A Comparison of Sixth-grade English Language Arts and Mathematics Achievement Between Middle Schools and K-8 Schools

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A COMPARISON OF SIXTH-GRADE ENGLISH LANGUAGE ARTS AND MATHEMATICS ACHIEVEMENT BETWEEN MIDDLE SCHOOLS AND K-8 SCHOOLS

by

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ABSTRACT

The purpose of this study was to compare the academic achievement of sixth grade students enrolled in a traditional middle school model versus those enrolled in a K-8 school model by analyzing English Language Arts (ELA) and mathematics scores. Developmental Scale Score (DSS) data from the 2017 Florida Standards Assessment (FSA) were collected from three K-8 schools and three middle schools in one high-performing Florida school district. Results from an independent samples t-test revealed that middle school student scores were slightly higher in overall ELA and mathematics proficiency, but the differences were not substantive. Cross-tabulation was utilized to compute the proportion of students making learning gains in ELA and mathematics. The results were nearly identical among the middle school students and the K-8 students relative to ELA; however, the proportion of students making learning gains in mathematics was substantially higher among the K-8 students. To investigate equity in the distribution of achievement, a comparison was made between Middle School and K-8 bi-serial correlation coefficients measuring the strength and direction of the relationship between student achievement and socioeconomic status (SES). Results suggested that the negative influence of low-SES on academic achievement in ELA and mathematics was notably stronger among students enrolled in the middle school model. While making school construction decisions, policy makers will be informed through these findings as to which type of grade span configuration is most likely to positively impact student achievement.

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THE PROBLEM AND ITS CLARIFYING COMPONENTS

Background of Study

Although not new in the history of education, K-8 schools have re-emerged as an innovation in some school districts, primarily for financial reasons (Byrnes & Ruby, 2007). Although deciding which type of school is fiscally responsible to construct, policy makers and other stakeholders have relied on many different types of data such as the number of homes under construction or projected to be under construction in a certain area to help them make their decisions. Projected student population data, the cost, and the academic needs of the students have led to the decisions policy makers and other stakeholders make regarding the types of buildings that would best fit the school district's needs. Understanding that school districts are on strict budgets, Herman (2004) reported that building K-8 schools rather than elementary and middle schools can be more cost effective in terms of land acquisition, land site expenses, and number of structures. Additionally, operational funds for salaries of administrative, custodial, clerical, and food service personnel would be reduced, given that a K-8 school requires only one office, one cafeteria, and one media center, half of what would be necessary for an elementary and middle school plan. School district administrators should certainly promote the financial benefits of building and operating one school versus two. Tax payers and other stakeholders view corporate social responsibility (CSR) as an investment when a decision to develop K-8 schools reflects excellent financial prowess as well as probable increased student achievement (Coombs & Holladay, 2010).

Although the financial benefits of building a K-8 school versus an elementary school and middle school may be apparent, policy makers and other stakeholders must also seriously

question how these two learning environments differ with regard to their effects on student achievement. Policy makers and other stakeholders require an understanding of the K-8 school model and the elementary-to-middle school model relative to the effects of transition on student achievement in the sixth and ninth grades. A clear understanding of the difference between the fifth to sixth grade transition in the K-8 school model and the elementary-to-middle school model relative to overall student success could influence school board members as they determine the need for certain types of schools to be constructed in the future.

Policy makers and other stakeholders must inquire as to the research that has been conducted regarding the K-8 concept across Florida and around the country in their consideration of the best educational environment. Do transitions from elementary school to middle school and then to high school negatively affect student achievement as compared to K-8 schools with only one transition to high school? Although more cost effective, is the K-8 school model more educationally sound than the elementary-to-middle school model? These questions cause policy makers and other stakeholders to ponder the most important priority: student learning relative to the model that best promotes student achievement. Because "the effect of grade span on achievement has received scant attention from researchers" (Johnson, Godwyll, & Shope, 2016, p. 385), more studies must be conducted in the area of student achievement to assist in school board members' decisions as they consider differences in budgets, academics, and return on investment (ROI) between the K-8 school concept and the middle school configuration.

In the Florida school district at the focus of the present study, the K-8 concept was introduced in 2008. In an effort to mitigate rapid growth in the student population, the policy makers and other stakeholders struggled to identify funding for new school construction while

also reflecting on what school type was best to increase student achievement. Over the last 10 years, the school district constructed three K-8 schools, each educating over 1,400 students.

Focusing on this pressing issue, the researcher analyzed sixth-grade English Language Arts (ELA) and mathematics performance to identify differences between the middle school and K-8 models. Developmental scale score (DSS) data from the 2017 Florida Standards Assessment (FSA) were collected to investigate differences in overall performance, learning gains, and equity in the distribution of achievement outcomes relative to socioeconomic status (SES). This chapter includes the background, statement of the problem, statement of the purpose, operational definitions of key terms, conceptual framework, and overview of the literature review. Also presented are the significance of the study, research questions, methodology, delimitations, limitations, and a summary of the study.

Statement of the Problem

Although research has been conducted in the area of school transitions and grade span inquiry, the results regarding effects on the academic achievement of students attending K-8 schools versus middle schools has been inconclusive. A number of researchers have indicated that the elementary-to-middle school transition negatively affects student achievement (Alspaugh, 1998; Byrnes & Ruby 2007; Poncelet 2004; Seidman, Allen, Aber, Mitchell, & Feinman, 1994; Wihry, Coladarci, & Meadow, 1992). These researchers have studied the effects of school-to-school transitions and the possible disruptive consequences of students leaving a familiar, safe school environment to begin new adventures at a different school. Other researchers, such as Whitley, Lupart, and Beran (2007) found no significant difference in student achievement when comparing Canadian K-8 schools to Canadian middle schools. Texas

researchers Wilson and Slate (2015) contradicted prior researchers by suggesting that middle schools reflected higher student achievement than K-8 schools.

Student enrollment has continued to grow rapidly in the school district that was the focus of this study. In anticipation of building needed schools, policy makers and other stakeholders will benefit from guidance as to which types of schools are best for student learning. Conflicting results from studies of student achievement in K-8 schools and middle schools in North America cause hesitation in making sound decisions. Complicating the inconsistencies in the literature was the fact that the school district of interest was somewhat unique in its sociodemographic characteristics (largely affluent) and academic performance trends (consistently very high performing); thus, findings from the literature reviewed were limited in their generalizability to the district. For these reasons, a study in the target Florida school district was needed to better understand which types of schools were best for student learning.

Purpose of the Study

The purpose of this study was to compare the academic achievement of sixth-grade students attending the traditional middle school model versus the K-8 model by analyzing 2017 ELA and mathematics scores. Understanding that K-8 schools were presently more cost effective to build and operate than two separate elementary and middle school structures (Herman, 2004), the information gleaned from this study was gathered to assist the target school district in deciding which types of schools were most educationally sound to construct and, with cautious generalizations, to inform the decision-making of other districts faced with the same questions and concerns.

Significance of the Study

The extant literature suggested, although inconclusively, that most traditional middle schools produce lower student achievement than K-8 schools due to the elementary to middle school transition (Alspaugh, 1998; Byrnes & Ruby 2007; Poncelet 2004; Seidman et al., 1994; Wihry et al., 1992). However, Whitley et al. (2007) found no difference in student achievement due to elementary to middle transition. In addition, Wilson and Slate (2015) suggested that the middle school model outperformed the K-8 model in their study. The findings of the present study were intended to influence policy makers and other stakeholders of the particular school district in this study as to their decisions on future school construction. Not only would K-8 schools be more cost effective to build, operate, and maintain (Herman, 2004), but the case for possible increased student achievement would be at the forefront of all decision making. In this study, the researcher has contributed to the literature investigating this important issue. The results of the study could encourage further studies regarding the relationship between student achievement and school transition, analyzing the effects of variables such as school size, student demographics, teacher certification and effectiveness, and socioeconomic status in different environments.

