviewed differences in reading and mathematics scores between boys and girls. They concurred that boys outperform girls in mathematics and science assessment scores, whereas girls outperform boys on teacher grades in mathematics and science. Cornwell et al. (2013) documented the boy/girl gap in reading was over 300% larger than the White/Black ethnicity gap. The gender gap in reading favoring girls was larger than corresponding Black and Hispanic ethnicity gap.

Additionally, Lindberg, Hyde, Petersen, and Linn (2010) conducted a meta-analysis in which they analyzed gender differences in mathematics performance between

1990 and 2007. The analysis included 242 studies with 441 samples representing 1,286,350 people. Lindberg et al. (2010) determined that the strongest predictors of mathematical performance included mother's education, quality of the home learning environment, and elementary school effectiveness. Gender had the smallest effect size as a predictor of mathematical performance.

Additional factors influence how boys and girls are rated in the classroom setting by their teachers including predetermined bias and gender related behaviors. Robinson-Cimpian, Lubienski, Ganley, and Copur-Oencturk (2014) determined that boys were rated higher than girls in proficiency in mathematics; however, teachers rated girls lower in proficiency in mathematics in comparison to boys who had similar performance and behavior. Differences between girls and boys were also present with respect to classroom behavior.

In regard to gender differences in grade reports, girls tend to have higher grades than boys (Duckworth & Seligman, 2006). Even though girls do not outperform boys on intelligence or achievement tests, girls show more self-discipline, which tends to promote greater success in the classroom setting (Duckworth & Seligman, 2006). Duckworth and Seligman (2006) completed a study on an ethnically diverse group of students in Grade 8 at magnet schools participating in the same coursework. Performing well in the classroom and earning higher grades require a greater sustained effort and self-discipline in which girls typically excel. Boys were able to perform well on achievement tests because the assessments required limited sustained concentration. Duckworth and Seligman (2006) noted that gender predicted self-discipline and self-discipline predicted overall grade point average.

Self-discipline and classroom behaviors affect classroom performance. Cornwell et al. (2013) noted that the inconsistency between assessment scores and classroom grades was largely due to noncognitive skills. "Girls are substantially more amenable to the learning process than boys, and that this noncognitive skill is a significant factor in teacher assessments" (Cornwell et al., 2013, p. 239). Noncognitive behaviors that affect classroom performance are skills such as planning, ability to sustain attention, ability to follow rules, ability to control actions, and ability to remain task and goal oriented (Segal, 2008).

Another nonacademic component of the classroom that has contributed to the advantage of girls over boys includes their ability to form high-quality relationships with teachers. Although boys actually outperformed girls on standardized assessments of mathematics across elementary school, McCormick and O'Conner (2015) attributed the success of girls to their ability to form and maintain closer relationships with their teachers. Hughs, Wu, Kwok, Villarreal, and Johnson (2012) also documented that girls have closer relationships with their teachers than do boys. However, when girls had a conflictual relationship with a teacher, they experienced lower average levels of mathematics achievement than did boys with similar conflictual relationships with teachers (McCormick & O'Conner, 2015).

Additionally, the quality of teacher-student interaction plays a role in the academic achievement of students (Rimm-Kaufman, Baroody, Larsen, Curby, & Abry, 2015). Rimm-Kaufman et al. (2015) analyzed three different forms of data to evaluate the quality of the interactions with the teacher by gender for 387 Grade 5 students in 63 classrooms. Boys demonstrated a higher cognitive and emotional engagement in

classrooms that had higher observed classroom organization, whereas girls demonstrated a lower social engagement. Additionally, boys had higher social engagement in the classrooms that had higher instructional support (Rimm-Kaufman et al., 2015). Girls did exhibit higher levels of engagement for three of the five measured areas: observed behavioral engagement, student-reported cognitive engagement, and student-reported social engagement. Statistically significant differences were present between boys and girls in self-reported emotional engagement and teacher reported behavioral engagement.

Many educators believe that students in Grade 5 do not need or have grown out of the need for relationships with their teachers. Rimm-Kaufman et al. (2015) shared the importance of "emotionally supportive interactions" (p. 182) between teachers and students even in the late elementary stages. Rather than gender differences, engagement was the factor that enabled the students to be more successful in the Grade 5 mathematics classroom. Reschly and Christenson (2012) stated that engagement is "the glue, or mediator that links important contexts- home, school, peers, and community- to students and, in turn, to outcomes of interest" (p. 3).

In a study regarding the presence of supportive adults and the level of school engagement, Woolley and Bowen (2007) commented that the students who had a self-report with higher presence of supportive adults had higher school engagement. "Such positive adult relationships appear to be most important for students who are at higher levels of risk, who are members of historically discriminated minority groups, and who are male" (Woolley & Bowen, 2007, p. 101). The concept of a strong relationship with adults was reiterated in the work of Bryk and Schneider (2003) and Croninger and Lee (2001) who shared trusting and supportive relationships among school staff have been

linked to a student's belief that school is important and positive outcomes. Additionally, Reyes, Brackett, Rivers, White, and Salovey (2012) addressed student engagement in their study on the classroom's emotional climate and academic achievement. Reyes et al. (2012) documented that boys had lower grades and lower ratings of engagement than girls. In conclusion, the classrooms that scored higher in the emotional climate had a higher rate of student engagement, thus, a higher level of academic performance.

The concept of student engagement and academic achievement has been analyzed and deemed important to the success of all students, regardless of gender. Hadjar, Krolak-Schwerdt, Priem, and Glock (2014) shared,

> School grades and transitions are linked to achievement and ability, they are indicative of a type of success in school that does not necessarily equate to aptitude… for the individual school students, it can be argued that such aspects of educational success are, in reality, even more important than actual ability. (p. 117)

One aspect of transition that plays an important role in the academic achievement of students is the configuration of schools. Kieffer (2013) reviewed the effects on the achievement of Grade 8 students in the area of reading and mathematics who continuously attending a K-8 school, as opposed to transitioning from an elementary to a middle school. Utilizing data from the National Center for Education Statistics, Kieffer (2013) examined academic and behavioral development between K-8 schools and middle schools (i.e., Grades 6-8, 7-8, or 7-9). Students who were enrolled in K-8 schools had higher Grade 8 reading scores than did their counterparts who were enrolled in middle

schools. No statistically significant differences were present for the Grade 8 mathematics achievement scores.

Academic achievement and grade span configuration were addressed by Combs, et al., (2011) and Clark, Slate, Combs, and Moore (2013) in two recent investigations. In both studies the K-8 configuration was compared to an alternate grade span (i.e., Grades 6-8 and Grades 5-6). In both investigations, statistically significant differences in reading and mathematics performance were present. Students had higher reading and mathematics scores in the K-8 setting than in the middle school setting.

Combs et al. (2011) reviewed the concept of communities of practice within the study on grade span configuration. Teachers have closer relationships in a K-8 setting and are able to discuss and solve issues, review teaching strategies, and remedy curriculum deficits. Students in a K-8 setting do not have to deal with the change in faculty, a different schedule, and an unfamiliar building layout. All of these factors may assist boys and girls in achieving their highest academic potential.

Additionally, Johnson, Jones, Simieou, Matthew, and Morgan (2012) completed a study on grade span configuration in Texas. Johnson et al. (2012) analyzed archival data in regard to the science standardized assessment given in Texas as it related to grade span configuration for Grade 5 students in the elementary (PreK-5) and intermediate (5-6) settings. Grade 5 students in the elementary setting had passing scores which were 18% higher than their peers in the intermediate school settings. Their findings were consistent with the notion that Grade 5 students in the elementary setting with more grade levels performed at higher levels than their peers in the intermediate school settings.

Rockoff and Lockwood (2010) documented that students who enter middle schools fell behind their peers in K-8 schools and the disadvantage continued to increase over the course of the middle school years. Absence rates were higher for students in middle schools. Moreover, students believed that the middle schools had less academic rigor, less mature behavior of peers, were less safe, and provided a lower quality of education than the K-8 or K-6 schools. Researchers and developmental psychologists have recorded changes in attitudes and motivation as students enter adolescence, changes that some hypothesize are "exacerbated by middle-school curricula and practices" (Rockoff & Lockwood, 2010, p. 69).

Students in middle schools tend to have greater anxiety and lower academic achievement than students in the elementary setting. Cullen and Robles-Pina (2009) completed a literature review on numerous studies relating to grade span configuration. In their review, Cullen and Robles-Pina (2009) identified three primary concerns of students who transition from elementary to secondary school: friendship quality, student social concerns, and academic performance. In each study reviewed, academic performance was almost always affected by student's transition to secondary school.

In an article on the revival of K-8 schools, Herman (2004) shared many concerns with the transition from elementary to middle schools and many benefits of the K-8 school setting. Transition concerns to the middle school setting included the academic demands are greater than elementary school, they tend to be larger than elementary schools, students have a wide variety of teachers in middle schools, students have to adapt to a new social situation, and behavioral standards are different (Herman, 2004). Advantages to the K-8 setting included an increased opportunity to develop relationships

over a longer time period, parental involvement increased as more siblings were in one school, the middle school age students took on a role of mentorship to younger students, and there was a greater opportunity for teacher collaboration and internal accountability for children.

Statement of the Problem

Numerous researchers (e.g., Cornwell et al., 2013; Lindberg et al., 2010; Rimm-Kaufman et al., 2015; Robinson-Cimpian et al., 2014) have investigated the academic achievement of boys and girls in various settings, countries, and subject areas. Boys and girls respond differently to the presentation of material, gender of the teacher, expectations of the teacher, and the relationship quality with the teacher. In an era of federal and state accountability in which the expectation is ensuring academic success for all students regardless of gender, it is imperative that educators consider a variety of avenues that will allow for academic success in schools. One avenue educational leaders in school districts can consider is the grade span configuration of schools within its boundaries. Grade span configuration has been a concept that has been reviewed by educators and researchers in terms of the most appropriate placement for students in order to support the academic and social needs of students (Clark et al., 2013; Combs et al., 2011; Johnson et al., 2012; Rockoff & Lockwood, 2010).

The concept that has not been addressed in depth in research literature is the effect of grade span configuration on the academic achievement of students based on their gender. Particularly not well examined in the extant literature is a comparison of the academic performance of students by gender in the grade span configurations of single or double grade levels in comparison to the typical elementary school setting (K-5). The

importance of teacher relationships and school connectedness for both boys and girls are paramount in the success of all students. The higher the number of transitions a student has to make from one school may negatively affect academic performance.

Purpose of the Study

Given the emphasis on all students being academically successful, efforts to support the academic achievement of boys and girls are needed. The purpose of this study was to examine the relationship of grade span configuration to the reading and mathematics achievement of boys and girls for the 2012-2013 through the 2014-2015 school years. Specifically, the academic achievement of boys and girls in Grade 5 and 6 was examined separately with respect to the grade span configuration of the school in which they were enrolled. As such, the extent to which grade span configuration was related to academic achievement was determined separately for boys and girls in a PreK-6 grade campus compared to the academic achievement of boys and girls in single or double grade campuses (i.e., Grades 4-5, 5 only, or Grades 5-6).

Significance of the Study

Wren (2003) commented that administrators need to consider the construct of grade span configuration if grade span configuration does make a difference in the achievement of students. Renchler (2002) noted that grade span configuration may have a tremendous influence on academic achievement but only a few empirical research investigations have been conducted on the topic. Through this study valuable information was obtained on the relationship of grade span configuration with the academic achievement (i.e., reading and mathematics) of boys and girls within multi-grade level or single/double grade span configurations. The information gathered by this

research will provide educational leaders and policymakers with credible data regarding the extent to which grade span configuration is related to student academic performance by gender. Furthermore, the extent to which differences exist in the reading and mathematics achievement as a function of grade span configuration for boys and girls was determined. Accordingly, policymakers and local school boards may utilize this information to determine how to configure school settings to obtain the highest academic achievement for all students.

Research Questions

The following research questions were addressed in this empirical investigation: (a) What is the difference in reading achievement as a function of grade span configuration for Grade 5 boys and girls?; (b) What is the difference in mathematics achievement as a function of grade span configuration for Grade 5 boys and girls?; (c) What is the difference in reading achievement as a function of grade span configuration for Grade 6 boys and girls?; and (d) What is the difference in mathematics achievement as a function of grade span configuration for Grade 6 boys and girls? All four research questions were examined for three school years of data (i.e., 2012-2013 through 2014-2015).

Method

Research Design

A non-experimental, causal-comparative research design (Creswell, 2009; Johnson & Christensen, 2012) was utilized for this study because of the use of archival data. Using archival, pre-existing data means that both the independent variable of grade span configuration and the dependent variables of reading and mathematics had already

occurred. Accordingly, the ability to manipulate either the independent variable or the dependent variables did not exist. The independent variable involved in this research article was grade span configuration (i.e., multi-grade level schools or single/double grade level schools). For each grade span configuration, the dependent variables were the State of Texas Assessments of Academic Readiness (STAAR) Reading and Mathematics passing rates of boys and girls in Grades 5 and 6.

Participants and Instrumentation

Archival data were obtained for the 2012-2013 through the 2014-2015 school years from the Texas Education Agency AskTexas Education Directory (Texas Education Agency, 2016) and Texas Academic Performance Reports system for all Grade 5 and 6 students. Once the test scores for all students in Grades 5 and 6 were available, they were analyzed separately for boys and girls. Demographic and assessment data are given to the Texas Education Agency from all school campuses and school districts across the state of Texas each year. Data present for each student are audited by the Texas Education Agency for errors.

Passing rates for Grade 5 and 6 students and the grade span configuration in which students were enrolled were obtained from the Texas Academic Performance Reports and AskTexas Education Directory. All school campuses and school districts are mandated by the Texas Education Agency to report student demographic characteristics, along with other salient information. Each spring students take the state-mandated assessments and the scores are provided to the Texas Education Agency.