Research Questions

This study was conducted, using three different measures of student performance to obtain a multi-faceted view of achievement: (a) excellence, (b) growth, and (c) equity in the distribution of student achievement relative to SES. The following research questions guided the investigation of sixth-grade student performance for students attending middle schools versus students attending K-8 schools.

Research Question 1

What difference, if any, exists in the overall English/Language Arts (ELA) and mathematics performance of 6th grade students attending a K-8 school versus 6th grade students attending a traditional elementary-to-middle school model?

This question was intended to measure excellence in achievement outcomes by comparing developmental scale score (DSS) data from the Florida Standards Assessment (FSA) across the two different school types. It was answered by comparing the achievement levels of students in each of the two school categories. The results displayed whether students in one school category or the other, on average, produced higher scores on ELA and mathematics assessments.

Research Question 2

What difference, if any, exists in the proportion of 6^{th} grade students making learning gains in a K-8 school versus a traditional elementary-to-middle school model?

This question was designed to reveal which school model type embodied the largest proportion of students with learning gains. This information was valuable to school board members when making construction decisions regarding school type. The results revealed whether students in one school category or the other, on average, produced higher learning gains on ELA and mathematics assessments using the FSA data.

Research Question 3

What difference, if any, exists in the strength and direction of the relationship between socioeconomic status (SES) and student achievement in K-8 schools versus middle schools?

To assess equity in the distribution of achievement outcomes, an analysis was performed to measure the strength and direction of the relationship between socioeconomic status (SES) and achievement for students in each of the two types of schools. The FSA results for the two school categories were compared in an effort to signify which type of school displayed greater SES-based equity in the distribution of student achievement (i.e., which type of school demonstrated narrower SES-based achievement gaps). This research question was especially important because its focus was on how well low-SES students were being served in this high-SES Florida school district.

Operational Definitions

Florida Standards Assessment (FSA). The FSA is the standardized test of reading and mathematics standards in the state of Florida taken by all students from third grade through tenth grade. "In 2014–2015, Florida implemented the Florida Standards Assessments (FSA) in ELA and Mathematics, which measure mastery of the Florida Standards" (FDOE, 2018b, p. 67). The scores analyzed in this study were the results from this statewide assessment.

Developmental Scale Score (DSS). DSS data were displayed as a three-digit score from the ELA and mathematics examinations that were analyzed as the dependent variable in this study. "Achievement level cut scores for FSA assessments were adopted in State Board of Education Rule 6A-1.09422, Florida Administrative Code, in January 2016. The lowest score in

Level 3 is the passing score for each grade level and subject" (FDOE, 2018a, p. 3). Each student's DSS falls within a certain achievement level as seen in the Table 1.

Table 1

Florida Standards Assessment (FSA) Scale Scores by Achievement Level

Grade 6 Assessment	Level 1	Level 2	Level 3	Level 4	Level 5
English Language Arts	259-308	309-325	326-338	339-355	356-391
Mathematics	260-309	310-324	325-338	339-355	356-390

Source. FDOE, (2018a)

Achievement Level. "Achievement Level Descriptions further specify what students should know and be able to do in each grade level and subject as indicated in the Florida Standards" FDOE, 2018a, p. 3). The level of competency of FSA ELA and mathematics scores are determined as level 1 being the lowest, level 3 as meeting proficiency, and level 5 as the highest within a certain grade level (FDOE, 2018a).

Learning Gains. Learning gains are required by law in s. 1008.34 F.S. and are calculated by the Florida Department of Education for both ELA and mathematics utilizing the FSA (FDOE, 2016c; Florida Statutes, 2017). A student can obtain a learning gain three different ways.

1. Improve one or more achievement levels from one year to the next (e.g., move from Level 1 to Level 2, Level 2 to Level 4, etc.).
2. Maintain a Level 3, Level 4, or Level 5 from one year to the next and the student's scores in Level 3 and Level 4 must have improved from one year to the next.

3. Split Levels 1 and 2 into multiple subcategories (Level 1 into thirds and Level 2 in half) and require the student to improve from one subcategory to a higher subcategory within the Level (e.g., move from the bottom third of Level 1 to the middle third of Level 1). (FDOE, 2016c, p. 1)

Grade-span configuration. Grade-span configuration was defined as "the number and range of grade levels that a school comprises" (District Administrator, 2005, p. 1). In this study, sixth-grade student achievement data were analyzed for students from middle schools representing sixth-grade through eighth-grade and K-8 schools comprised of kindergarten through eighth grade students.

Low Socioeconomic Status (SES). In this study, low-SES described students categorized as living in a household with an overall income at or below the poverty level. The National School Lunch Program (NSLP) is a federally assisted meal program that provides low-cost or free lunch to students living at the poverty level (United States Department of Agriculture [USDA], 2018). For this study, student achievement scores of low-SES students in the K-8 schools were compared to those in middle schools.

Conceptual Framework/Literature Review

The conceptual framework for the study was grounded in the organizational adaptation of affordance theory (Gibson, 1977), the idea that certain structures can make certain outcomes more likely by creating and reinforcing possibilities not otherwise apparent. Viewed empirically, and specific to the focus of this study, affordance theory, suggests that structural elements of schooling such as school size, district size, and grade span configurations represent a viable option for influencing outcomes, more particularly equity in the distribution of achievement

outcomes (Howley & Howley, 2004; Johnson, 2007) and in literature investigating the impacts of transitions on students (Alspaugh 1998; Byrnes & Ruby 2007; Poncelet 2004;).

The literature review for this study focused on three areas related to student performance in the K-8 school model and the traditional middle school model. These three areas include the history of the school models, the structure or grade span of the school models, and the sixth-grade transition of the school models as they relate to academic achievement. Following are brief treatments of these sections, intended to characterize the breadth and scope of the review.

History

The K-8 school concept is not new. From the late 1800s into the early 20th century, the K-8 school organization was the predominate form of educational institution for elementary and middle school aged children (Byrnes & Ruby, 2007). Cooperative learning with younger students receiving assistance from older students was a large part of the learning process (Herman, 2004). The junior high school model began in the first decade of the 20th century. Herman claimed that the purposes of junior high schools were to ease the difficulty of early adolescence, accommodate physical, emotional, and social problems, develop independence, and allow for exploration of special interests. The K-8 organization was, however, replaced by the middle school concept in the 1960s which by the 1990s had become the dominant school structure (Byrnes & Ruby, 2007). The 1,000 middle schools established in the 1960s grew to more than 12,000 by 2003 (Herman, 2004). In addition, Epstein and MacIver (1990) professed that middle schools could engage in pedagogy, small learning communities, professional development, and team teaching to address academic achievement issues. By the mid-1990s, middle schools that embraced team teaching, interdisciplinary instruction, and flexible scheduling were scrutinized

for implementing such a nurturing environment and failing to make adequate progress in terms of academic achievement (Herman, 2004). As schools moved into the 21st century, there was renewed interest in the K-8 school model. Byrnes and Ruby (2007) contended that researchers were observing higher levels of academic achievement among students who attended K-8 schools.

Grade Span/School Structure

Feldlaufer, Midgley, & Eccles (1988) suggested that middle school teachers have many more students for a shorter period of time than their elementary teaching counterparts, and that this diminishes the teacher-student relationship. Building trust and a good student-teacher rapport takes time, and a student may only communicate with a middle school teacher for one year (Alspaugh, 1998). Simmons and Blyth (1987) alleged that negative consequences exist for early adolescents experiencing school transitions and life changes simultaneously. Larson, Moneta, Richards, and Wilson (2002) suggested, "The early years, grades 5 through 7, are associated with the largest instability" (p. 1161). Evidence from research has also indicated that children may not be ready to handle a school transition after fifth grade which creates undue stress and less motivation to learn (Poncelet, 2004).

Additional studies, including research conducted in 18 K-8 and 6-8 schools in New York City, revealed that reading achievement scores of seventh- and eighth-grade students were higher in the K-8 schools (Moore, 1984). Moore (1984) also reported that the K-8 students exhibited higher self-esteem, better attendance, and positivity about their schools.

After conducting a study of 700 rural schools in Louisiana, Franklin and Glascock (1998) asserted, "From this study it appears that elementary and combination school learning

environments are more beneficial to students than either the middle or secondary school learning environments (p. 22). In studies conducted by researchers in Milwaukee, Baltimore, Philadelphia, and Wisconsin, students in K-8 schools demonstrated fewer behavioral problems and higher academic achievement than students in traditional middle schools (Yecke, 2006).

Sixth-grade Transition

Alspaugh (1998) suggested that students experience more achievement loss by transitioning from the elementary school to middle school than from continually and consistently attending a K-8 school. Alspaugh and Harting (1995) spoke to the loss in student achievement, observing, "The decline in achievement for the transition years indicates that as the schools make the transition from a self-contained classroom, there is an expected loss in achievement" (p. 148). It is unclear as to exactly why school transition negatively affects student achievement. In addition, Seidman et al. (1994) proposed that the transition from elementary school to middle school has caused the self-esteem of students to decrease. After completing a study in Cleveland, Ohio, Poncelet (2004) noted, "It appears that attending a K-8 school and avoiding the discontinuity associated with a transition to a middle school had a positive impact on sixth-grade students' proficiency in mathematics as well as reading" (p. 93). Simmons and Blyth (1987) found that a school transition nearly always resulted in a decreased level of extracurricular participation and a decline in GPA. Byrnes and Ruby (2007) conducted a K-8 school study in the Philadelphia City School District in which the data confirmed that students attending K-8 schools outperformed middle school students in each subject. A study of Florida schools in 2011 as part of the Program on Education Policy and Governance Working Papers Series at Harvard

University revealed a large drop in mathematics and language arts achievement during the transition year from fifth grade to sixth grade among middle school students (Sparks, 2011).

A Canadian study of students in Ontario and Quebec, however, revealed that school transition did not impact academic achievement (Whitley et al., 2007). Whitley et al. (2007) summarized: "The research that exists (Alspaugh, 1998; Simmons & Blyth, 1987; Wigfield & Eccles, 1994) and theory supporting this research (e.g. Eccles et al., 1993) contradict our findings" (p. 662).

In Texas, Wilson and Slate (2015) alleged no significant difference in African American mathematics scores between the K-8 schools and the middle schools. In addition, Hispanic student scores for students enrolled in the traditional middle school had statistically significantly higher passing rates than those enrolled in the K-8 schools (Wilson & Slate, 2015).

The results of this short review of research literature are inconclusive. Most researchers have suggested that multiple school-to-school transitions lead to a negative impact on academic achievement, notably in mathematics and reading. However, a few researchers indicated that middle school reading and mathematics results were the same as, or showed that students outperformed students in the K-8 model.

Methodology

Research Design

A causal-comparative design was used for this study. This model was aimed at determining the cause of differences between two existing groups utilizing existing data (Fraenkel, Wallen, Hyun, 2015). This design was appropriate for this study because it allowed

the researcher to compare differences and/or relationships between the independent variables (Fraenkel et al., 2015).

Participants

The study included the entire population of sixth-grade students from three K-8 schools and three middle schools in the Florida school district of interest. This sample can be classified as cluster purposive (Fraenkel et al., 2015). Each of the three middle schools had populations of approximately 1,400 total students, serving an average of 330 sixth-grade students; thus, the researcher in the study analyzed the mathematics scores of 1,010 sixth-grade students and the ELA scores of 1,010 sixth-grade students from the three traditional middle schools. Each of the K-8 schools had populations of approximately 1,600 total students, serving approximately 178 sixth-grade students. Thus, the mathematics scores for 534 sixth-grade students and the ELA scores for 534 sixth-grade students from the three K-8 schools were included in the data to be analyzed. The middle schools in this study had an average free and reduced lunch rate of 11.6%, almost mirroring the 11.4% rate for the K-8 schools.

Instrumentation and Data Collection

Developmental scale score (DSS) data for all 2017 sixth-grade ELA and mathematics Florida Standards Assessments (FSAs) from the six schools were collected from the Florida Department of Education (FDOE). The researcher utilized the Statistical Package for the Social Sciences (SPSS) to manage the data and conduct the analysis.

Variables

For Research Question 1, student-level sixth grade ELA and mathematics DSS data were the dependent variables. Fields included K-8 and middle school sixth grade ELA and mathematics DSS data. The independent variable was the school grade configuration category: the traditional middle school model or the K-8 school model.

For Research Question 2, the dependent variables consisted of sixth-grade ELA and mathematics learning gains identifiers (i.e., gain or no-gain). Learning gains occupied a field reflecting 1 as a learning gain and 0 as no learning gain. The independent variable was the school grade configuration category: the traditional middle school model or the K-8 school model.

For Research Question 3, the sixth grade ELA and mathematics DSS data were the dependent variables. The independent variable was the socioeconomic status designation for each student (i.e., economically disadvantaged or non-economically disadvantaged, as determined by eligibility for free or reduced meals).

This study was designed as a quantitative inquiry to understand the extant student data results among middle and K-8 schools in a particular highly affluent Florida school district. Extraneous variables that would contribute to "why" certain results were obtained would be a good topic for another study and were not examined in this study. These extraneous variables included teacher qualifications, styles of teaching, parental involvement, student attitude, general environment, school processes and procedures, school culture, gender of students, gender of teachers, teacher strengths and weaknesses, teacher experience, teacher effectiveness, class sizes, and teacher resources.

Data Analysis

To analyze data to respond to Research Question 1, the difference in ELA scores between the K-8 schools and the middle schools were examined via an independent samples t-test. The same process was utilized to examine differences for mathematics scores. Of note, the data set included the full population; thus, there was no need to make inferences from a sample to the larger population. Although statistical significance was, strictly speaking, immaterial to the investigation, significance levels were nevertheless reported and treated as indicators that an observed relationship might be of practical significance (Bickel, 2007).

To analyze data to answer Research Question 2, learning gains data (coded numerically as learning gain = 1 and no learning gain = 0) were organized and presented in a cross-tabulation table to display frequencies and percentages disaggregated by school configuration category, and were interpreted to characterize any difference in ELA learning gains between the K-8 the middle school categories. The same procedure was followed for analysis of the mathematics data.

For Research Question 3, student data were disaggregated by school category and a bi-serial correlation analysis (student performance by student SES designation) was conducted for each subset of data (i.e., K-8 data and middle school data). Squaring the Pearson's r coefficient yielded a measure of the proportion of variance in student performance that was accounted for by the students' SES designation (Steinberg, 2011). The smaller the r^2 value, the weaker the relationship was between SES and achievement. The r^2 value for each category of schools was compared to determine whether the relationship between SES and achievement differed by school category (i.e., whether SES matters more in the production of student achievement in one

school category or the other). As was the case with the independent samples t-test, significance levels were reported and treated as indicators that an observed relationship might be of practical significance (Bickel, 2007). Table 2 presents a brief overview of the research questions, data, and analyses.

Table 2

Research Questions, Variables, and Methods of Analysis

Research Questions	Variables	Analysis
1. What difference, if any, exists in the overall English/Language Arts (ELA) and mathematics performance of 6th grade students attending a K-8 school versus 6th grade students attending a traditional elementary-to-middle school model?	Dependent Variables: ELA and mathematics developmental scale scores (DSS) from FSA Independent Variable: School categories	Independent samples t-test
2. What difference, if any, exists in the proportion of 6th grade students making learning gains in a K-8 school versus a traditional elementary-to-middle school model?	Dependent Variable: Learning gains (yes, no) Independent Variable: School Category	Cross-tabulation
3. What difference, if any, exists in the strength and direction of the relationship between socioeconomic status (SES) and student achievement in K-8 schools versus middle schools?	Dependent Variable: ELA and mathematics (DSS) from FSA Independent Variable: Socioeconomic status (SES)	Disaggregate by category Calculate r^2 between SES and DSS achievement Compare r^2 by category

Delimitations

The study was delimited to one public Florida school district. The outcome variables were delimited to sixth-grade 2017 ELA and mathematics FSA results for students enrolled in three K-8 schools and three middle schools with similar demographics.