Specific data downloaded from the Texas Education Agency Academic Performance Reports were: (a) grade span configuration of the school in which each

student was enrolled; (b) student demographic characteristics; and (c) reading and mathematics achievement passing rates. Readers are referred to the Texas Education Agency website for more detailed information about the data they require school campuses and school districts to provide; for the auditing procedures used to ensure accuracy of the data; and for the technical manuals on the score reliabilities and score validities of the STAAR Reading and Mathematics tests.

Results

Prior to conducting inferential statistics to determine whether differences were present between single/double and multi-grade level schools in the academic achievement of boys and girls in Grades 5 and 6, checks were conducted to determine the extent to which these data were normally distributed (Onwuegbuzie & Daniel, 2002). Although some of the data were not normally distributed, a decision was made to use parametric independent samples *t*-tests to answer the research questions. For results that were statistically significant at the .05 level, the effect size (i.e., Cohen's *d*) was calculated. Statistical results will now be presented by academic subject area and by school year for boys and then for girls.

For the 2012-2013 school year for Grade 5 boys, the parametric independent samples *t*-test revealed a statistically significant difference, $t(181.70) = 3.86$, $p < .001$, between single/double grade level schools and multi-grade level schools on the STAAR Reading test passing rates. This difference represented a small effect size (Cohen's *d*) of 0.46 (Cohen, 1988). Grade 5 boys had higher STAAR Reading passing rates in multi-grade level schools by more than 4.5% than did boys who were enrolled in single/double

grade level schools. Readers are directed to Table 3.1 for the descriptive statistics for this analysis.

Insert Table 3.1 about here

Concerning the 2013-2014 school year for Grade 5 boys, the parametric independent samples *t*-test yielded a statistically significant difference, $t(206.93) = 5.63$, $p < .001$, on the STAAR Reading test passing rates as a function of grade span configuration. This difference represented a moderate effect size (Cohen's *d*) of 0.65 (Cohen, 1988). Congruent with the previous year, Grade 5 boys had higher STAAR Reading passing rates in multi-grade level schools by more than 6.5% than did boys who were enrolled in single/double grade level schools. The descriptive statistics for this analysis are presented in Table 3.1.

With respect to the 2014-2015 school year for Grade 5 boys, the parametric independent samples *t*-test revealed a statistically significant difference, $t(579.41) = -2.18$, $p = .03$, on the STAAR Reading test passing rates between the two grade span configurations. This difference represented a small effect size (Cohen's *d*) of 0.17 (Cohen, 1988). Commensurate with the previous two years, Grade 5 boys had higher STAAR Reading passing rates in multi-grade level schools by 2% than did boys who were enrolled in single/double grade level schools. The descriptive statistics for this analysis are revealed in Table 3.1.

For the 2012-2013 school year for Grade 5 girls, the parametric independent samples *t*-test revealed a statistically significant difference, $t(185.50) = 4.07$, $p < .001$, in

the STAAR Reading test passing rates between single/double grade level schools and multi-grade level schools. This difference represented a small effect size (Cohen's *d*) of 0.48 (Cohen, 1988). Grade 5 girls had higher STAAR Reading passing rates in multi-grade level schools by more than 4% than did girls who were enrolled in single/double grade level schools. Delineated in Table 3.2 are the descriptive statistics for this analysis.

Insert Table 3.2 about here

Concerning the 2013-2014 school year for Grade 5 girls, the parametric independent samples *t*-test yielded a statistically significant difference, $t(208.93) = 4.04$, $p < .001$, on the STAAR Reading test passing rates as a function of grade span configuration. This difference represented a small effect size (Cohen's *d*) of 0.46 (Cohen, 1988). Congruent with the previous year, Grade 5 girls had higher STAAR Reading passing rates in multi-grade level schools by more than 4% than did girls who were enrolled in single/double grade level schools. Revealed in Table 3.2 are the descriptive statistics for this analysis.

With respect to the 2014-2015 school year for Grade 5 girls, the parametric independent samples *t*-test revealed a statistically significant difference, $t(582.51) = -3.18$, $p = .002$, on the STAAR Reading test passing rates as a function of grade span configuration. This difference represented a small effect size (Cohen's *d*) of 0.25 (Cohen, 1988). Commensurate with the previous two years, Grade 5 girls had higher STAAR Reading passing rates in multi-grade level schools by more than 2.25% than did

girls who were enrolled in single/double grade level schools. The descriptive statistics for this analysis are presented in Table 3.2.

Next, the STAAR Mathematics test passing rates were analyzed as a function of grade span configuration for Grade 5 boys. Concerning the 2012-2013 school year, the parametric independent samples *t*-test revealed a statistically significant difference, $t(182.17) = 2.66$, $p = .008$, on the STAAR Mathematics test passing rates between the two grade span configurations. The difference represented a small effect size (Cohen's *d*) of 0.32 (Cohen, 1988). Passing rates on the STAAR Mathematics test for Grade 5 boys in multi-grade level schools were more than 3.3% higher than for boys who were enrolled in single/double grade level schools. Revealed in Table 3.3 are the descriptive statistics for this analysis.

Insert Table 3.3 about here

Regarding the 2013-2014 school year for Grade 5 boys, the parametric independent samples *t*-test yielded a statistically significant difference in STAAR Mathematics passing rates between the two grade span configurations, $t(211.64) = 4.43$, $p < .001$. The difference represented a moderate effect size (Cohen's *d*) of 0.51 (Cohen, 1988). Grade 5 boys who were enrolled in a multi-grade level campuses had passing rates that were over 5% higher on the STAAR Mathematics assessment than did boys who were enrolled in a single/double grade level campus. Readers are referred to Table 3.3 for the descriptive statistics for this analysis.

Next, the STAAR Mathematics test passing rates were analyzed as a function of grade span configuration for Grade 5 girls. Concerning the 2012-2013 school year, the parametric independent samples *t*-test revealed a statistically significant difference, $t(180.84) = 1.96$, $p = .05$, on the STAAR Mathematics test passing rates as a function of grade span configuration. The difference represented a small effect size (Cohen's *d*) of 0.23 (Cohen, 1988). Grade 5 girls who were enrolled in multi-grade level campuses had higher passing rate on the STAAR Mathematics test by more than 2% than did girls who were enrolled in single/double grade level schools. Table 3.4 contains the descriptive statistics for this analysis

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Insert Table 3.4 about here

With respect to the 2013-2014 school year for Grade 5 girls, the parametric independent samples *t*-test yielded a statistically significant difference in STAAR Mathematics passing rates between the two grade span configurations, $t(187.16) = 2.74$, $p = .007$. The difference represented a small effect size (Cohen's *d*) of 0.32 (Cohen, 1988). Congruent with the previous year, Grade 5 girls had a higher average STAAR Mathematics passing rate in multi-grade level schools by 3.25% than girls in single/double grade level schools. Readers are referred to Table 3.4 for the descriptive statistics for this analysis.

Results of the statistical analyses for Grade 6 students will now be reported. For the 2012-2013 school year for Grade 6 boys, a statistically significant difference was revealed, $t(183.48) = 3.65$, $p < .001$, in the STAAR Reading test passing rates between

single/double grade level schools and multi-grade level grade schools. This difference represented a small effect size (Cohen's *d*) of 0.45 (Cohen, 1988). Grade 6 boys had STAAR Reading passing rates in multi-grade level schools that were more than 6.25% higher than their peers who were enrolled in single/double grade level schools. Revealed in Table 3.5 are the descriptive statistics for this analysis.

Insert Table 3.5 about here

Concerning the 2013-2014 school year for Grade 6 boys a statistically significant difference was present, $t(179.82) = 3.02$, $p = .003$, on the STAAR Reading test passing rates as a function of grade span configuration. This difference represented a small effect size (Cohen's *d*) of 0.37 (Cohen, 1988). Congruent with the previous year, Grade 6 boys had higher STAAR Reading passing rates in multi-grade level schools by more than 4.75% than did their peers who were enrolled in single/double grade level schools. The descriptive statistics for this analysis are presented in Table 3.5.

With respect to the 2014-2015 school year for Grade 6 boys, a statistically significant difference was yielded, $t(403.70) = -2.97$, $p = .003$, on the STAAR Reading test passing rates as a function of grade span configuration. This difference represented a small effect size (Cohen's *d*) of 0.26 (Cohen, 1988). Commensurate with the previous two years, Grade 6 boys had higher STAAR Reading passing rates in multi-grade level schools by more than 3.25% than did their peers who were enrolled in single/double grade level schools. Table 3.5 contains the descriptive statistics for this analysis.

For the 2012-2013 school year for Grade 6 girls, the parametric independent samples *t*-test revealed a statistically significant difference, $t(183.68) = 4.23$, $p < .001$, in the STAAR Reading test passing rates between single/double grade level schools and multi-grade level schools. This difference represented a moderate effect size (Cohen's *d*) of 0.52 (Cohen, 1988). Grade 6 girls had STAAR Reading passing rates in multi-grade level schools that were more than 7% higher than their peers who were enrolled in single/double grade level schools. Readers are directed to Table 3.6 for the descriptive statistics for this analysis.

Insert Table 3.6 about here

Regarding the 2013-2014 school year for Grade 6 girls, a statistically significant difference was present, $t(184.80) = 3.40$, $p = .001$, on the STAAR Reading test passing rates as a function of grade span configuration. This difference represented a small effect size (Cohen's *d*) of 0.41 (Cohen, 1988). Congruent with the previous year, Grade 6 girls had higher STAAR Reading passing rates in multi-grade level schools by more than 4.5% than did their peers who were enrolled in single/double grade level schools. The descriptive statistics for this analysis are presented in Table 3.6.

With respect to the 2014-2015 school year for Grade 6 girls, a statistically significant difference was revealed, $t(386.33) = -3.59$, $p < .001$, on the STAAR Reading test passing rates as a function of grade span configuration. This difference represented a small effect size (Cohen's *d*) of 0.32 (Cohen, 1988). Commensurate with the previous two years, Grade 6 girls had higher STAAR Reading passing rates in multi-grade level

schools by more than 3.5% than did their peers who were enrolled in single/double grade level schools. The descriptive statistics for this analysis are presented in Table 3.6.

Next, the STAAR Mathematics test passing rates were analyzed as a function of grade span configuration for Grade 6 boys. Concerning the 2012-2013 school year, a statistically significant difference was yielded, $t(184.15) = 3.61$, $p < .001$, on the STAAR Mathematics test passing rates as a function of grade span configuration. The difference represented a small effect size (Cohen's *d)* of 0.44 (Cohen, 1988). Grade 6 boys had higher STAAR Mathematics passing rates in multi-grade level schools by more than 6% than their peers who were enrolled in single/double grade level schools. Table 3.7 contains the descriptive statistics for this analysis.

Insert Table 3.7 about here

With respect to the 2013-2014 school year for Grade 6 boys, a statistically significant difference was present, $t(198.86) = 3.66$, $p < .001$, on the STAAR Mathematics passing rates between the two grade span configurations. This difference represented a small effect size (Cohen's *d*) of 0.44 (Cohen, 1988). Commensurate with the previous year, Grade 6 boys had higher STAAR Mathematics passing rates in multi-grade level schools by more than 5.5% than did their peers who were enrolled in single/double grade level schools. Revealed in Table 3.7 are the descriptive statistics for this analysis.

The STAAR Mathematics test passing rates were next analyzed as a function of grade span configuration for Grade 6 girls. Regarding the 2012-2013 school year, the

parametric independent samples *t*-test revealed a statistically significant difference, $t(172.89) = 2.91$, $p = .004$, on the STAAR Mathematics test passing rates as a function of grade span configuration. The difference represented a small effect size (Cohen's *d)* of 0.36 (Cohen, 1988). Grade 6 girls had higher STAAR Mathematics passing rates in multi-grade level schools by more than 5.25% than did their peers who were enrolled in single/double grade level schools. Delineated in Table 3.8 are the descriptive statistics for this analysis.

Insert Table 3.8 about here

With respect to the 2013-2014 school year for Grade 6 girls, statistically significant difference was revealed, $t(211.39) = 3.51$, $p = .001$, on the STAAR Mathematics passing rates between the two grade span configurations. This difference represented a small effect size (Cohen's *d*) of 0.42 (Cohen, 1988). Commensurate with the previous year, Grade 6 girls had higher STAAR Mathematics passing rates in multi-grade level schools by more than 4.5% than their peers who were enrolled in single/double grade level schools. Table 3.8 contains the descriptive statistics for this analysis.

Discussion

In this investigation, the degree to which differences were present in reading and mathematics achievement as a function of grade span configuration for boys and girls in Texas was examined. Three years of Texas statewide data were obtained and analyzed on boys and girls in Grades 5 and 6 who were enrolled in either multi-grade level schools

(i.e., PreK-6) or in single/ double grade level campuses (i.e., Grades 4-5, 5 only, or Grades 5-6). For all three school years analyzed, the passing rates on the STAAR Reading and Mathematics tests for Grade 5 and 6 boys and girls were statistically significantly higher in multi-grade level schools than in single/double grade level schools.

To determine the magnitude of the differences between the average passing rates for Grade 5 and 6 boys and girls who were enrolled in either a single/double grade level configuration or a multi-grade level configuration for each school year, a Cohen's *d* (Cohen, 1988) was calculated for each subject, school year, and grade level. The array of the Cohen's *d* calculations for both the STAAR Reading and Mathematics analyses ranged from a low of 0.17 to a high of 0.65, with the average being 0.48 for the three years of data analyzed. Thus, the average degree of practical significance of the statistically significant results was close to being moderate (i.e., 0.50 is the beginning of the moderate effect size range). Readers are referred to Table 3.9 for the Cohen's *d* effect size calculations for the STAAR Reading and Mathematics analyses.