Limitations

Because the researcher analyzed sixth grade scores from six schools in one Florida school district, the results were not immediately generalizable to other school districts in Florida or in other states (some cautious generalizations may be offered, however, if warranted by the results). Certain possible threats to the internal validity of this study included subject characteristics, location, history, or attitude (Fraenkel et al., 2015). Items such as socioeconomic status, gender, vocabulary, needs for accommodations, and background knowledge are examples of the subject characteristics threat (Fraenkel et al., 2015). Location threat suggests that some schools may have had different resources or parent support than others (Fraenkel et al., 2015). The six schools targeted in this study were in affluent areas of the school district, reflecting very low percentages of students at low-SES. The characteristics and location threats were somewhat controlled because the schools in the study represented affluent students overall and had been historically labeled as very high performing. Community and parent support were evident, and resources were plentiful in all study schools.

Different teaching styles may have presented a threat, considering the curriculum may have been taught through teacher facilitation and inquiry in a collaborative, student-centered approach in some classrooms or through more traditional styles in other classrooms. History posed a possible threat as well, due to unplanned events such as fire alarms during the FSA testing (Fraenkel et al., 2015). During the 2016-17 and 2017-18 school years, the school district suffered through two hurricanes that may have affected scores in some classrooms over others because of possible changes in curricular pacing guide timelines. Student attitude could have played a positive or negative role in scores on a standardized test, depending on the effects of

activities in students' lives. Student maturity was a probable underlying issue in the study because sixth-grade students mature at incredibly different rates (Fraenkel et al., 2015). However, this threat was probably minimal because it was likely to be normally distributed within the study population, and there was no reason to suspect that the distribution did not parallel the distribution within the larger population. Moreover, because the data collected were historical data from a past event, causal-comparative research could not be used to determine actual causes of a result, only possible causes (Fraenkel et al., 2015).

Summary

Although cost effective to build and operate (Herman, 2004), the question remains as to whether a K-8 school model will lead to increased student achievement for its students beyond that of a middle school model? Johnson et al. (2016) commented on the status of construction in Florida, "Construction of buildings serving broader grade spans is trending, with districts citing lower operation costs, higher achievement, lower discipline referrals, and smoother transitions from grade to grade" (p. 384). However, studies conducted throughout the nation and Canada relative to grade span effects on student achievement have been inconclusive (Alspaugh 1998; Byrnes & Ruby 2007; Poncelet 2004; Whitley et al., 2007; Wilson & Slate 2015).

This study was designed to analyze ELA and mathematics results of sixth-grade students in a particular Florida school district. Besides overall achievement, learning gains were examined to show differences between the K-8 model and the middle school model. In addition, school model categories were compared regarding low-SES student achievement data. Student learning and success have been paramount in this particular Florida school district and the results of this

study were intended to possibly inform and benefit policy makers and other stakeholders as they make school model decisions on future construction in a fast-growing school district.

The information gleaned from the results of this study illuminate the need for future studies and inquiry as to the following questions. What are the reasons school-to-school transitions affect academic achievement? Are there social-emotional explanations leading to students' achievement in K-8 schools versus middle school? Does school culture play a part in the higher achievement associated with different grade span configurations? To what extent does familiarity of the school and teachers in the K-8 school promote better student achievement? Does school size effect student achievement? The answers to these and other questions would help policy makers and other stakeholders understand why different school models affect student achievement, especially during the fifth-grade to sixth-grade transition period.

CHAPTER 2
LITERATURE REVIEW

Introduction

This chapter reviews and synthesizes past research investigating grade span configurations and related structural characteristics in relation to their impact on student academic progress from kindergarten through high school. This chapter was structured to frame the current study and to inform policy makers of decades of results gathered from prominent researchers, and the researcher attempted to display the pros and cons of certain school designs. The number of grade levels in a school, the arrangement of students within those grade levels, and the effects of school-to-school transitions are important considerations in maximizing students' learning potential.

The researcher pursued confirmation or denial of inconclusive findings surrounding extant studies comparing achievement of sixth-grade students attending K-8 model schools to that of sixth-grade students attending middle school model schools. The information gathered from this study should be very useful for policy makers of school districts as they make decisions on types of schools to build and/or convert.

This chapter has been organized into four sections: affordance theory, history of grade level structures, grade span configurations, and school-to-school transitions. Affordance theory is briefly discussed, explaining that environmental considerations allow for opportunities to influence students' motivation and attitude persuading them to engage in desired academic activities. This theory informs policy makers of the importance of creating the optimal environment to motivate students to accomplish their goals. The researcher has reviewed literature to provide the historical view and reasoning behind changes in school types over the

years. Understanding the American culture, economics, politics, and demographics during the last century informs policy makers of the rigorous educational needs in today's society. Furthermore, in this chapter, the researcher has provided a review of studies that were conducted to analyze the academic and personal effects of school-to-school transitions and influences displayed through different grade-span configurations.

Affordance Theory

In his development of affordance theory, Gibson (1979) suggested that providing the optimal atmosphere influences others to act in certain ways, promoting affordance. In any environment or situation in which a person is trying to pursue a goal, affordance is suggested to be the potential that allows one to successfully reach a specific outcome (Volkoff & Strong 2013). As stated by Norman in the late 1980s, the design of the environment influences people to perceive certain actions that make sense. For example, a plate on a door suggests that the door must be pushed to open whereas a door handle indicates the door must be pulled to open. These objects act as clues implying a certain action should occur.

When designing school environments, perceived affordances should be taken into account when contemplating grade span configuration and transitions, as researchers have suggested there is a relationship between these items and academic performance. Eccles et al. (1993) argued that in school settings "optimal development takes place when there is good stage-environment fit between the needs of developing individuals and the opportunities afforded them by their social environments" (p. 98). Differences in the elementary and secondary school environments such as the number of different teachers assigned to a student, the number of different classes, unfamiliar setting transitioning from school to school, strength of

student/teacher relationships, large or small student population, and different school rules could affect student achievement. When reflecting on the stage-environment fit theory, Eccles et al. (1993) suggested that declines in student performance may be a result of the learning environment relative to a school-to-school transition. Similarly, Whitley et al. (2007) stated, "For a student progressing through early adolescence, changes in the educational environment occurring as a result of the transition to junior high school may not be entirely appropriate, and students may experience academic difficulties as a result" (p. 651).

It is critical for policy makers and educators to create an environment conducive to learning that encourages students to act on their educational experiences. "The ways schools organize teachers and schedule and group students have a significant impact on the learning environment" (Swaim et al., 2003, p. 29). To decide the grade span configuration (i.e., K-8 model or the middle school model) which affords the best school environment to promote academic achievement, one must comprehend the history of grade span configuration and the changes that have occurred over the last 100 years in the United States education system.

History

One room schools educating children of all ages from kindergarten to eighth grade (K-8) were primary educational institutions from the late 1800s through the early 1900s (Byrnes & Ruby, 2007). The grade span configuration at that time was known as an 8-4 pattern, eight elementary school years and four high school years (Manning, 2000). The family unit was very strong in the early 1900s and it was not unusual for older students in these K-8 schools to support the younger children. It was understood that everyone had a responsibility to work together and take care of each other. Herman (2004) confirmed this belief, suggesting that older students

during this time in history assisted the younger students in a cooperative learning model which was a natural and large part of the learning process.

As immigration increased, the number of students in the primary schools began to swell, and the growth of the student population began to become an issue of overcrowding in the schools. In addition, the industrial revolution emerged in the early 1900s, leaving business owners of factories with a genuine need for a better educated work force (Juvonen, Le, Kaganoff, Augustine, & Constant, 2004). The demand for highly educated workers who were prepared for the academic rigor of high school and college prompted the argument to begin secondary education at Grade 7 instead of Grade 9 (NEA, 1899). Secondary education promoted exploration of interesting courses taught by a variety of teachers who were experts in their field and could push students to be more qualified and ready for the jobs upon graduation from high school (Clark, Slate, Combs, & Moore, 2013). In agreement with this sentiment, the NEA expressed the importance of introducing a number of specialized teachers for different subjects earlier in a student's life versus the same teacher for all subjects, avoiding the anxiety of an abrupt transition to high school (Juvonen et al., 2004).

Increased economic and political pressures causing overall societal changes during the industrial revolution further influenced the need to introduce secondary education earlier in students' lives (Cuban 1992). Juvonen et al. (2004) reported that the recommendation of the Commission on the Reorganization of Secondary Education in 1918 was for junior high and senior high levels to be created (Spring, 1986). Cuban (1992) reported that the philosophy of the time called for reorganizing the secondary schools into 7-9 or 7-12 configurations as to deter students from dropping out by offering them prevocational options. Responding to an influx of

immigrants and concerns related to overcrowded neighborhoods, the first junior high school with a grade span of 7-9 was established in 1909 in Columbus, Ohio (Lounsbury, 2009).

The commission decided that junior high schools should be an opportunity for students to explore vocational options and receive vocational guidance (Spring, 1986). The junior high school 6-3-3 grade pattern was introduced in 1946, replacing the predominant 8-4 configuration (Lounsbury, 2009) and became the core structure for the American education system (Cuban, 1992). This new grade span configuration supported the mission of junior high schools to teach different courses of study, adapt instruction to high school and vocational school requirements to include both sexes, and categorize students by their abilities (Spring, 1986). With increasing numbers of students enrolling in junior high school, a dialog relative to the needs of this age group ensued. Juvonen et al. (2004) suggested that the need for education to serve the "whole" middle aged child out-weighed ensuring the correct grade level configuration for content.

During the 1950s, according to Spring (1986), the focus in schools gave hope to a promising future for economic and political improvement. Emphasis was placed on teaching the whole child, including "the child's and the family's personal life, health problems, and social life" (Spring, 1986, p. 337). Herman (2004) emphasized that though junior high schools were designed to ease the difficulty of early adolescence, accommodate physical, emotional, and social problems, develop independence, and allow for exploration of special interests. Contrary to this philosophy, however, junior high schools remained completely content driven, not serving the "whole child" during the 1950s. The result was a decline in secondary school attendance. Also, at that time, elementary schools continued to grow, as early childhood education enrollment multiplied, resulting in overcrowding and lack of space at the elementary level.

Due to the dissatisfaction with the junior high school model which resembled the senior high model, the concern of overcrowding in the elementary schools, and other societal issues such as desegregation, the middle school 6-8 grade configuration was adopted in the 1960s; and this became the dominant school structure in the 1990s (Alexander & McEwin, 1989; Byrnes & Ruby, 2007; Herman, 2004; Juvenon et al. 2004; Paglin & Fager, 1997). In 1963, William Alexander became known as the father of the middle school movement, introducing the term "middle school" while speaking at Cornell University (Lounsbury, 2009, p. 31).

As the middle school concept took hold in the 1960s, middle schools (with 6-8 grade configurations) were established across the nation. By 1970, there were 1,662 schools, and by 1986 junior high schools (with 7-9 grade configurations) had decreased to 2,191 (Alexander & McEwin, 1989). During the 1980s, middle school educators and researchers focused on the unique needs of young teens, and this led to yet another grade span configuration. Lounsbury (2009) reported that by 1983, the predominant grade span configuration in the United States was a 5-3-4 model (i.e., five years at the elementary level, three years at the middle school level, and 4 high school years. By 1987, the number of middle schools in the U. S. exceeded 5,466 (Cuban, 1992).

Educating the "whole child" became the mantra for middle school educators who believed that this particular age group had unique psychological, intellectual, emotional, and social challenges (Schafer, 2010). Schaefer, Malu, and Yoon (2016) discussed middle school practices, which included advisory activities, cooperative learning, teaming, and student engagement. In addition, Epstein and MacIver (1990) professed that middle schools could engage in pedagogy, small learning communities, professional development, and team teaching

to address academic achievement issues. Interdisciplinary teaming was touted among educators as an essential strategy in excellent functioning middle schools. This approach was endorsed as an educational design that would provide opportunities for collaborative planning, establish a community of learning and a way to build relationships with students (Pate, Thomson, & Homestead, 2004). By 1993, over 52% of middle schools nationwide had scheduled teachers and students into interdisciplinary teams and by 2003, the number of middle schools increased to approximately 12,000 (Herman, 2004). During this time, the number of middle schools quadrupled with the number of middle schools increasing to 13,300 by 2015 (NCES, 2018).

However, a shift began during the late 1990s, and low levels of achievement and high numbers of discipline problems began to plague the middle schools (Blair, 2008). The No Child Left Behind Act was re-authorized in 2002, holding students and schools accountable for meeting higher levels of academic achievement or Adequate Yearly Progress (AYP). NCLB demanded academic gains in return for federal funding and sanctioned schools that did not meet AYP (U.S. Department of Education [USDE], 2002). Although middle schools embraced interdisciplinary team teaching, they were scrutinized for not meeting academic achievement standards (Herman, 2004). Pardini (2002) reported schools that were once praised for nurturing students through team teaching and interdisciplinary instruction were now under attack in the late 1990s to the early 2000s, due to disappointing academic results. The National Center on Education and the Economy proclaimed middle schools "the wasteland of our primary and secondary landscape" (Pardini, 2002, p. 3).

This scrutiny led school districts across the nation to examine student achievement in their middle schools. The research began to favor other grade span configurations such the K-8

model which suggested better academic performance when compared to the middle school model. Studies were conducted drawing attention to higher levels of academic achievement among students who attended K-8 schools (Alspaugh 1998; Byrnes & Ruby 2007 Poncelet 2004). Beginning in the late 1990s, a trend began across the country in which school district policy makers and leaders decided to build, convert, and replace elementary and middle schools with K-8 schools as was popular 100 years ago.

For example, in 1998, the Cleveland school district concluded that 25 middle schools (Grades 6-8) were failing, as evidenced by downward-spiraling test scores, increased absences, and escalating suspension rates (Pardini, 2002). The chief executive officer believed the transition from a stable environment to a new school in which students moved from class to class, knew no teachers, and had to recreate social circles was detrimental. She decided to convert 21 elementary schools to K-8 schools, and she accomplished this by 2000 (Pardini, 2002). The change was positive, and the school district witnessed higher test scores and better attendance (Pardini, 2002). Other school districts also believed the K-8 model was a positive change, and thus began a growing movement to convert existing school sites to K-8 schools. Cincinnati public schools transitioned all elementary and middle schools to K-8 schools due to parent dissatisfaction with middle schools (Pardini, 2002). The Chicago school board decided to continue utilizing K-8 schools because they cost less to build and operate and parents liked having their child in one school for eight years. Similarly, school districts in Philadelphia, Baltimore, Oklahoma City, Boston, and Fayetteville, Tennessee approved plans to reconfigure most elementary and middle schools to the K-8 model (Pardini, 2002). These changes were based on findings in major research studies and local disparities discovered in the examination of

data and assessment of student needs (Alspaugh 1998; Byrnes & Ruby 2007; Franklin & Glasscock, 1996; Herman, 2004, Offenberg, 2001; Poncelet 2004).

Grade Span Configuration

Creating a school environment conducive to student learning is essential. School size, structure, culture, and climate promote certain values and beliefs that allow for a nurturing environment in which students can thrive. With this in mind, education policy makers have reconfigured grade span options many times since the 1800s. As previously mentioned, during the 1930s, junior high school grade span configurations varied from two grades to four grades with some secondary schools serving six grades (Cuban, 1992). Political tensions, economic shifts, community pressure, and needs of students, have in the past, factored into decisions as to which grade configuration best accommodates students' academic and social needs.