Insert Table 3.9 about here

With reference to the STAAR Reading results of Grade 5 boys, Cohen's *d* values ranged from a low of 0.17 to a high of 0.65 for the three years that were analyzed. For Grade 5 girls, Cohen's *d* values for the STAAR Reading results ranged from a low of 0.25 to a high of 0.48 for the same three years. In comparison, the Cohen's *d* for the STAAR Reading results of Grade 6 boys ranged from a low of 0.26 to a high of 0.45 for the same three years that were analyzed. The Cohen's *d* calculations for Grade 6 girls on

the STAAR Reading assessment ranged from 0.32 to 0.52. For both grade levels, students enrolled in multi-grade level schools performed at a higher rate on the STAAR Reading assessment than did their peers in single/double grade level schools. Students enrolled in multi-grade level schools had an average passing rate that was 1.99% to 7.05% higher than students enrolled in single/double grade level schools. Readers are referred to Table 3.9 for these Cohen's *d* calculations.

In regard to the STAAR Mathematics Assessment for Grade 5 boys, only two years of data were reported for the STAAR Mathematics due to the fact that performance standards were not yet established for the redesigned assessment which included the new curriculum standards (Texas Education Agency, 2013). The difference in Cohen's *d* values of STAAR Mathematics passing rates as a function of grade span configuration for Grade 5 boys ranged from 0.32 to 0.51. The difference in average passing rates for the two years were 3.37% and 5.09%. For Grade 5 girls, the average difference in STAAR Mathematics passing rates as a function of grade span configuration ranged from 0.23 to 0.32 (i.e., Cohen's *d*). The difference in average passing rates for the two years were 5.44% and 4.73%. All of these averages were in favor of students who were enrolled in multi-grade level schools in comparison to students who were enrolled in single/double grade level schools. Readers are referred to Table 3.9 for these Cohen's *d* calculations.

With respect to the STAAR Mathematics Assessment for Grade 6 boys, Cohen's *d*s ranged from 0.22 to 0.44. The difference in the average passing rates were 6.05% and 5.54%, both in favor of students who were enrolled in multi-grade level schools in comparison to their peers who were enrolled in single/double grade level schools. For

Grade 6 girls, the Cohen's *d* calculations ranged from 0.36 to 0.42. Readers are referred to Table 3.9 for these Cohen's *d* calculations.

Grade 5 and 6 boys and girls who were enrolled in multi-grade level schools had higher average passing rates in reading and in mathematics for the 2012-2013, 2013-2014, and 2014-2015 school years than did their peers who were enrolled in single/double grade level schools. Readers are referred to Table 3.10 and 3.11 for the mean differences between the grade span configurations and the grade span configuration wherein students had higher passing rates. The minimum difference was 1.99% and the maximum difference was 7.06% in favor of the multi-grade level schools.

Insert Tables 3.10 and 3.11 about here

Connections with Existing Literature

The effect of grade span configuration on student achievement has been investigated in several studies (e.g., Clark et al., 2013; Combs et al., 2011; Johnson et al., 2012; Kieffer, 2013). Middle school students enrolled in K-8 settings have previously been documented as having statistically significant higher passing rates than their peers enrolled in traditional middle schools (Clark et al., 2013; Combs et al., 2011; Kieffer, 2013). In this multiyear, statewide investigation, results were congruent with Johnson et al. (2012) wherein students who were enrolled in schools with multi-grade level grade span configurations (PreK-5) had higher academic achievement scores than did their peers in schools with single/double grade span configurations (5-6). The benefits noted in the previous studies included higher academic achievement scores. Herman (2004)

discussed additional benefits of a more inclusive grade span configuration including student-teacher relationships exist over a longer period of time, greater parental involvement, opportunity for older students to mentor younger students, and increased teacher collaboration.

Readers should recognize, however, that other researchers (e.g., Carolan & Chesky, 2012; Wilson & Slate, 2014) have investigated and reported that grade span configuration was not related to the academic achievement of the population studied. Carolan and Chesky (2012) and Wilson and Slate (2014) conducted studies in which they reviewed the influence of grade span configuration and school attachment on academic achievement. These researchers reported that grade span configurations did not play a statistically significant role in the academic achievement of middle school students.

Connection to Theoretical Framework

In this article, the school connectedness theory (McCormick & O'Conner, 2015; Rimm-Kaufman et al., 2015; Woolley & Brown, 2007) was used as the theoretical framework. McCormick and O'Conner (2015) contended that girls tend to be more successful in their classrooms due to their ability to form and maintain closer relationships with their instructors than do their male peers. However, Rimm-Kaufman et al. (2015) analyzed the components of a classroom and stated that boys had higher cognitive and emotional engagement when the classroom was organized and provided a high level of instructional support. Woolley and Brown (2007) noted that students who had a high presence of supportive adults had higher engagement in schools, thus had higher academic performance. The results of this study are commensurate with the findings of these authors. Boys and girls in Grades 5 and 6 who attended a multi-grade

level school setting had higher passing rates for reading and mathematics for every year analyzed than their peers who attended single/double grade span configured school settings. Students in multi-grade level settings would have had a greater opportunity to develop close relationships with the school staff for a longer period of time, up to eight to 10 years, as compared with their peers at a single/double grade level configuration.

Implications for Policy and Practice

In this multiyear analysis of academic achievement and grade span configuration, Grade 5 and 6 boys and girls who were enrolled in schools with multi-grade level configurations had the highest passing rates on the STAAR Reading and Mathematics assessments. Grade span configuration has substantial implications for education policy and practice. First, educational leaders need to examine the current grade span configurations of their schools. If their school districts contain schools with a limited number of grade levels, they may seriously consider reconfiguration. Not only would this reconfiguration benefit the connectedness of the students, it should enhance academic performance. Moreover, it would also create a more cohesive and collaborative environment among staff members and between grade levels in vertical alignment activities. Additionally, schools that have multi-grade level configurations have a reduced number of transitions between schools. This phenomena allows for greater consistency among students and families with their home to school relationships, greater consistency between multiple students within one family unit, greater focus on academics versus redefining social statuses, and a supportive staff and peer group for a longer period of time. For future school construction, Texas legislators should examine the extant literature on grade span configuration and student performance.

Recommendations for Future Research

In this study, differences in passing rates in reading and in mathematics were examined for Texas boys and girls as a function of grade span configuration. The results that were obtained were consistent across both grade levels and all three years analyzed for both boys and girls. Accordingly, researchers are encouraged to extend this study to other groups of students such as at-risk or English Language Learners to determine whether grade span configuration is related to their academic achievement. Researchers may also wish to include additional subject areas such as science, writing, and social studies. Additionally, researchers are encouraged to analyze individual student data as provided by the Texas Education Agency Public Education Information Management System. An investigation including individual student data would be more detailed than the aggregate information provided in this study. Such individual level analyses could be conducted by ethnicity/race, by student programmatic enrollment, and by school campus level. Researchers are also encouraged to replicate this study in other states. Because the sole focus in this investigation was on reading and mathematics achievement, future research needs to be conducted to determine the degree to which grade span configuration might be related to school connectedness variables such as attendance rates, truancy, and misbehaviors.

Because of the sole focus on quantitative data in this investigation, researchers are encouraged to examine qualitative data including perceptions of educational leaders, teachers, parents, and students regarding grade span configuration. As such, researchers are encouraged to conduct studies into the underlying reasons for the relationship between grade span configuration and academic achievement. Finally, a mixed method

research study would be beneficial to identify school personnel and student views on school connectedness as it relates to grade span configuration and how their perceptions match the academic achievement data at their schools.

Conclusion

The purpose of this research study was to determine the extent to which differences were present in reading and mathematics passing rates as a function of grade span configuration for boys and girls in Texas. Data were analyzed for all Grade 5 and 6 boys and girls who were enrolled in either multi-grade level schools (i.e., PK-6) or in single/double grade level schools (i.e., Grades 4-5, 5 only, or Grades 5-6) in Texas for the 2012-2013, 2013-2014, and the 2014-2015 school years. Statistically significant differences were present for all three school years for Grade 5 and 6 boys and girls in their reading and mathematics passing rates as a function of the grade span configuration of the school in which they were enrolled. Grade 5 and Grade 6 boys and girls had higher average passing rates in both reading and mathematics in multi-grade level settings than in single/double grade level settings. Congruent with previous researchers (Clark et al., 2013; Combs et al., 2011; Kieffer, 2013), boys and girls who were enrolled in multi-grade level school settings had higher levels of academic success than did their peers who were enrolled in single/double grade span settings.

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Table 3.1

Descriptive Statistics for the STAAR Reading Passing Rates by Grade Span Configuration for Grade 5 Boys for the 2012-2013 Through the 2014-2015 School Years

Grade Span Configuration	*n* of schools	*M*	*SD*
2012-2013			
Single/Double	241	84.38	9.28
Multi-Grade Level	110	89.05	11.06
2013-2014			
Single/Double	245	82.97	10.05
Multi-Grade Level	112	89.62	10.50
2014-2015			
Single/Double	244	83.68	10.49
Multi-Grade Level	403	85.67	12.44

Table 3.2

Descriptive Statistics for the STAAR Reading Passing Rates by Grade Span Configuration for Grade 5 Girls for the 2012-2013 Through the 2014-2015 School Years

Grade Span Configuration	*n* of schools	*M*	*SD*
2012-2013			
Single/Double	241	87.39	7.94
Multi-Grade Level	111	91.56	9.37
2013-2014			
Single/Double	245	86.25	8.89
Multi-Grade Level	112	90.45	9.19
2014-2015			
Single/Double	244	88.03	8.46
Multi-Grade Level	412	90.37	10.13

Table 3.3

Descriptive Statistics for the STAAR Mathematics Passing Rates by Grade Span Configuration for Grade 5 Boys for the 2012-2013 and the 2013-2014 School Years

Grade Span Configuration	*n* of schools	*M*	*SD*
2012-2013			
Single/Double	241	85.81	9.71
Multi-Grade Level	110	89.17	11.54
2013-2014			
Single/Double	245	85.97	9.94
Multi-Grade Level	112	91.05	10.13

Table 3.4

Descriptive Statistics for the STAAR Mathematics Passing Rates by Grade Span Configuration for Grade 5 Girls for the 2012-2013 and the 2013-2014 School Years

Grade Span Configuration	*n* of schools	*M*	*SD*
2012-2013			
Single/Double	241	86.91	9.03
Multi-Grade Level	110	89.24	10.83
2013-2014			
Single/Double	245	86.98.	9.31
Multi-Grade Level	111	90.23	10.79

Table 3.5

Descriptive Statistics for the STAAR Reading Passing Rates by Grade Span Configuration for Grade 6 Boys for the 2012-2013 Through the 2014-2015 School Years

Grade Span Configuration	*n* of schools	*M*	*SD*
2012-2013			
Single/Double	202	72.04	12.24
Multi-Grade Level	111	78.36	15.81
2013-2014			
Single/Double	209	77.65	11.09
Multi-Grade Level	111	82.41	14.50
2014-2015			
Single/Double	180	77.36	12.25
Multi-Grade Level	400	80.83	14.50

Table 3.6

Descriptive Statistics for the STAAR Reading Passing Rates by Grade Span Configuration for Grade 6 Girls for the 2012-2013 Through the 2014-2015 School Years

Grade Span Configuration	*n* of schools	*M*	*SD*
2012-2013			
Single/Double	202	75.75	11.92
Multi-Grade Level	110	82.81	15.13
2013-2014			
Single/Double	209	82.80	9.65
Multi-Grade Level	111	87.33	12.17
2014-2015			
Single/Double	180	80.17	10.96
Multi-Grade Level	397	83.84	12.34

Table 3.7

Descriptive Statistics for the STAAR Mathematics Passing Rates by Grade Span Configuration for Grade 6 Boys for the 2012-2013 and the 2013-2014 School Years

Grade Span Configuration	*n* of schools	*M*	*SD*
2012-2013			
Single/Double	241	85.81	9.71
Multi-Grade Level	110	89.17	11.54
2013-2014			
Single/Double	245	85.97	9.94
Multi-Grade Level	112	91.05	10.13

Table 3.8

Descriptive Statistics for the STAAR Mathematics Passing Rates by Grade Span Configuration for Grade 6 Girls for the 2012-2013 and the 2013-2014 School Years

Grade Span Configuration	*n* of schools	*M*	*SD*
2012-2013			
Single/Double	202	76.52	12.55
Multi-Grade Level	110	81.96	17.28
2013-2014			
Single/Double	209	82.64	10.89
Multi-Grade Level	112	87.37	11.83

Table 3.9

Cohen's d for Differences in the STAAR Reading and Mathematics Passing Rates by Grade Span Configuration for Grade 5 and 6 Boys and Girls for the 2012-2013 Through the 2014-2015 School Years

Grade and Subject	2012-2013	2013-2014	2014-2015
Grade 5 Boys			
STAAR Reading	0.46	0.65	0.17
STAAR Mathematics	0.32	0.51	N/A
Grade 5 Girls			
STAAR Reading	0.48	0.46	0.25
STAAR Mathematics	0.23	0.32	N/A
Grade 6 Boys			
STAAR Reading	0.45	0.37	0.26
STAAR Mathematics	0.22	0.44	N/A
Grade 6 Girls			
STAAR Reading	0.52	0.41	0.32
STAAR Mathematics	0.36	0.42	N/A

Table 3.10

Differences in the STAAR Reading and Mathematics Passing Rates by Grade Span Configuration for Grade 5 Boys and Girls for the 2012-2013 Through the 2014-2015 School Years

Grade, Subject, and Year	Mean Difference	Grade Span With Highest Passing Rate
Grade 5 Boys		
STAAR Reading		
2012-2013	4.68	Multi-Grade Level
2013-2014	6.65	Multi-Grade Level
2014-2015	1.99	Multi-Grade Level
STAAR Mathematics		
2012-2013	3.37	Multi-Grade Level
2013-2014	5.09	Multi-Grade Level
Grade 5 Girls		
STAAR Reading		
2012-2013	4.17	Multi-Grade Level
2013-2014	4.19	Multi-Grade Level
2014-2015	2.34	Multi-Grade Level
STAAR Mathematics		
2012-2013	2.32	Multi-Grade Level
2013-2014	3.24	Multi-Grade Level

Table 3.11

Differences in the STAAR Reading and Mathematics Passing Rates by Grade Span Configuration for Grade 6 Boys and Girls for the 2012-2013 Through the 2014-2015 School Years

Grade, Subject, and Year	Mean Difference	Grade Span With Highest Passing Rate
Grade 6 Boys		
STAAR Reading		
2012-2013	6.32	Multi-Grade Level
2013-2014	4.76	Multi-Grade Level
2014-2015	3.46	Multi-Grade Level
STAAR Mathematics		
2012-2013	6.05	Multi-Grade Level
2013-2014	5.54	Multi-Grade Level
Grade 6 Girls		
STAAR Reading		
2012-2013	7.06	Multi-Grade Level
2013-2014	4.53	Multi-Grade Level
2014-2015	3.68	Multi-Grade Level
STAAR Mathematics		
2012-2013	5.44	Multi-Grade Level
2013-2014	4.73	Multi-Grade Level

CHAPTER IV

DIFFERENCES IN READING AND MATHEMATICS PERFORMANCE BY GRADE SPAN CONFIGURATION FOR WHITE, BLACK, AND HISPANIC STUDENTS: A MULTIYEAR, STATEWIDE ANALYSIS

This dissertation follows the style and format of *Research in the Schools (RITS)*.