While analyzing student populations, school size, and student demographics, school district policy makers have grappled with which type of grade span configurations (i.e., K-3, K-5, K-8, 6-8, 7-9) foster academic success. In a national survey conducted by the Johns Hopkins University Center for Research on Elementary and Middle Schools approximately 30 different grade span configurations were found to exist in U.S. schools with seventh grade student enrollment (Epstein, 1990). With all of these alternatives, the question arises as to the ideal number of grade levels for one school and which grades should be included. Dove, Pearson, and Hopper (2010) suggested that financial resources, and best fit for an ever-changing student population and community play a large part in the decisions of educational leaders relative to the proper grade span configurations for a district's schools. Confined to tight capital budgets, policy makers contemplate land and construction costs while deciding which grade configurations

produce the best academic results (Colladarci & Hancock, 2002). Although finances, economic stress, and politics play a part in the decisions of policy makers as they convert and construct schools into the future, the focus should ultimately be on which grade span configuration contributes to academic achievement of students. To make this decision, one must ask, does grade span configuration really affect student achievement?

Johnson et al. (2016) boldly suggested that grade span configuration directly influences academic achievement and that broader grade spans such as the K-8 model allowed for better achievement than small grade spans (i.e., the 6-8 middle school model). Lee and Smith (1993) found that schools having a small grade span (i.e., 6-8 model), resulted in larger cohort sizes, leading to "negative consequences on both engagement and achievement" (p. 180).

Cohort size has been defined as the total school enrollment divided by the number of grades in a school. Johnson et al. (2016) maintained that smaller cohort sizes are "associated with greater equity in the distribution of achievement" (p. 395). Larger grade span schools typically have a smaller cohort size, for example, the cost-effective K-8 model which allows for the benefit of higher student academic achievement. In agreement with this claim, Howley (2001) insisted that "small schools are more effective in impoverished communities and make achievement dramatically more equitable" (p. 1). In addition, Fiaschetti and Slate (2014) found that students of low-SES who attended larger grade span schools with small cohort grade levels performed better than single/dual grade level schools.

A small grade span configuration, the most popular during the 1900s, was the Grade 6-8 middle school. Bridging the gap between primary school and high school was of high concern then, and Eichorn (1966) fervently expressed the need for a school to solve the issue surrounding

the transition from the elementary classroom to the departmentalized class periods of the high school. Alexander and George (1981) alleged that a school grade span configuration of 6-8, operating between elementary school and high school, should not only be a transition from the childhood experience to the high school learning experience, but also "be directly concerned with the here-and-now problems and interests of students" (p. 2). The impetus for the middle school movement was aptly described by the Carnegie Council on Adolescent Development (1989) who believed that the transition from elementary school to middle school included moving from the small, stable, primary classroom to a larger impersonal setting: "[a] volatile mismatch exists between the organization and curriculum of middle grades schools, and the intellectual, emotional, and interpersonal needs of young adolescents" (p. 32).

Middle school concept advocates of a Grade 6-8 configuration believed, however, that the main contributor to student achievement was the understanding of adolescent changes while meeting the social-emotional needs of the child (Carnegie Council on Adolescent Development, 1989; Hough, 2005; Lee & Smith 1993; National Association of Secondary School Principals, 1985; National Middle School Association, 2003). In 1985, the National Association of Secondary School Principals (NASSP) published a report regarding the unique ideas outlining the middle school concept. These beliefs included opportunities for students in arts, crafts, athletics, and academics; caring and supportive atmosphere; student advisement; sensitivity to physical, emotional, and social needs; and exploration of talents to promote positive self-concept and build self-esteem (Clark, Slate, Combs, & Moore, 2013). The middle school 6-8 grade span philosophy included tactics such as advisory, teaming, cooperative learning, and engagement of students while supporting team teaching, mixed level classrooms, and small learning

communities to enhance student growth (Hough, 2005; Offenberg, 2001; Schaefer et al., 2016;). Interdisciplinary curriculum content, recognition of diverse needs, and inspiring students to understand the effects of their choices have been encouraged as strategies to include in teachers' best practices (Schaefer et al., 2016). Still, the question remains as to which grade span configuration enhances student academic achievement.

In 2001, The No Child Left Behind Act (NCLB) mandated that students take statewide standardized tests, holding school districts accountable for student proficiency of minimal standards. Prior to NCLB, however, during the late 1980s and through the 1990s, many researchers (Becker, 1987; Franklin & Glascock, 1998; Moore, 1984; Tucker & Andrada, 1997; Wihry et al., 1992) had already begun examining the relationship between student academic achievement and grade span configuration. These findings in these studies began to turn the tide against the advantages of the 6-8 middle school grade span configuration, favoring the re-emergence of the K-8 model. Until this time, no large study had been conducted relative to the correlation between grade span configuration and student achievement (Hough, 2003).

Becker, an elementary and middle school researcher at Johns Hopkins University, was one of the first to study the impact of grade span organizational patterns on student achievement (Clark et al., 2013). Comparing K-6 schools and 6-8 schools, Becker (1987) analyzed the sixth-grade results from the Pennsylvania Education Quality Assessment (EQA) and documented a significant difference in achievement scores favoring the K-6 schools. However, Becker (1987) also alleged that “research about the impact of alternative organizational structures has not been clear and consistent” (p. 29). Wihry et al. (1992) examined 163 schools in Maine, comparing the influence of different grade level schools using the state achievement test. These researchers

discovered that eighth-grade student achievement was significantly higher in K-8 schools than in middle schools and suggested that "the junior/senior setting was the least successful location for eighth grades" (p. 68).

Tucker and Andrada (1997) conducted research in Connecticut using the Connecticut Mastery Test. In support of prior research, they declared that students in the K-6 schools performed better than those in the 6-8 model schools. Additionally, Moore (1984) managed a study conducted in 18 K-8 and 6-8 schools in New York City, revealing that reading achievement scores of seventh- and eighth-grade students were higher in the K-8 schools. Moore also reported that the K-8 students had higher self-esteem, better attendance, and were more positive about their schools.

In their study of 700 rural schools in Louisiana, Franklin and Glascock (1998) suggested that sixth- and seventh-grade students in K-6 and K-7 schools performed significantly higher on the California Achievement Test (CAT) than students enrolled in middle schools. Social indicators also revealed a lower rate of suspensions and an increase in attendance for students attending the K-6 or K-7 schools. Franklin and Glascock (1998) asserted, "From this study it appears that elementary and combination school learning environments are more beneficial to students than either the middle or secondary school learning environments" (p. 22). Wren (2003) aligned with these researchers, arguing, "As grade span configuration increases so does achievement" (p. 10).

Although these early studies reflected that the K-6 and K-8 students outperformed the 6-8 configuration, effect sizes in most cases were low or did not exist, making it difficult to

determine the strength of the findings. The relationship between grade span configuration and academic achievement remained inconclusive.

Additional studies conducted to analyze the effects of grade span configuration on student achievement continued to offer additional data after the 2002 implementation of the NCLB Act. Most of the grade span researchers held the view that students enrolled in K-8 schools outperformed students attending middle schools; however, some findings were not significant, proving to be inconclusive (Bickel, Howley, Williams, & Glascock, 2001; Byrnes & Ruby, 2007; Connolly, Yakimowski-Srebnick, & Russo, 2002; Fink, 2010; Schafer, 2010 Weiss & Kipnes, 2006; Yeck, 2006).

Conducting a study in Baltimore in 2002, Connolly et al. analyzed mathematics, reading, and writing scores of 2,871 students. Data revealed a statistically significant higher performance by students attending K-8 schools over those students enrolled in a 6-8 grade span environments. Similarly, Bickel et al. (2001) analyzed 1,001 reading, writing, and mathematics scores, utilizing the Texas Assessment of Academic Skills (TAAS). Bickel et al. (2001) reported that student achievement was positively influenced by the K-12 model which was also more cost effective.

In studies conducted by researchers in Milwaukee, Baltimore, Philadelphia, and Wisconsin, students in K-8 schools demonstrated fewer behavioral problems and higher academic achievement than students in traditional middle schools (Yecke, 2006). A longitudinal study of 924 K-8 and K-6 students in Milwaukee revealed higher standardized test scores and higher grade point averages (Yecke, 2006). The Baltimore study exposed similar results after analyzing scores from over 3,000 students in traditional middle schools and K-8 schools (Yecke, 2006). After analyzing student achievement data in New Jersey, Keegan (2000) revealed that

students in the K-8 schools outperformed middle school students in every category including mathematics, language arts, science, and attendance rates and further proposed that the K-8 structure may be the best grade span configuration for academic achievement.

Reflecting on the Philadelphia analysis, Byrnes and Ruby (2007) analyzed 40,883 students' scores of 95 schools on the Pennsylvania State System of Assessment (PSSA). The results indicated that students from old K-8 schools had large and significant gains in reading when compared to middle school students, but students from new K-8 schools did not have significantly different averages (Byrnes & Ruby, 2007). Interestingly, Byrnes and Ruby (2007) concluded, "After controlling for transition and average grade size, there were no discernable differences between K-8 schools and middle schools in terms of academic achievement" (p. 128). Hong, Zimmer, and Engberg (2018) stipulated that K-8 schools had a negative effect on elementary students, suggesting that "the adverse effects for elementary students in K-8 schools combined with the lack of long-term adverse effects for students attending separate middle schools does not provide support for K-8 configuration" (p. 12). Aligning with these results, Dove et al. (2010), analyzing results of the Arkansas Benchmark Examination, found no relationship between grade span configuration and academic achievement.

Although the results of research conducted to analyze the relationship between grade span configuration and academic achievement have been inconclusive and suggest uncertainty, many policy makers around the country have been convinced that students learn better in a K-8 setting than in a 6-8 grade configuration. Yecke (2006) asserted that several urban school districts, were abandoning the middle school concept and turning to K-8 schools. In 2006, it was anticipated that Philadelphia would increase the number of K-8 schools to 130, and Yecke

(2006) maintained that school districts in Massachusetts and Ohio had almost exclusively turned to K-8 schooling. In addition, as noted by Pardini (2002), Cleveland, Cincinnati, Chicago, Baltimore, Oklahoma, and Boston were also among those school districts that converted to the K-8 configuration. The question remains, however, as to whether there is sufficient evidence to strongly recommend that school districts build and convert existing schools to the K-8 model.

Advocates for the middle school concept believe the 6-8 model provides a caring, encouraging, comfortable environment in which students can explore their strengths, weaknesses, and interests. Dickinson (2001) argued that the middle school concept is strong, assisting students with developmental needs in a safe environment. McEwin, Dickinson, and Jacobson (2005) agreed, claiming that based on their study, "The typical middle school is more likely to meet the educational and developmental needs of young adolescents than is the typical K-8 school" (p. 27). Hough (2005) put forth a slightly different view, writing, "In theory, again, any school with a nurturing learner-centered environment, staffed by competent, caring teachers who fully implement promising practices should be able to document positive student outcomes" (p. 7). The National Middle Schools Association (NMSA) embraced the middle school concept, basing its support on research and practice that accommodates the needs of early adolescents (Swaim et al., 2003). NMSA Executive Director Swaim completely supported the middle school concept, questioning whether some school districts that had bleak academic gains in the middle schools had fully implemented the true middle school philosophy with consistency and fidelity (Pardini, 2002).

Epstein and MacIver (1990) asserted that when a school district applies exceptional practices that support students' social and academic development, grade span configuration is

irrelevant. Accepting this premise would lead to the assumption that academic student achievement would increase if the social, emotional, and personal needs of students were met. If this is true, one must question why researchers have found a lack of academic achievement in middle schools during the 6-8 grades compared to K-8 schools. Why have many school districts decided to jettison the 6-8 school model and embrace the K-8 model?

Results of a study conducted by Schwartz, Stiefel, and Rubenstein (2017) proposed four possible reasons why student achievement in the K-8 model outperforms student achievement in the middle school model: (a) the number of school transitions, (b) the timing of school transitions, (c) the stability of students, and (d) the size of school classes. The K-8 grade span configuration allows students to remain in the same school for a longer period of time, avoiding school-to-school transitions. Byrnes and Ruby (2007) emphasized that when students migrate from elementary school to middle school, they go from being the oldest students to the youngest students. “Some past research has found that K-8 students may benefit from spending the middle grades as the older children in their school building, and that being the ‘top dog’ might lead to greater feelings of confidence, maturity, and leadership” (Byrnes & Ruby, 2007, p. 106).

Weiss and Kipnes (2006) found that students with a high level of self-esteem had significantly better grades, and that “the benefit of self-esteem is not significantly different for students in middle schools as compared to those in K–8 schools” (p. 264). A study conducted by Booth, Sheehan, and Earley (2005) suggested that “middle schools may be more detrimental to socio-emotional development, especially self-esteem and feelings of anonymity” (p. 16). The report further explained that sixth graders did not increase their self-esteem levels at the same rate in middle schools as in K-8 schools (Booth, Sheehan, & Earley, 2005).

Stress and anxiety can cripple a student's focus and engagement in activities at school. Goldstein, Boxer, and Rudolph (2015) purported that "those adolescents who reported higher levels of stress regarding the transition from their elementary schools to their middle schools also reported greater levels of academic challenges during middle school" (p. 26). Averting the stressful transition to an unfamiliar environment (e.g., a new middle school building, new teachers, different policies and procedures, different student rules, and new classmates) can reduce student anxiety.

The wider grade span of the K-8 model affords a longer continuity of experience (Coladarci & Hancock, 2002) to grow relationships and trust others during this sensitive and vulnerable time for youth. A sense of belonging and confidence in a familiar environment showered with support and opportunities to grow, results in better attendance which in turn promotes academic achievement. Because students build closer relationships over a longer period of time, K-8 schools seem to have excellent attendance rates, higher self-esteem, and more positive attitudes (Moore, 1984). Elementary teachers foster a stress-free, nurturing environment that can permeate throughout a K-8 school, particularly in the sixth through eighth grades, encouraging attendance, self-confidence, and student efficacy which enhances academic achievement (Wren, 2003).

Creating a safe, inviting, service-oriented climate is essential, and Poncelet (2004) revealed that three years after the K-8 conversions in Cleveland, students and teachers provided testimony of no fights; a feeling of campus-wide safety; and teachers described the older students as very patient with, courteous to, and respectful of the younger students. Seventh-and eighth-grade students in the K-8 schools reported that "they served as role models for younger students

in the school" (Poncelet, 2004, p. 90). Students enrolled in the K-8 model were less likely to feel victimized or unsafe as compared to students attending middle school (Anderman, 2002).

Positive, caring teacher relationships and familiarity of environment from year to year cause less angst for students, allowing them to focus and not fall behind while taking time to understand new surroundings. A possible detriment to student achievement at the middle school model is the minimal time provided for student-teacher discussion and relationship building. Feldlaufer et al. (1988) observed that middle school teachers have many more students for a shorter period of time, thereby diminishing the teacher-student relationship and possibly student achievement. Building trust and good student-teacher rapport takes time, and a student may only communicate with a middle school teacher for one year (Alspaugh, 1998). Children need close relationships with teachers, as they desire for an adult to care about them and encourage them to engage in their interests (Eccles et al. 1993). The elementary philosophy of students assigned to one or two teachers to promote a familiar, caring, and respectful student-teacher and teacher-parent relationship is easily replicated in the K-8 school configuration as students move from Grade 5 to Grade 6, remaining in the same school. Teachers of K-8 schools get to know students, parents, and families very well, as they serve students for nine years as opposed to middle schools that serve students for only three years (Offenberg, 2001). Hough (2009) contended that parents with students enrolled in the K-8 school usually have elementary and middle school aged children together at the same school. This permits parents to be easily engaged and much more comfortable with the school over the years. The process of minimizing each student's number of teachers and continuing lasting relationships as they begin their sixth, seventh and eighth grades seems to benefit student learning (Becker, 1987; Offenberg, 2001).