Abstract

Three years of Texas statewide data were analyzed to determine the degree to which two grade span configurations (i.e., multi-grade and single/double grade levels) influenced the reading and mathematics performance of Grade 5 and 6 White, Black, and Hispanic students. Data were obtained from the Texas Education Agency for all Grade 5 and 6 White, Black, and Hispanic students who were enrolled in either single/double grade level (Grades 4-5, 5 only, or Grades 5-6) or multi-grade level (PreK-6) configurations for the 2012-2013 through the 2014-2015 school years. In all cases, reading and mathematics passing rates were statistically significantly higher in multi-grade level settings for Grade 5 and 6 White, Black, and Hispanic students than for their peers in single/double grade level settings. Implications for policy and practice are provided.

Keywords: Grade span configuration, Academic achievement, Ethnicity, White, Black, Hispanic

DIFFERENCES IN READING AND MATHEMATICS PERFORMANCE BY GRADE SPAN CONFIGURATION FOR WHITE, BLACK, AND HISPANIC STUDENTS: A MULTIYEAR, STATEWIDE ANALYSIS

The issue of segregation, desegregation, equality, and success of all students regardless of ethnicity/race have been an ongoing theme since the onset of public education in the United States. In 1954 the U.S. Supreme Court unanimously ruled

> to separate them [African American school children] from others of similar age and qualifications solely due to their race generates a feeling of inferiority as their status in the community that may affect their hearts and minds in a way unlikely to ever be undone. (Brown versus the Board of Education of Topeka Kansas, 347 U.S. 483, 1954)

Even though this ruling was historical and was intended to integrate children of all ethnic/racial groups into public schools, Kozol (2010) contended that the segregation of public schools is currently at its highest levels since the 1960s.

Many reasons including social, educational, and financial exist to explain why students of different ethnic/racial groups still remain largely separate in public schools. Gandara and Aldana (2014) described how Hispanic students have a triple separation by ethnicity, poverty, and language. By the year 2011, the English learners have experienced the greatest impact of segregation with 90-100% of Hispanic students in minority schools with low income students (Gandara & Aldana, 2014). Farkas (2006) reviewed that families closer to the bottom of status hierarchies have weaker networks of social relationships, fewer resources for parenting, and an increased amount of negative stressors in their daily lives. Many stressors including living in poverty, being a single

parent, parents' education, parents' home language, and social class are just a few items that contribute to the gap in performance among various ethnicities.

Utilizing the demographic information of the families who participated in the Early Childhood Longitudinal Study-Kindergarten, a nationally representative group of children who began kindergarten in 1998, Farkas (2006) analyzed a variety of social and familial factors which can affect school readiness status. Black students had the highest rate of single parent families at 54%, followed by Hispanic students who had 27%, followed by White students who had 15%, and concluding with Asian students who had 10% of single parent families. These children only had one parent providing attention, interaction, instruction, monitoring, and financial resources devoted to their education. Additionally, Black and Hispanic children had the highest percentage living in poverty, 42% and 37% respectfully. This degree of economic disadvantage results in fewer available resources. Black families had an average of 39.6 children's books in their households and only 32.9% of Black families had a computer. Hispanic families had an average of 52.5 children's books in their households with 41.5% of Hispanic families owning a computer. In contrast, White families had an average of 93.1 children's books in their households with 65.7% of White families owning a household computer. Although owning books and computers is an imperfect measure of school readiness, discrepancies are clearly present in the number of resources available to children of different ethnic/racial groups. Overall, a "performance decrement" (Farkas, 2006, p. 24) is associated with the Black and Hispanic ethnicity/race, with an additional performance decrement of being a second language learner.

Davis-Kean and Jager (2014) utilized the same data set, Early Childhood Longitudinal Study- Kindergarten, and investigated whether different profiles of reading and mathematics achievement were present within each ethnic/racial group. Davis-Kean and Jager (2014) documented the presence of students from each ethnicity/race in the highest levels of academic achievement. White and Asian families had a higher percentage of students in the high achieving trajectory than Black and Hispanic families. Every ethnic/racial group had students performing below the population average, however, Black students had the highest percentage of all ethnic groups, 72%, performing below the population average. High performing Black students had scores that were 10 points lower than Hispanic and Asian students, and 20 points lower than White students, demonstrating the presence of an achievement gap among the highest performing students.

The gap among ethnic/racial groups continues to exist as students and their families prepare for high school completion and college entrance. Mangino (2012) reported that White students have less of a need for educational investments because they have many information opportunities available to them which allows for economic success including social networks, and high returns in economic and human capital investments. Mangino (2012) utilized data from the National Longitudinal Study of Adolescent Health and Adolescent Health and Academic Achievement to review ethnic/racial disparities among entering college students. Asian students had the highest percentage attending college, followed by White, Hispanic, and Black students. Hispanic and Black populations, or the "aspiring class" (Mangino, 2012, p. 565), rely on education to improve their standard of living, status, and prestige.

The federal government has attempted to address the academic performance of all students and reduce gaps by implementing a federal law, the No Child Left Behind Act in 2002. The No Child Left Behind Act was designed to hold all schools accountable for poor students via high stakes testing, introducing competitive choices to opt out of struggling schools, and increasing family involvement (Grogan-Kaylor & Woolley, 2010). Grogan-Kaylor and Woolley (2010) commented that the No Child Left Behind Act has not concentrated efforts on considering societal factors that affect the academic achievement of Black, Hispanic, and students in poverty including parenting styles, neighborhood conditions, school social climate, family economic status, and the school funding system. A school funding system based on property wealth has encouraged the further separation of students based on their economic wealth. Kozol (2005) identified that property value funding leads Hispanic and Black students to experience (a) lower paid teachers, (b) higher teacher-student ratios, (c) older teaching materials, (d) fewer extracurricular activities, (e) poorly maintained school buildings, and (f) less access to critical social services such as nurses and social workers.

An important concept for students of all ethnic/racial groups that may assist in overcoming the deficits they face is the value of school connectedness and parental involvement. School connectedness and school engagement and their effect on academic achievement are concepts that have been investigated by educators and psychologists alike (Benner, Graham, & Mistry, 2008; Carolan & Chesky, 2012). In an examination of the effects of family and school characteristics on school achievement, Benner et al. (2008) utilized a large multiethnic, urban sample of Grade 9 students to determine various ecological structures that have an impact on student academic performance.

Student records, family climate, school climate, school belonging, and school interracial surveys were all utilized in this investigation. Benner et al. (2008) shared that differences in ethnicities arose on the items related to school size. Hispanic and Black students reported that the increased school size was associated with negative perceptions of the academic climate and school achievement level. Additionally, Hispanic and Black families faced hardships that limited school involvement: (a) most were immigrants and spoke a language other than English at home, (b) many had jobs with inflexible hours and/or had multiple jobs, and (c) financial constraints created challenges of transportation to the school. Benner et al. (2008) contended "finding ways to better connect families to schools is imperative for the educational success of these youth" (p. 851).

Numerous avenues exist to encourage parental involvement, school connectedness, and the academic achievement of students of all ethnic/racial groups. One such avenue is the grade span configuration of schools. The breadth of the grades included in a school building can support or depress the social and academic achievement of students in school and encourage or discourage parental involvement.

Abella (2005) investigated the effects of various grade span configurations on the academic performance, discipline, and attendance of students in Grade 6 in K-8 school settings and Grades 6-8 (middle) school settings by administering surveys to parents, teachers, and principals. The majority of the participants were on free or reduced lunch in both settings. In the K-8 setting, the student sample group consisted of 85% Hispanic and the middle school (comparison school) was 78% Hispanic. Abella (2005) analyzed scores in reading and mathematics, attendance rates, and discipline consequences for three years (during the students' sixth, seventh, and eighth grade school years). For each

year, students in the K-8 school setting outperformed students in middle school in reading comprehension and mathematics. By Grade 9, both groups of students scored similarly in reading comprehension and mathematics. Additionally, the attendance rate was higher for all years analyzed for the K-8 setting. In regard to discipline consequences, the out-of-school suspension rate was statistically significantly different in the seventh grade year, less than two days of suspensions in K-8 versus seven days of suspension in the 6-8 configuration. By the eighth grade, the suspension rates were similar.

In contrast, Wilson and Slate (2014) investigated Grade 6 Hispanic and Black students' academic achievement based on their school's grade span configuration. Hispanic students who were enrolled in Texas middle schools had statistically significant higher mathematics passing rates, 78.43%, than did the Hispanic students enrolled in K-8 schools, 72.17%. Wilson and Slate (2014) commented that their results were contrary to current literature on grade span configuration and academic achievement. As such, they recommended that future researchers analyze individual student level data, rather than the aggregated school level data they analyzed.

The Carnegie Council on Adolescent Development (1989) reported "a volatile mismatch exists between the organization and curriculum of middle grades schools, and the intellectual, emotional, and interpersonal needs of young adolescents" (pp. 8-9). Mizell (2005) shared that a critical requirement for a successful academic outcome for middle school students is a more personalized setting where students are in contact with adults who know them well and provide academic and emotional support. Personalized settings will be more available in smaller elementary configurations versus larger middle school settings. Anderman (2003) also commented that the longer middle school

students remained in the Grade 6-8 configuration, their sense of acceptance and school connectedness decreased.

Benner et al. (2008) shared the idea that in the school microsystem, educators need to implement interventions that increase students' feelings of belonging and connectedness which positively influences academic achievement. In the family microsystem level, schools need to intervene to encourage greater levels of parent involvement which is directly related to increased academic performance- higher grades, increased achievement test scores, and increased rating of students' academic attitudes (Benner et al., 2008). Benner et al. (2008) examined relations among family and school characteristics, family and school processes, student school engagement, and academic performance. Benner et al. (2008) clarified that students' engagement in school influences their feelings of belonging, thus, influences their families' involvement in their child's academics. School configurations, relationships with staff, less transitions/adjustments made by students, and the involvement of the parental community are main reasons why a larger grade span configuration may increase the academic performance of students. Abella (2005) noted, "educators and researchers also believe that the beneficial effects of K-8 schools can be attributed to smaller student populations at the schools and to staff being more familiar with students and their parents" (p. 29). The greater the grade span in the school setting, the greater the preponderance of relationship building and feelings of school connectedness for individual students and their families.

Statement of the Problem

Numerous authors and researchers (e.g., Anderson, 2012; Davis-Kean & Jager, 2014; Diamond & Huguley, 2014; Flashman, 2012; Gandara & Aldana, 2014; Grogan-Kaylor & Woolley, 2010; Mangino, 2012) have investigated and documented discrepancies in the academic achievement of Black and Hispanic students from White and Asian students. By 2042, the population of the United States will become more racially diverse with the population of minorities (everyone other than non-Hispanic White) becoming the majority (U.S. Census Bureau, 2010). Black and Hispanic children are being raised in families with fewer resources and in a higher percentage of single parent families than the White and Asian children, and on average Black and Hispanic families experience more negative stressors. These stressors have assisted in creating large reading, mathematics, and behavioral readiness gaps during preschool years (Farkas, 2006). One approach that educational leaders can consider to combat the variety of stressors and needs of students from diverse backgrounds includes adjusting the grade span configuration of their schools.

Although grade span configuration has been analyzed by researchers (Clark, Slate, Combs, & Moore, 2013; Combs, et al., 2011; Johnson, Jones, Simieou, Matthew, & Morgan, 2012; Rockoff & Lockwood, 2010), what has not been investigated in depth is the effect of grade span configuration on the academic success of elementary and middle students based on their ethnicity/race. School connectedness and relationships that are developed as students are engaged with their teachers and friends for a greater span of time are extremely important for students of all racial and ethnic groups.

Purpose of the Study

The purpose of this research investigation was to determine the degree to which differences might be present in the reading and mathematics performance of Grade 5 and 6 White, Hispanic, and Black students as a function of the grade span configuration in which they were enrolled. These analyses were conducted for the 2012-2013 through the 2014-2015 school years so that trends could be ascertained, if present. As such, the extent to which grade span configuration was related to academic achievement was determined separately for students in a PreK-6 grade campus and for students in single or double grade campuses (Grades 4-5, 5 only, or Grades 5-6).

Significance of the Study

In a review of the benefits of a larger grade span configuration, Herman (2004) noted that students have better relationships with staff members, teachers can collaborate and devise creative approaches to learning, parent involvement increases, and older students can serve as role models and mentors to younger students creating a safer atmosphere. Meeting the physical, academic, social, and emotional challenges of all grade level students, particularly students in a transition phase of maturity, is important for student success. Grade span configuration may be one vital opportunity in meeting these needs. Through this study valuable information was obtained on the relationship of grade span configuration with the academic achievement (i.e., reading and mathematics) of White, Black, and Hispanic students within multi-grade level or single/double grade span configurations. Upon the completion of this research study, empirical information will be available to educational leaders and policymakers for their use in the determination of the most appropriate grade span configuration in their schools.

Furthermore, the extent to which reading and mathematics achievement as a function of grade span configuration for students of diverse backgrounds was determined. Accordingly, policymakers and educational leaders may utilize this information to determine how to configure their school settings to improve their students' academic performance.

Research Questions

The following research questions were addressed in this study: (a) What is the difference in reading achievement as a function of grade span configuration for Grade 5 White, Black, and Hispanic students? (b) What is the difference in mathematics achievement as a function of grade span configuration for Grade 5 White, Black, and Hispanic students?; (c) What is the difference in reading achievement as a function of grade span configuration for Grade 6 White, Black, and Hispanic students?; and (d) What is the difference in mathematics achievement as a function of grade span configuration for Grade 6 White, Black, and Hispanic students? All four research questions were examined for three school years of data (i.e., 2012-2013 through 2014-2015). Furthermore, each research question was analyzed separately for each ethnic/racial membership. Following the statistical analyses, the extent to which trends were present in reading and in mathematics achievement were examined for each grade span configuration.

Method

Research Design

The research design for this study was a non-experimental, causal-comparative research design (Creswell, 2009; Johnson & Christensen, 2012). In non-experimental

causal-comparative research, the independent variable cannot be manipulated. In this multiyear, statewide investigation, the independent variable of grade span configuration had already occurred and extraneous variables were not controlled. The archival data that were utilized herein represent past events (Johnson & Christensen, 2012). The independent variable involved in this research article was grade span configuration (i.e., multi-grade level schools or single/double grade level schools). For each grade span configuration, the dependent variables were the State of Texas Assessments of Academic Readiness (STAAR) Reading and Mathematics passing rates of Grade 5 and 6 students. Three different samples of student data were analyzed: White, Black, and Hispanic students.

Participants and Instrumentation

Archival data were obtained for the 2012-2013 through the 2014-2015 school years from the Texas Education Agency AskTexas Education Directory (Texas Education Agency, 2016) and Texas Academic Performance Reports system for all Grade 5 and 6 students. Once the test scores for all students in Grades 5 and 6 were available, they were analyzed separately for three ethnic/racial groups: White, Black, and Hispanic. All school campuses and school districts are mandated by the Texas Education Agency to report student demographic characteristics, along with other salient information. Each spring students take the state-mandated assessments and the score are provided to the Texas Education Agency. Data present for each student are audited by the Texas Education Agency for errors.

Specific data downloaded from the Texas Education Agency Academic Performance Reports were: (a) grade span configuration of the school in which each

student was enrolled; (b) student demographic characteristics; and (c) reading and mathematics achievement passing rates. Readers are referred to the Texas Education Agency website for more detailed information about the data they require school campuses and school districts to provide; for the auditing procedures used to ensure accuracy of the data; and for the technical manuals on the score reliabilities and score validities of the STAAR Reading and Mathematics tests.

Results

Prior to conducting inferential statistics to determine whether differences were present between single/double and multi-grade level schools in the academic achievement of White, Black, and Hispanic students in Grades 5 and 6, checks were conducted to determine the extent to which these data were normally distributed (Onwuegbuzie & Daniel, 2002). Although some of the data were not normally distributed, a decision was made to use parametric independent samples *t*-tests to answer the research questions. For results that were statistically significant at the .05 level, the effect size (i.e., Cohen's *d*) was calculated. Statistical results will now be presented by grade level, student ethnicity, subject area, and by school year.

With respect to Grade 5 White students for the 2012-2013 school year, the parametric independent samples *t*-test revealed a statistically significant difference, $t(161.85) = 3.61$, $p < .001$, in the STAAR Reading test passing rates between single/double grade level schools and multi-grade level schools. This difference represented a small effect size (Cohen's *d*) of 0.45 (Cohen, 1988). Grade 5 White students had higher average STAAR Reading passing rates in multi-grade level schools by more than 3.5% than did Grade 5 White students who were enrolled in single/double

grade level schools. Readers are directed to Table 4.1 for the descriptive statistics for this analysis.

Insert Table 4.1 about here

Concerning the 2013-2014 school year for Grade 5 White students, the parametric independent samples *t*-test yielded a statistically significant difference, $t(157.85) = 3.64$, $p < .001$, on the STAAR Reading test passing rates as a function of grade span configuration. This difference represented a small effect size (Cohen's *d*) of 0.45 (Cohen, 1988). Congruent with the previous year, Grade 5 White students had higher average STAAR Reading passing rates in multi-grade level schools by more than 3.5% than did Grade 5 White students who were enrolled in single/double grade level schools. The descriptive statistics for this analysis are presented in Table 4.1.

With respect to the 2014-2015 school year for Grade 5 White students, a statistically significant difference was present, $t(520.55) = -3.30$, $p = .001$, on the STAAR Reading test passing rates between the two grade span configurations. This difference represented a small effect size (Cohen's *d*) of 0.28 (Cohen, 1988). Commensurate with the previous two years, Grade 5 White students had higher average STAAR Reading passing rates in multi-grade level schools by more than 2.25% than did Grade 5 White students who were enrolled in single/double grade level schools. The descriptive statistics for this analysis are revealed in Table 4.1.

For the 2012-2013 school year for Grade 6 White students, a statistically significant difference was yielded, $t(163.39) = 2.72$, $p = .007$, in the STAAR Reading test

passing rates between single/double grade level schools and multi-grade level schools. This difference represented a small effect size (Cohen's *d*) of 0.35 (Cohen, 1988). Grade 6 White students had higher average STAAR Reading passing rates in multi-grade level schools by more than 4% than did Grade 6 White students who were enrolled in single/double grade level schools. Delineated in Table 4.2 are the descriptive statistics for this analysis.

Insert Table 4.2 about here

Regarding the 2013-2014 school year for Grade 6 White students, a statistically significant difference was revealed, $t(155.48) = 2.18$, $p = .03$, on the STAAR Reading test passing rates as a function of grade span configuration. This difference represented a small effect size (Cohen's *d*) of 0.28 (Cohen, 1988). Congruent with the previous year, Grade 6 White students had higher average STAAR Reading passing rates in multi-grade level schools by more than 3% than did Grade 6 White students who were enrolled in single/double grade level schools. Revealed in Table 4.2 are the descriptive statistics for this analysis.

With respect to the 2014-2015 school year for Grade 6 White students, a statistically significant difference was yielded, $t(349.06) = -4.11$, $p < .001$, on the STAAR Reading test passing rates as a function of grade span configuration. This difference represented a small effect size (Cohen's *d*) of 0.39 (Cohen, 1988). Commensurate with the previous two years, Grade 6 White students had higher average STAAR Reading passing rates in multi-grade level schools by more than 3.75% than did Grade 6 White

students who were enrolled in single/double grade level schools. The descriptive statistics for this analysis are presented in Table 4.2.

Next, the STAAR Mathematics test passing rates were analyzed as a function of grade span configuration for Grade 5 White students. Regarding the 2012-2013 school year, a statistically significant difference was yielded, $t(152.95) = 2.02$, $p = .05$, on the STAAR Mathematics test passing rates between the two grade span configurations. The difference represented a small effect size (Cohen's *d*) of 0.26 (Cohen, 1988). Passing rates on the STAAR Mathematics test for Grade 5 White students in multi-grade level schools were 2.25% higher than for Grade 5 White students who were enrolled in single/double grade level schools. Revealed in Table 4.1 are the descriptive statistics for this analysis.

With respect to the 2013-2014 school year for Grade 5 White students, the parametric independent samples *t*-test revealed a statistically significant difference, $t(165.23) = 3.04$, $p = .003$, $d = 0.38$, in STAAR Mathematics passing rates between the two grade span configurations. The difference represented a small effect size (Cohen, 1988). Grade 5 White students who were enrolled in multi-grade level campuses had average passing rates that were 3.25% higher on the STAAR Mathematics assessment than did Grade 5 White students who were enrolled in single/double grade level campuses. Readers are referred to Table 4.1 for the descriptive statistics for this analysis.

Next, the STAAR Mathematics test passing rates were analyzed as a function of grade span configuration for Grade 6 White students. Regarding the 2012-2013 school year, a statistically significant difference was revealed, $t(156.59) = 2.02$, $p = .05$, $d = 0.26$, on the STAAR Mathematics test passing rates as a function of grade span

configuration. The difference represented a small effect size (Cohen, 1988). Grade 6 White students who were enrolled in multi-grade level campuses had a higher average passing rate in mathematics by more than 3.25% than did Grade 6 White students in single/double grade level schools. Table 4.2 contains the descriptive statistics for this analysis.

Concerning the 2013-2014 school year for Grade 6 White students, a statistically significant difference was not present, $t(156.44) = 1.38$, $p = .17$, in STAAR Mathematics passing rates between the two grade span configurations. Although the results were not statistically significant, Grade 6 White students had a higher average STAAR Mathematics passing rate in multi-grade level schools by 2.15% than Grade 6 White students in single/double grade level schools. Readers are referred to Table 4.2 for the descriptive statistics for this analysis.

Results of the statistical analyses for Grade 5 and 6 Black students will now be reported. For the 2012-2013 school year for Grade 5 Black students, a statistically significant difference was yielded, $t(74.25) = 4.15$, $p < .001$, $d = 0.68$, on the STAAR Reading passing rates between single/double grade level schools and multi-grade level grade schools. This difference represented a moderate effect size (Cohen, 1988). Grade 5 Black students had STAAR Reading passing rates in multi-grade level schools that were more than 7.75% higher than Grade 5 Black students who were enrolled in single/double grade level schools. Table 4.3 contains for the descriptive statistics for this analysis.

Insert Table 4.3 about here

Regarding the 2013-2014 school year for Grade 5 Black students, a statistically significant difference was yielded, $t(96.47) = 4.03$, $p < .001$, $d = 0.62$, on the STAAR Reading test passing rates as a function of grade span configuration. This difference represented a moderate effect size (Cohen, 1988). Congruent with the previous year, Grade 5 Black students had higher average STAAR Reading passing rates in multi-grade level schools by more than 7% than did Grade 5 Black students who were enrolled in single/double grade level schools. The descriptive statistics for this analysis are presented in Table 4.3.

With respect to the 2014-2015 school year for Grade 5 Black students, a statistically significant difference was revealed, $t(319.93) = -2.23$, $p = .027$, $d = 0.25$, on the STAAR Reading test passing rates as a function of grade span configuration. This difference represented a small effect size (Cohen, 1988). Commensurate with the previous two years, Grade 5 Black students had higher STAAR Reading passing rates in multi-grade level schools by more than 3.15% than did Grade 5 Black students who were enrolled in single/double grade level schools. Table 4.3 contains the descriptive statistics for this analysis.

For the 2012-2013 school year for Grade 6 Black students, a statistically significant difference was present, $t(63.29) = 4.34$, $p < .001$, $d = 0.77$, in the STAAR Reading test passing rates between single/double grade level schools and multi-grade level schools. This difference represented a moderate effect size (Cohen, 1988). Grade 6

Black students had STAAR Reading passing rates in multi-grade level schools that were more than 11.25% higher than Grade 6 Black students who were enrolled in single/double grade level schools. Readers are directed to Table 4.4 for the descriptive statistics for this analysis.

Insert Table 4.4 about here

Concerning the 2013-2014 school year for Grade 6 Black students, a statistically significant difference was yielded, $t(77.04) = 3.65$, $p < .001$, $d = 0.61$, on the STAAR Reading test passing rates as a function of grade span configuration. This difference represented a moderate effect size (Cohen, 1988). Congruent with the previous year, Grade 6 Black students had higher average STAAR Reading passing rates in multi-grade level schools by more than 8.4% than did Grade 6 Black students who were enrolled in single/double grade level schools. The descriptive statistics for this analysis are presented in Table 4.4.

With respect to the 2014-2015 school year for Grade 6 Black students, a statistically significant difference was revealed, $t(274.95) = -2.73$, $p = .007$, $d = 0.32$, on the STAAR Reading test passing rates as a function of grade span configuration. This difference represented a small effect size (Cohen, 1988). Commensurate with the previous two years, Grade 6 Black students had higher average STAAR Reading passing rates in multi-grade level schools by 4.7% than did Grade 6 Black students who were enrolled in single/double grade level schools. Revealed in Table 4.4 are the descriptive statistics for this analysis.

Next, the STAAR Mathematics test passing rates were analyzed as a function of grade span configuration for Grade 5 Black students. Regarding the 2012-2013 school year, a statistically significant difference was present, $t(82.83) = 2.88$, $p = .005$, $d = 0.46$, on the STAAR Mathematics test passing rates as a function of grade span configuration. The difference represented a small effect size (Cohen, 1988). Grade 5 Black students had higher average STAAR Mathematics passing rates in multi-grade level schools by more than 5.9% than Grade 5 Black students who were enrolled in single/double grade level schools. Table 4.3 contains the descriptive statistics for this analysis.

With respect to the 2013-2014 school year for Grade 5 Black students, a statistically significant difference was revealed, $t(93.03) = 2.87$, $p = .005$, $d = 0.45$, on the STAAR Mathematics passing rates between the two grade span configurations. This difference represented a small effect size (Cohen, 1988). Commensurate with the previous year, Grade 5 Black students had higher average STAAR Mathematics passing rates in multi-grade level schools by more than 5.99% than did Grade 5 Black students who were enrolled in single/double grade level schools. Revealed in Table 4.3 are the descriptive statistics for this analysis.

The STAAR Mathematics test passing rates were next analyzed as a function of grade span configuration for Grade 6 Black students. Regarding the 2012-2013 school year, a statistically significant difference was yielded, $t(64.79) = 4.94$, $p < .001$, $d = 0.88$, on the STAAR Mathematics test passing rates as a function of grade span configuration. The difference represented a large effect size (Cohen, 1988). Grade 6 Black students had higher average STAAR Mathematics passing rates in multi-grade level schools by more

than 13.65% than did Grade 6 Black students who were enrolled in single/double grade level schools. Delineated in Table 4.4 are the descriptive statistics for this analysis.

With respect to the 2013-2014 school year for Grade 6 Black students, a statistically significant difference was revealed, $t(96.96) = 4.01$, $p < .001$, $d = 0.63$, on the STAAR Mathematics passing rates between the two grade span configurations. This difference represented a moderate effect size (Cohen, 1988). Commensurate with the previous year, Grade 6 Black students had higher average STAAR Mathematics passing rates in multi-grade level schools by 8.95% than Grade 6 Black students who were enrolled in single/double grade level schools. The descriptive statistics for this analysis are presented in Table 4.4.

Results of the statistical analyses for Grade 5 and 6 Hispanic students will now be reported. For the 2012-2013 school year, the parametric independent samples *t*-test revealed a statistically significant difference, $t(162.61) = 4.26$, $p < .001$, $d = 0.52$, on the STAAR Reading passing rates between single/double grade level schools and multi-grade level schools. This difference represented a moderate effect size (Cohen, 1988). Grade 5 Hispanic students had STAAR Reading passing rates in multi-grade level schools that were more than 5% higher than Grade 5 Hispanic students who were enrolled in single/double grade level schools. Readers are directed to Table 4.5 for the descriptive statistics for this analysis.

Insert Table 4.5 about here

Concerning the 2013-2014 school year for Grade 5 Hispanic students, a statistically significant difference was revealed, $t(183.50) = 4.83$, $p < .001$, $d = 0.57$, on the STAAR Reading test passing rates as a function of grade span configuration. This difference represented a moderate effect size (Cohen, 1988). Congruent with the previous year, Grade 5 Hispanic students had higher average STAAR Reading passing rates in multi-grade level schools by more than 5.75% than did Grade 5 Hispanic students who were enrolled in single/double grade level schools. The descriptive statistics for this analysis are presented in Table 4.5.

With respect to the 2014-2015 school year for Grade 5 Hispanic students, a statistically significant difference was yielded, $t(572.27) = -3.16$, $p = .002$, $d = 0.26$, on the STAAR Reading test passing rates as a function of grade span configuration. This difference represented a small effect size (Cohen, 1988). Commensurate with the previous two years, Grade 5 Hispanic students had higher average STAAR Reading passing rates in multi-grade level schools by more than 2.75% than did Grade 5 Hispanic students who were enrolled in single/double grade level schools. Revealed in Table 4.5 are the descriptive statistics for this analysis.

For the 2012-2013 school year for Grade 6 Hispanic students, a statistically significant difference was present, $t(154.51) = 3.87$, $p < .001$, $d = 0.50$, on the STAAR Reading test passing rates between single/double grade level schools and multi-grade level schools. This difference represented a moderate effect size (Cohen, 1988). Grade 6 Hispanic students had STAAR Reading passing rates in multi-grade level schools that were more than 7.25% higher than Grade 6 Hispanic students who were enrolled in

single/double grade level schools. Table 4.6 contains the descriptive statistics for this analysis.

Insert Table 4.6 about here

Regarding the 2013-2014 school year for Grade 6 Hispanic students, a statistically significant difference was revealed, $t(158.95) = 2.78$, $p = .006$, $d = 0.35$, on the STAAR Reading test passing rates as a function of grade span configuration. This difference represented a small effect size (Cohen, 1988). Congruent with the previous year, Grade 6 Hispanic students had higher average STAAR Reading passing rates in multi-grade level schools by more than 4.25% than did Grade 6 Hispanic students who were enrolled in single/double grade level schools. The descriptive statistics for this analysis are presented in Table 4.6.

With respect to the 2014-2015 school year for Grade 6 Hispanic students, a statistically significant difference was present, $t(439.69) = -3.98$, $p < .001$, $d = 0.35$, on the STAAR Reading test passing rates as a function of grade span configuration. This difference represented a small effect size (Cohen, 1988). Commensurate with the previous two years, Grade 6 Hispanic students had higher average STAAR Reading passing rates in multi-grade level schools by 4.45% than did Grade 6 Hispanic students who were enrolled in single/double grade level schools. Revealed in Table 4.6 are the descriptive statistics for this analysis.

Next, the STAAR Mathematics test passing rates were analyzed as a function of grade span configuration for Grade 5 Hispanic students. For the 2012-2013 school year,

a statistically significant difference was yielded, $t(157.86) = 2.05$, $p = .042$, $d = 0.25$, on the STAAR Mathematics test passing rates as a function of grade span configuration. The difference represented a small effect size (Cohen, 1988). Grade 5 Hispanic students had higher average STAAR Mathematics passing rates in multi-grade level schools by more than 2.65% than Grade 5 Hispanic students who were enrolled in single/double grade level schools. The descriptive statistics for this analysis are presented in Table 4.5.

With respect to the 2013-2014 school year for Grade 5 Hispanic students, a statistically significant difference was revealed, $t(161.67) = 3.10$, $p = .002$, $d = 0.38$, on the STAAR Mathematics passing rates between the two grade span configurations. This difference represented a small effect size (Cohen, 1988). Commensurate with the previous year, Grade 5 Hispanic students had higher average STAAR Mathematics passing rates in multi-grade level schools by more than 4% than did Grade 5 Hispanic students who were enrolled in single/double grade level schools. Revealed in Table 4.5 are the descriptive statistics for this analysis.

The STAAR Mathematics test passing rates were next analyzed as a function of grade span configuration for Grade 6 Hispanic students. Regarding the 2012-2013 school year, a statistically significant difference was yielded, $t(155.81) = 2.94$, $p = .004$, $d = 0.38$, on the STAAR Mathematics test passing rates as a function of grade span configuration. The difference represented a small effect size (Cohen, 1988). Grade 6 Hispanic students had higher average STAAR Mathematics passing rates in multi-grade level schools by more than 5.45% than did Grade 6 Hispanic students who were enrolled in single/double grade level schools. Table 4.6 contains the descriptive statistics for this analysis.

With respect to the 2013-2014 school year for Grade 6 Hispanic students, a statistically significant difference was present, $t(176.20) = 3.26$, $p = .001$, $d = 0.40$, on the STAAR Mathematics passing rates between the two grade span configurations. This difference represented a small effect size (Cohen, 1988). Commensurate with the previous year, Grade 6 Hispanic students had higher average STAAR Mathematics passing rates in multi-grade level schools by 4.75% than Grade 6 Hispanic students who were enrolled in single/double grade level schools. The descriptive statistics for this analysis are presented in Table 4.6.

Discussion

In this investigation, the degree to which differences were present in reading and mathematics achievement as a function of grade span configuration for White, Black, and Hispanic students in Texas was examined. Three years of Texas statewide data were obtained and analyzed on White, Black, and Hispanic students in Grades 5 and 6 who were enrolled in either multi-grade level schools (i.e., PreK-6) or in single/double grade level campuses (i.e., Grades 4-5, 5 only, or Grades 5-6). For all three school years analyzed, the passing rates on the STAAR Reading and Mathematics tests for Grade 5 and 6 White, Black, and Hispanic students were statistically significantly higher in multi-grade level schools than in single/double grade level schools.

A Cohen's *d* (Cohen, 1988) was calculated to determine the practical importance of the passing rates differences for Grade 5 and 6 White, Black, and Hispanic students who were enrolled in either a single/double grade level configuration or a multi-grade level configuration for each subject area and school year. The array of the Cohen's *d* calculations for both the STAAR Reading and Mathematics analyses ranged from a low

of 0.25 to a high of 0.88, with the average being 0.57 for the three years of data analyzed. Thus, the average degree of practical significance of the statistically significant results was moderate (i.e., 0.50 is the beginning of the moderate effect size range). Readers are referred to Table 4.7 for the Cohen's *d* effect size calculations for the STAAR Reading and Mathematics analyses.

Insert Table 4.7 about here

With reference to the STAAR Reading results of Grade 5 White students, Cohen's *d* values ranged from a low of 0.28 to a high of 0.45 for the three years that were analyzed. For Grade 6 White students, Cohen's *d* values for the STAAR Reading results ranged from a low of 0.28 to a high of 0.39 for the same three years. In comparison, the Cohen's *d*s for the STAAR Reading results of Grade 5 Black students ranged from a low of 0.25 to a high of 0.68 for the same three years that were analyzed. The Cohen's *d* calculations for Grade 6 Black students on the STAAR Reading assessment ranged from 0.32 to 0.77. With reference to the STAAR Reading results of Grade 5 Hispanic students, Cohen's *d* values ranged from a low of 0.26 to a high of 0.57 for the three years that were analyzed. For Grade 6 Hispanic students, Cohen's *d* values for the STAAR Reading results ranged from a low of 0.35 to a high of 0.50 for the same three years. For both grade levels for all ethnic groups, students enrolled in multi-grade level schools performed at a higher rate on the STAAR Reading assessment than did their peers in single/double grade level schools. Students enrolled in multi-grade level schools had an average passing rate that was 2.32% to 11.35% higher than students enrolled in

single/double grade level schools. These Cohen's *d* calculations are presented in Table 4.7.

In regard to the STAAR Mathematics Assessment for Grade 5 White students, only two years of data were reported for the 2012-2013 and 2013-2014 school years. The Texas Education Agency had not established standards for the redesigned STAAR Mathematics assessment for the 2014-2015 school year, therefore, passing rates were not reported (Texas Education Agency, 2013). The difference in STAAR Mathematics passing rates as a function of grade span configuration for Grade 5 White students ranged from 0.26 to 0.38. The difference in average passing rates for the two years were 2.25% and 3.34%. For Grade 6 White students, the average difference in STAAR Mathematics passing rates as a function of grade span configuration ranged from 0.18 to 0.26 (i.e., Cohen's *d*). The difference in average passing rates for the two years were 3.28% and 2.15%. All of these averages were in favor of White students who were enrolled in multi-grade level schools in comparison to White students who were enrolled in single/double grade level schools. Readers are referred to Table 4.7 for these Cohen's *d* calculations.

With respect to the STAAR Mathematics Assessment for Grade 5 Black students, Cohen's *d*s ranged from 0.45 to 0.46. The difference in the average passing rates were 5.95% and 5.99%, both in favor of Grade 5 Black students who were enrolled in multi-grade level schools in comparison to Grade 5 Black students who were enrolled in single/double grade level schools. For Grade 6 Black students, the Cohen's *d* calculations ranged from 0.63 to 0.88. These Cohen's *d* values are delineated in Table 4.7.

Concerning the STAAR Mathematics Assessment for Grade 5 Hispanic students, Cohen's *d*s ranged from 0.25 to 0.38. The difference in the average passing rates were 2.68% and 4.01%, both in favor of Grade 5 Hispanic students who were enrolled in multi-grade level schools in comparison to Grade 5 Hispanic students who were enrolled in single/double grade level schools. For Grade 6 Hispanic students, the Cohen's *d* calculations ranged from 0.38 to 0.40. Table 4.7 contains these Cohen's *d* values.

Grade 5 and 6 White, Black, and Hispanic students who were enrolled in multi-grade level schools had higher average passing rates in reading and in mathematics for the three school years than did their peers who were enrolled in single/double grade level schools. Readers are referred to Table 4.8, 4.9, and 4.10 for the mean differences between the grade span configurations and the grade span configuration wherein students had higher passing rates. The minimum difference was 2.15% and the maximum difference was 13.69% in favor of the multi-grade level schools.

Insert Tables 4.8 through 4.10 about here

Connections with Existing Literature

Schwartz, Stiefel, Rubenstein, and Zabel (2011) analyzed the achievement of students in Grade 8 based on grade span configuration. They noted that changing schools more frequently was associated with lower academic performance. Schwartz et al. (2011) noted that students in schools with multi-grade span configurations (e.g., K-8 or K-4 and 5-8) had a greater sense of belonging and the teachers had an improved opportunity to know the students, ultimately resulting in higher achievement scores.

Similar results occurred when Rockoff and Lockwood (2010) documented that students' academic level decreased 0.15 standard deviations in mathematics and English when they transitioned from elementary to middle schools.

Additionally, Johnson et al. (2012) reviewed grade span configuration and analyzed the difference between the Texas Assessment of Knowledge and Skills passing rates in Science for Grade 5 students based on grade span configuration. They compared elementary settings (K-5) with intermediate settings (5-6) on the statewide science assessment. Johnson et al. (2012) documented that students in the K-5 setting had statistically significant higher science scores than their peers in the intermediate setting. Of particular importance in their study were student passing rates that were up to 18% higher in the K-5 setting versus the 5-6 setting. The connectedness of all students, regardless of their race or ethnicity, can be increased by expanding the number of years spent in one school setting and implementing fewer transitions between schools.

Connection to Theoretical Framework

In this article, the school connectedness theory served as the theoretical framework (Biag, 2016; Niehaus, Rudasill, & Rakes, 2012; Woolley & Brown, 2007). Biag (2016) explored school connectedness for urban school personnel and the low-income ethnic minority youth they taught. Biag (2016) contended that school personnel were responsive to the family, economic, and community problems in which students face which help build caring and trusting relationships. In a study completed by Niehaus et al. (2012), trusting and supportive relationships that were consistent among staff in the school setting and students in Grade 6 were associated with higher academic achievement of Grade 6 students. Woolley and Bowen (2007) noted that students had higher academic

performance if they had engaged, supportive adults present in their educational experience.

The results of this empirical, multiyear investigation are commensurate with the findings of Bing (2016), Niehaus et al. (2012), and Woolley and Brown (2007). White, Black, and Hispanic students in Grades 5 and 6 who attended a multi-grade level school setting had higher passing rates in reading and mathematics for every year analyzed than their peers who attended single/double grade span configured school settings. One explanation of these results can be explained by the support and engagement the students receive in a multi-grade level configuration versus a single/double grade span configuration.

Implications for Policy and Practice

In this multiyear analysis of academic achievement and grade span configuration for Grade 5 and 6 White, Black, and Hispanic students in Texas, students in schools with multi-grade level configurations had the highest passing rates on the STAAR Reading and Mathematics assessments. The concept of grade span configuration has substantial implications for education policy and practice. Local school district leaders and school board members should analyze the benefits of grade span configuration and review the grade span configurations of the campuses within the district's boundaries. If the district has any single/double grade span configurations within the schools, it would be important to reconfigure the schools to include multi-grade levels. This action would serve multiple purposes including increasing school connectedness among students and increasing academic achievement. Expanding the number of grade levels within school campuses would reduce the transitions students would have to make, which have been associated

with decreases in academic achievement. The recognition and actions taken to increase the grade levels in school buildings would allow for greater consistency for students in reference to school procedures and expectations, greater consistency between families and school personnel, a reduced number of discipline concerns, and a greater focus on academics versus reestablishing oneself in a group of new peer groups. For future school construction, school leaders and school boards should examine the extant literature on grade span configuration and student performance.

Recommendations for Future Research

In this multiyear study, differences in passing rates in reading and in mathematics were examined for Texas White, Black, and Hispanic students in Grade 5 and 6 as a function of grade span configuration. The results that were obtained were consistent across both grade levels and all three years for all three student groups. Accordingly, researchers are encouraged to extend this study to other groups of students in secondary school levels. An extension of this study would be useful to determine whether grade span configuration is related to the academic achievement of students at advanced levels, students determined to be at-risk or economically disadvantaged, English Language Learners, or enrolled in special education. To date, researchers have utilized aggregated campus-level data to ascertain the effects of grade span configuration on student achievement. Utilizing individual student data provided by the Texas Education Agency Public Education Information Management System would be beneficial to add to the body of research on grade span configuration. Researchers are also encouraged to extend this study to other states to determine the extent to which results from this empirical investigation are generalizable to students and to school campuses in other states.

Additional school connectedness factors that could be evaluated based on grade span configurations include attendance rates, truancy, and discipline records.

Researchers are encouraged to include qualitative data in a mixed methods study to enhance the qualitative information provided in this study. The qualitative data could include the perceptions of educational leaders, teachers, parents, and students regarding grade span configuration. As such, researchers are encouraged to conduct investigations into the social and/or emotional reasons for the relationship between grade span configuration and academic achievement.

Conclusion

The purpose of this research study was to determine the degree to which differences were present in reading and mathematics passing rates as a function of grade span configuration for White, Black, and Hispanic students in Texas. Data were analyzed for all Grade 5 and 6 White, Black, and Hispanic students who were enrolled in either multi-grade level schools (i.e., PK-6) or in single/double grade level schools (i.e., Grades 4-5, 5 only, or Grades 5-6) in Texas for the 2012-2013, 2013-2014, and the 2014-2015 school years. Statistically significant differences were present for all three school years for Grade 5 and 6 White, Black, and Hispanic students in their reading and mathematics passing rates as a function of the grade span configuration of the school in which they were enrolled. White, Black, and Hispanic students in Grade 5 and 6 had higher average passing rates in both reading and mathematics in multi-grade level settings than in single/double grade level settings. Congruent with previous researchers (Clark et al., 2013; Combs et al., 2011; Kieffer, 2013), White, Black, and Hispanic students in Grade 5 and 6 who were enrolled in multi-grade level school settings had higher levels of

academic success than did their peers who were enrolled in single/double grade level span settings.

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Table 4.1

Descriptive Statistics for the STAAR Reading and Mathematics Passing Rates by Grade Span Configuration for Grade 5 White Students for the 2012-2013 Through the 2014-2015 School Years

Subject Area, Year, and Grade Span Configuration	*n* of schools	*M*	*SD*
Reading for 2012-2013			
Single/Double	227	89.87	7.45
Multi-Grade	99	93.53	8.81
Reading for 2013-2014			
Single/Double	231	90.11	7.08
Multi-Grade	101	93.75	8.89
Reading for 2014-2015			
Single/Double	231	90.90	7.77
Multi-Grade	316	93.22	8.57
Mathematics for 2012-2013			
Single/Double	226	90.43	7.87
Multi-Grade	97	92.68	9.68
Mathematics for 2013-2014			
Single/Double	230	89.92	8.12
Multi-Grade	101	93.26	9.63

Table 4.2

Descriptive Statistics for the STAAR Reading and Mathematics Passing Rates by Grade Span Configuration for Grade 6 White Students for the 2012-2013 Through the 2014-2015 School Years

Subject Area, Year, and Grade Span Configuration	*n* of schools	*M*	*SD*
Reading for 2012-2013			
Single/Double	182	82.58	10.05
Multi-Grade	100	86.70	13.16
Reading for 2013-2014			
Single/Double	191	85.72	9.23
Multi-Grade	101	88.87	12.90
Reading for 2014-2015			
Single/Double	164	85.52	9.71
Multi-Grade	310	89.45	10.28
Mathematics for 2012-2013			
Single/Double	184	83.40	10.47
Multi-Grade	99	86.68	14.19
Mathematics for 2013-2014			
Single/Double	194	86.77	10.13
Multi-Grade	101	88.92	13.94

Table 4.3

Descriptive Statistics for the STAAR Reading and Mathematics Passing Rates by Grade Span Configuration for Grade 5 Black Students for the 2012-2013 Through the 2014-2015 School Years

Subject Area, Year, and Grade Span Configuration	*n* of schools	*M*	*SD*
Reading for 2012-2013			
Single/Double	169	82.42	11.28
Multi-Grade	48	90.23	11.57
Reading for 2013-2014			
Single/Double	162	79.88	12.12
Multi-Grade	52	86.98	10.70
Reading for 2014-2015			
Single/Double	164	80.73	13.67
Multi-Grade	162	83.90	12.05
Mathematics for 2012-2013			
Single/Double	168	79.90	13.84
Multi-Grade	47	85.85	12.09
Mathematics for 2013-2014			
Single/Double	164	79.93	14.22
Multi-Grade	51	85.92	12.59

Table 4.4

Descriptive Statistics for the STAAR Reading and Mathematics Passing Rates by Grade Span Configuration for Grade 6 Black Students for the 2012-2013 Through the 2014-2015 School Years

Subject Area, Year, and Grade Span Configuration	*n* of schools	*M*	*SD*
Reading for 2012-2013			
Single/Double	146	67.46	14.23
Multi-Grade	42	78.81	15.15
Reading for 2013-2014			
Single/Double	152	74.80	12.85
Multi-Grade	51	83.24	14.75
Reading for 2014-2015			
Single/Double	128	74.02	14.31
Multi-Grade	158	78.74	14.75
Mathematics for 2012-2013			
Single/Double	142	67.78	15.24
Multi-Grade	42	81.48	15.94
Mathematics for 2013-2014			
Single/Double	153	74.97	15.21
Multi-Grade	51	83.92	13.31

Table 4.5

Descriptive Statistics for the STAAR Reading and Mathematics Passing Rates by Grade Span Configuration for Grade 5 Hispanic Students for the 2012-2013 Through the 2014-2015 School Years

Subject Area, Year, and Grade Span Configuration	*n* of schools	*M*	*SD*
Reading for 2012-2013			
Single/Double	237	83.69	8.65
Multi-Grade	102	88.73	10.50
Reading for 2013-2014			
Single/Double	244	81.79	9.83
Multi-Grade	105	87.67	10.66
Reading for 2014-2015			
Single/Double	241	83.11	9.98
Multi-Grade	370	85.94	11.94
Mathematics for 2012-2013			
Single/Double	238	85.65	9.37
Multi-Grade	101	88.33	11.61
Mathematics for 2013-2014			
Single/Double	243	85.57	9.43
Multi-Grade	103	89.58	11.62

Table 4.6

Descriptive Statistics for the STAAR Reading and Mathematics Passing Rates by Grade Span Configuration for Grade 6 Hispanic Students for the 2012-2013 Through the 2014-2015 School Years

Subject Area, Year, and Grade Span Configuration	*n* of schools	*M*	*SD*
Reading for 2012-2013			
Single/Double	201	69.78	12.33
Multi-Grade	100	77.05	16.67
Reading for 2013-2014			
Single/Double	205	78.62	10.13
Multi-Grade	104	82.92	14.05
Reading for 2014-2015			
Single/Double	178	75.70	11.09
Multi-Grade	358	80.16	14.25
Mathematics for 2012-2013			
Single/Double	200	73.94	12.00
Multi-Grade	102	79.39	16.69
Mathematics for 2013-2014			
Single/Double	206	80.81	10.73
Multi-Grade	105	85.65	13.16

Table 4.7

Cohen's ds for Differences in the STAAR Reading and Mathematics Passing Rates by Grade Span Configuration for Grade 5 and 6 White, Black, and Hispanic Students for the 2012-2013 Through the 2014-2015 School Years

Grade Level, Ethnicity/Race, and Subject	2012-2013	2013-2014	2014-2015
Grade 5 White Students			
Reading	0.45	0.45	0.28
Mathematics	0.26	0.38	N/A
Grade 6 White Students			
Reading	0.35	0.28	0.39
Mathematics	0.26	0.18	N/A
Grade 5 Black Students			
Reading	0.68	0.62	0.25
Mathematics	0.46	0.45	N/A
Grade 6 Black Students			
Reading	0.77	0.61	0.32
Mathematics	0.88	0.63	N/A
Grade 5 Hispanic Students			
Reading	0.52	0.57	0.26
Mathematics	0.25	0.38	N/A
Grade 6 Hispanic Students			
Reading	0.50	0.35	0.35
Mathematics	0.38	0.40	N/A

Table 4.8

Mean Differences and Grade Span Configuration with the Best Performance in the STAAR Reading and Mathematics Passing Rates for Grade 5 and 6 White Students for the 2012-2013 Through the 2014-2015 School Years

Grade Level, Subject, and Year	Mean Difference	Grade Span With Highest Passing Rate
Grade 5		
Reading		
2012-2013	3.66	Multi-Grade Level
2013-2014	3.64	Multi-Grade Level
2014-2015	2.32	Multi-Grade Level
Mathematics		
2012-2013	2.25	Multi-Grade Level
2013-2014	3.34	Multi-Grade Level
Grade 6		
Reading		
2012-2013	4.12	Multi-Grade Level
2013-2014	3.15	Multi-Grade Level
2014-2015	3.93	Multi-Grade Level
Mathematics		
2012-2013	3.28	Multi-Grade Level
2013-2014	2.15	Multi-Grade Level

Table 4.9

Mean Differences and Grade Span Configuration with the Best Performance in the STAAR Reading and Mathematics Passing Rates for Grade 5 and 6 Black Students for the 2012-2013 Through the 2014-2015 School Years

Grade Level, Subject, and Year	Mean Difference	Grade Span With Highest Passing Rate
Grade 5		
Reading		
2012-2013	7.81	Multi-Grade Level
2013-2014	7.10	Multi-Grade Level
2014-2015	3.18	Multi-Grade Level
Mathematics		
2012-2013	5.95	Multi-Grade Level
2013-2014	5.99	Multi-Grade Level
Grade 6		
Reading		
2012-2013	11.35	Multi-Grade Level
2013-2014	8.43	Multi-Grade Level
2014-2015	4.72	Multi-Grade Level
Mathematics		
2012-2013	13.69	Multi-Grade Level
2013-2014	8.95	Multi-Grade Level

Table 4.10

Mean Differences and Grade Span Configuration with the Best Performance in the STAAR Reading and Mathematics Passing Rates for Grade 5 and 6 Hispanic Students for the 2012-2013 Through the 2014-2015 School Years

Grade Level, Subject, and Year	Mean Difference	Grade Span With Highest Passing Rate
Grade 5		
Reading		
2012-2013	5.04	Multi-Grade Level
2013-2014	5.88	Multi-Grade Level
2014-2015	2.83	Multi-Grade Level
Mathematics		
2012-2013	2.68	Multi-Grade Level
2013-2014	4.01	Multi-Grade Level
Grade 6		
Reading		
2012-2013	7.27	Multi-Grade Level
2013-2014	4.30	Multi-Grade Level
2014-2015	4.46	Multi-Grade Level
Mathematics		
2012-2013	5.46	Multi-Grade Level
2013-2014	4.84	Multi-Grade Level

CHAPTER V

DISCUSSION

The purpose of this journal-ready dissertation was to examine the extent to which grade span configuration was related to the academic achievement of students in Grades 5 and 6. Specifically, the academic achievement of students in poverty, boys and girls, and students of three ethnic/racial groups (i.e., White, Black, and Hispanic) were examined. Specifically analyzed in these three investigations were the reading and mathematics achievement of these groups of students according to the grade span configuration of their school. The two grade span categories that were compared were a single or double grade level school (i.e., Grade 4-5, 5 only, or 5-6) and a multiple grade level school (i.e., PreK-Grade 6).

In the first journal article, the relationship of reading and mathematics achievement and grade span configuration for students in poverty was determined. In the second study, the extent to which grade span configuration was related to reading and mathematics achievement for boys and girls was ascertained. Finally, in the third empirical investigation, the relationship between grade span configuration and academic achievement for White, Black, and Hispanic students was examined. Each of these three empirical investigations included three years of statewide public school data analyzed. This 3-year analysis of data permitted a determination of the extent to which trends were present in the relationship of reading and mathematics achievement from two types of grade span configuration models for students in Grades 5 and 6 who were enrolled in Texas public schools by economic status, gender, and ethnicity/race (i.e., White, Black, and Hispanic).

In this chapter, results are discussed and a summary of each of the three articles is provided. Implications for policy and for practice are also discussed. Lastly, recommendations for future research are provided.

Study One

In the first investigation, the extent to which differences were present in reading and mathematics achievement as a function of grade span configuration for Grade 5 and 6 students identified as economically disadvantaged in Texas was examined. Three years of Texas statewide data were obtained and analyzed on Grade 5 and 6 students in poverty who were enrolled either multi-grade or single/double grade level span configured schools. With respect to reading performance in all three school years analyzed, Grade 5 and 6 students in poverty had statistically significantly higher passing rates in multi-grade level schools than did Grade 5 and 6 students in poverty who were enrolled single/double grade level schools. Mathematics passing rates for Grade 5 students in poverty were not statistically significant in any of the years analyzed. Though not statistically significant, readers should note that the passing rates in mathematics for Grade 5 students were higher for students in multi-grade level schools than their peers in single/double grade level schools. Grade 6 students in poverty had statistically significant higher passing rates in mathematics in multi-grade level schools than did their peers in single/double grade level schools. In all three years, the academic performance of Grade 5 and 6 students in poverty were the highest in multi-grade level schools.

Study Two

Analyzed in the second investigation was the degree to which differences existed in academic achievement as a function of grade span configuration for Grade 5 and 6

boys and girls in Texas. Three years of Texas statewide data were obtained and analyzed on boys and girls enrolled in single/double and multi-grade level grade span configurations. For all three school years, boys and girls had statistically significant higher scores in multi-grade level grade span configurations in reading and mathematics than did their peers in single/double grade level span configurations. Additionally, for all years analyzed the academic performance of boys and girls in Grade 5 and 6 was higher in multi-grade level schools than in single/double grade level schools.

Study Three

Examined in this third investigation was the degree to which differences were present in academic achievement as a function of grade span configuration for Grade 5 and 6 White, Black, and Hispanic students in Texas. Three years of Texas statewide data were obtained and analyzed on White, Black, and Hispanic students enrolled in single/double and multi-grade level grade span configurations. For all three school years analyzed, White, Black, and Hispanic students in multi-grade level grade span configurations had statistically significantly higher passing rates in reading than did White, Black, and Hispanic students enrolled in schools with single/double grade level span configurations. With respect to mathematics, Grade 5 White students, and Grade 5 and 6 Black and Hispanic students had statistically significant higher passing rates in multi-grade level schools than did their peers in single/double grade level configured schools.

Summary of Results

Across the three empirical statewide investigations conducted in this journal-ready dissertation, statistically significant results were present for nearly all analyses,

with multi-grade level grade span configured school settings having better results than single/double grade level configured school settings. For the three school years analyzed in this journal-ready dissertation, Grade 5 and 6 students in Texas who were enrolled in multi-grade level schools had higher academic performance by economic status, gender and ethnicity/race (i.e. White, Black, and Hispanic) in reading and in mathematics than students in single/double schools. All but two of the inferential analyses were statistically significant. The outcomes of the mathematics analysis for Grade 5 students in poverty and Grade 6 White students were not statistically significant. Even in these analyses, higher passing rates were present for students in multi-grade level schools than their peers in single/double grade level schools. Results from this study were congruent with much of the existing research literature (e.g., Clark, Slate, Combs, & Moore, 2013; Combs et al., 2011; Dove, Pearson, & Hooper, 2010; Fiaschetti & Slate, 2015; Johnson, Jones, Simieou, Matthew, & Morgan, 2012) regarding academic performance and grade span configuration.

Connection to Theoretical Framework

For this journal-ready dissertation's theoretical framework, the school connectedness theory was utilized. As mentioned previously, academic performance is not only related to grade span configuration but also to school connectedness. Klem and Connell (2004) contended that students have a positive attitude and are engaged academically if they know that teachers appreciate and care about them. The development of supportive and caring relationships enable students to have a greater connection to their school allowing for improved academic performance.

Results from the empirical studies conducted in this journal-ready dissertation were supportive of multi-grade level configurations having more student connectedness than single/double grade level configurations. Students who attend the same school for a longer span of time tend to develop closer staff and peer relationships, resulting in a more engaged student with increased academic performance. Results from this study are commensurate with researchers (e.g., Furrer & Skinner, 2003; Goodenow, 1992; Hamre & Pianta, 2005) who have documented that students who have closely developed relationships at school and feel socially connected have higher and sustained motivation toward their academic progress.

Implications for Policy and Practice

In the three studies in this journal-ready dissertation, multi-grade level school grade span configurations had the highest results in all three academic investigations. Students in multi-grade level configurations outperformed students in single/double grade level configurations and had higher passing rates for every year of analysis in reading and mathematics. These findings have substantial implications for education policy and practice.

First, educational leaders need to examine the grade span configuration of schools situated within their school boundaries. If the school campuses with a limited grade span are not performing well academically, then the possibility of reconfiguration would merit consideration. The consolidation of grade levels would reduce the number of transitions students would have to make, transitions which are associated with lower academic performance. The consolidation would enable families to have authentic relationships with staff members as students and siblings may be connected to the school for a longer

period of time. Consistency for siblings among school procedures, academic and social expectations, and the familiarity of the staff may result in closer relationship between the school and familial unit. Another benefit to a multi-grade level configuration would be the increased opportunity for staff members to interact and communicate, thus, vertically align curriculum and coordinate expectations allowing for consistency between grade levels. Increased consistency allows for a familiarity and motivation for students that is not present in single/double grade span configurations. For future school construction, Texas legislators should examine the extant literature on grade span configuration and student performance.

Recommendations for Future Research

For all three studies in this journal-ready dissertation, statistically significant differences were evident in the reading and mathematics achievement for Grade 5 and 6 students by economic status, gender, and race/ethnicity as a function of grade span configuration. Given the importance of the results, researchers are encouraged to extend this study to additional programmatic labels (e.g., English Language Learners, special education, secondary students). At present, the generalizability of the results from the three studies in this journal-ready dissertation to other subgroups is not known. Another recommendation for future research is to extend this study to other states. Again, the extent to which the findings of this study would generalize to other states is not known. A third suggestion for future research would be to repeat this study at the secondary school level. This analysis would allow for generalizability among all grade levels.

Because the data analyzed in this study were aggregated data across elementary/middle schools, researchers are recommended to examine individual student

level data, data that can be obtained from the Texas Education Agency Public Education Information Management System. This type of individual analyses would permit more detailed analyses than are possible with aggregated school level data. Such individual level analyses could be conducted by ethnicity/race, by student programmatic enrollment, and by school campus level.

Due to the fact that only quantitative data were analyzed in this journal-ready dissertation, researchers are encouraged to collect data on perceptions of educational leaders, teachers, and students regarding student attendance, dropout, and high school completion rates and any relation it may have to school size. Moreover, research should be conducted into the underlying factors involved in school size that might explain the obtained differences in Hispanic attendance, dropout, and high school completion rates. Finally, a mixed method research study should be considered to examine similarities in school personnel views and attendance, dropout, and high school completion rates data.

Conclusion

The purpose of this journal-ready dissertation was to determine the extent to which differences were present in academic achievement as a function of grade span configuration for Grade 5 and 6 students in Texas. Data were obtained and analyzed by students in poverty, boys and girls, and by race/ethnicity (i.e. White, Black, and Hispanic) who were enrolled in single/double grade span configurations or multi-grade level configurations in Texas for the 2012-2013 through the 2014-2015 school years. The two grade span categories that were compared were a single or double grade level school (i.e., Grade 4-5, 5 only, or 5-6) and a multiple grade level school (i.e., PreK-Grade 6). For all three school years, statistically significant differences were present in reading

passing rates for all populations analyzed. Statistically significant differences were present in mathematics for all years analyzed with the exception of Grade 5 students in poverty and Grade 6 White students. However, both of these groups had higher passing rates for students attending a multi-grade level configuration than their peers in a single/double grade level configuration. For every population and year analyzed, passing rates in reading and mathematics were higher in multi-grade level configurations than single/double configurations.

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APPENDIX A

Institutional Review Board
Office of Research and Sponsored Programs
903 Bowers Blvd, Huntsville, TX 77341-2448
Phone: 936.294.4875
Fax: 936.294.3622
irb@shsu.edu
www.shsu.edu/~rgs_www/irb/

Sam Houston STATE UNIVERSITY
A Member of The Texas State University System

DATE:	December 9, 2015
TO:	Carolyn Fiaschetti [Faculty Sponsor: Dr. John Slate]
FROM:	Sam Houston State University (SHSU) IRB
PROJECT TITLE:	*Differences in Academic Achievement by Grade Span Configuration: A Texas Statewide Study [T/D]*
PROTOCOL #:	2015-11-27383
SUBMISSION TYPE:	INITIAL REVIEW
ACTION:	DETERMINATION OF EXEMPT STATUS
DECISION DATE:	December 9, 2015
REVIEW CATEGORY:	Title 45 §46.101(b)(4)

Thank you for your submission of Initial Review materials for this project. The Sam Houston State University (SHSU) IRB has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

We will retain a copy of this correspondence within our records.

*** What should investigators do when considering changes to an exempt study that could make it nonexempt?**

It is the PI's responsibility to consult with the IRB whenever questions arise about whether planned changes to an exempt study might make that study nonexempt human subjects research. In this case, please make available sufficient information to the IRB so it can make a correct determination.

If you have any questions, please contact the IRB Office at 936-294-4875 or irb@shsu.edu. Please include your project title and protocol number in all correspondence with this committee.

Sincerely,

Donna Desforges
IRB Chair, PHSC
PHSC-IRB

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Sam Houston State University IRB's records

APPENDIX B

Institutional Review Board
Office of Research and Sponsored Programs
903 Bowers Blvd, Huntsville, TX 77341-2448
Phone: 936.294.4875
Fax: 936.294.3622
irb@shsu.edu
www.shsu.edu/~rgs_www/irb/

Sam Houston STATE UNIVERSITY
A Member of The Texas State University System

DATE:	April 21, 2016
TO:	Carolyn Fiaschetti [Faculty Sponsor: Dr. John Slate]
FROM:	Sam Houston State University (SHSU) IRB
PROJECT TITLE:	*Differences in Academic Achievement in Grade Span Configuration: A Texas Statewide Study [T/D]*
PROTOCOL #:	2015-11-27383
SUBMISSION TYPE:	AMENDMENT
ACTION:	DETERMINATION OF EXEMPT STATUS
DECISION DATE:	April 21, 2016
REVIEW CATEGORY:	Category 4—research involving existing, publicly available data usually has little, if any, associated risk, particularly if subject identifiers are removed from the data or specimens.

Thank you for your submission of Initial Review materials for this project. The Sam Houston State University (SHSU) IRB has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

We will retain a copy of this correspondence within our records.

*** What should investigators do when considering changes to an exempt study that could make it nonexempt?**

It is the PI's responsibility to consult with the IRB whenever questions arise about whether planned changes to an exempt study might make that study nonexempt human subjects research. In this case, please make available sufficient information to the IRB so it can make a correct determination.

If you have any questions, please contact the IRB Office at 936-294-4875 or irb@shsu.edu. Please include your project title and protocol number in all correspondence with this committee.

Sincerely,

Donna Desforges
IRB Chair, PHSC
PHSC-IRB

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Sam Houston State University IRB's records

VITA

Carolyn Forbes Fiaschetti

EDUCATIONAL HISTORY

Doctorate of Education – Educational Leadership, May 2016
Sam Houston State University, Huntsville, TX
Dissertation: Differences in Academic Achievement by Grade Span Configuration: A Texas Statewide Study

Master of Education in Administration, EC-12, May 2000
Sam Houston State University, Huntsville, TX

Bachelor of Science in Education, May 1994
Miami of Ohio University, Oxford, OH

PROFESSIONAL EXPERIENCE

Director of Special Programs, Montgomery Independent School District, Montgomery, TX, 2015-2016
Principal, Lone Star Elementary School and Stewart Creek Elementary School, Montgomery ISD, Montgomery, TX, 2008-2015
Assistant Principal, Lone Star Elementary School, Montgomery ISD, Montgomery, TX, 2006-2008 and Buckalew Elementary School, Conroe ISD, Conroe, TX, 2001-2006
Teacher- First Grade and Third Grade, Galatas Elementary School, Conroe ISD, Conroe, TX, 1996-2001
Teacher- First Grade, Hoelscher Elementary School, Edgewood ISD, San Antonio, TX, 1995-1996
Teacher- Spanish for Grades One through Five, Skiles Test Elementary, Lawrence Township, Indianapolis, IN, 1994-1995

RECOGNITIONS

2015 HEB Excellence in Education Awards, Statewide Semi-Finalist- Principal
2011 Superintendent Student of the Year, Sam Houston State University
Assistant Principal of the Year, TEPSA, 2006
Teacher of the Year, 2001

SCHOLARLY RESEARCH ACTIVITY

Publications

Fiaschetti, C. F., & Slate, J. R. (2015). Differences in student achievement by grade span configuration for students who were economically disadvantaged. In G. Abbott (Ed.), *Private and public schools: International perspectives, management and educational efficiency* (pp. 1-9). Hauppauge, NY: Nova Science Publishers.

PRESENTATIONS

Fiaschetti, C. F. (2015, January). *Differences in student achievement by grade span configuration for students who were economically disadvantaged*. Paper presented at the Hawaii International Conference on Education, Honolulu, HI.

PROFESSIONAL AFFILIATIONS

Texas Elementary Principals and Supervisors Association, 2001-2015