School-to-School Transitions

Evidence produced in many research studies has suggested that transition effects are largely negative and that children may not be ready to handle a school transition, which creates undue stress and less motivation to learn, after fifth grade (Coladarci & Hancock, 2002; Poncelet, 2004). Larson et al. (2002) observed that middle-grade students show high emotional instability and that forcing them to experience more transitions than the norm has unfavorable repercussions. Seidman et al. (1994) agreed that the transition from elementary school to middle school causes the self-perception and self-esteem of students to decrease. Booth, Sheehan, and Early (2005) asserted that the transition into middle school requires students to adjust to their new surroundings causing feelings of anonymity. In addition, according to Simmons, Burgeson, Ford and Blyth (1987), motivation and performance seem to decrease after students transition to another school. Simmons et al. (1987) also found that a school transition nearly always resulted in a decreased level of extracurricular participation and a decline in GPA for boys and girls. Interestingly, in this same study, Simmons et al. found that school transitions negatively affect the self-esteem of girls more than boys. Whether these negative variables of school-to-school transitions affect academic achievement of sixth-, seventh-, and eighth-grade students in a middle school model remains a question. After analyzing the results of many studies, it seems that school-to-school transitions do significantly affect student achievement (Alspaugh, 1998; Byrnes & Ruby, 2007; Collins, 2006; Delvicio, 2013; Hough, 2005; Poncelet, 2004; Simmons & Blyth, 1987; Sparks, 2011; Wren, 2003).

In the 1800s and early 1900s, school transitions were touted as an opportunity to grow, embracing the next step in a student's life journey learning how to cope and adjust. At the time

of the present study, school transitions were seen as the culprit behind lower academic achievement, anxiety, and negative personal development (Clark et al., 2013).

Delviscio (2013) analyzed academic records of 598 school districts in New York and discovered that the number of school-to-school transitions made during a student's years of education has a statistically significant influence on academic achievement. "The more transitions a student makes, the worse the student performs" (Wren, 2003, p. 10). The results of a study in North Carolina indicated that sixth-grade middle school students who made the transition from elementary school, displayed lower reading and mathematics scores than students in the K-8 model (Collins, 2006).

In his research, Alspaugh (1998) suggested that students experience more achievement loss by transitioning from the elementary school to middle school than from continually and consistently attending a K-8 school. Alspaugh compared student achievement of students in 48 school districts using the Missouri Mastery and Achievement Tests (MMAT). The first group represented school districts consisting of a K-8 school that transitioned once to a high school. The second group of school districts reflected a linear arrangement involving one elementary school, one middle school, and one high school suggesting two school-to-school transitions. The third group of school districts contained two or three elementary schools in which students merged during the transition to a middle school and then transitioned again to a high school indicating a pyramid transition layout. After analyzing the average gain or loss among scores in reading, mathematics, science, and social studies, Alspaugh found that the K-8 school group reflected a sizeable gain compared to a loss in the other two groups. These findings indicated that students having no school-to-school transition in the K-8 schools had higher achievement scores

than both other groups. Alspaugh also analyzed 8th grade to 9th grade standardized test scores in which he found that each of the three groups demonstrated an average loss in student achievement points, however the K-8 group had the least dip in scores.

Overall, Alspaugh (1998) found that the number of different school transitions a student experiences likely affects students' academic achievement. Because no school-to-school transitions occurred in K-8 schools during the fifth-grade to sixth-grade progression, district average standardized test scores were significantly higher for students in the K-8 model than students who transitioned from an elementary school to a middle school (Alspaugh, 1998).

Poncelet (2004) conducted a study in Cleveland, Ohio, exploring the educational effects of sixth-grade students attending a K-8 school versus a traditional middle school. This study emerged as the Cleveland Municipal School District began phasing out middle schools and restructuring 21 elementary schools into K-8 schools to solve the problem of failing middle schools. Poncelet analyzed data in this Cleveland school district and found that the absence of a school transition from fifth to sixth grade promoted higher academic achievement and that a familiar, safe environment that aligns to social and emotional needs may enable positive academic outcomes. Two elementary schools in the third year of restructuring to K-8 schools were investigated. Both schools had a population of approximately 80% free and reduced lunch with one reflecting a minority population of 73% and the other at 99% (Poncelet, 2004). Proficiency scores revealed a statistically significant difference in sixth-grade achievement between the K-8 schools and traditional middle schools. Poncelet reported, "It appears that attending a K-8 school and avoiding the discontinuity associated with a transition to a middle

school had a positive impact on sixth-grade students' proficiency in mathematics as well as reading" (p. 93).

Byrnes and Ruby (2007) conducted a K-8 school study in the Philadelphia City School District, analyzing the assessment results of 40,883 eighth-grade students from 95 schools using the Pennsylvania State System of Assessment (PSSA) over a period of five years. After analyzing 29,000 middle school students' scores and 11,000 K-8 school students' scores, data confirmed that students attending K-8 schools outperformed the middle school students in each subject (Byrnes & Ruby, 2007). A plausible explanation for the higher student achievement in K-8 schools rests with the lack of transitions from school to school.

A study of Florida schools in 2011 as part of the Program on Education Policy and Governance Working Papers Series at Harvard University revealed a large drop in mathematics and language arts achievement during the transition year from fifth to sixth grade among middle school students (Sparks, 2011). This study, 2000-2009, was a longitudinal probe of 450,000 students in Florida's public school system. Sparks stated that students who transitioned to a middle school, entering in sixth grade, were absent from school more often and had a higher chance of dropping out of school by 10^{th} grade as opposed to those students in a K-8 school who made no transition. Students attending elementary schools had a slight edge over those attending K-8 schools in mathematics and language arts, but their performance dropped upon entering middle school in the sixth grade (Sparks, 2011). The K-8 students did not lose ground as they attended sixth grade; rather, they outperformed the middle school students and continued to widen the gap well into high school (Sparks, 2011).

The student transition to high school entering ninth grade involves a new environment, more rigorous standards, less student-teacher communication, new social relationships, overwhelming numbers of activities, and greater independence for the student to accomplish goals. Weiss and Baker-Smith (2010) expressed their belief that sixth-grade students who attended the K-8 model school with no transition, and an emphasis on academic and personal needs, overcame adversity and built a strong foundation; thus, they were better prepared for high school than those who attended the middle school model. In their study, Weiss and Baker-Smith (2010) analyzed ninth-grade data from the Philadelphia Educational Longitudinal Study (PELS) and found that when comparing the middle school model and the K-8 model, students who attended the 6-8 middle school model scored significantly lower and were more likely to fail a ninth-grade course. Rockoff and Lockwood (2010) conducted a longitudinal study of the effects of school-to-school transitions using New York City school data from 1998-2008. These researchers discovered that no matter when students left the elementary school or a K-8 school and transitioned to a middle school, on average, there was a large dip in test scores which was not temporary but continued to widen through high school. Likewise, Schwert and West (2011) found that Florida students who transitioned to middle school had a drop in mathematics and English scores which continued to fall through 10^{th} grade.

Other studies contradict the notion that school-to-school transitions negatively affect student achievement in middle school. Whitley et al. (2007) found that student scores in Quebec and Ontario were not affected by the transition to middle school. Also, Wilson and Slate found, in their 2015 Texas study, no negative transition effects for African American and Hispanic

middle school students as evidenced by test scores indicating they outperformed their K-8 model counterparts.

Summary

As policy makers construct cost effective K-8 schools, they must contemplate the effects of grade span configuration and school transition on student achievement. The purpose of this study was to compare the academic achievement of sixth-grade students attending a Grade 6-8 model middle school to those students attending a K-8 model school. Information collected from this high-performing Florida school district was intended to assist the policy makers in deciding which types of schools are most educationally sound to construct, with a potential to inform the decision-making of other districts.

In this chapter, the researcher presented historical information and data, suggesting that educators have revised grade span configurations based on politics, societal changes, work force needs, and legislative mandates. The longest running type of school was the middle school, serving the social-emotional needs of the whole child. Researchers found that grade span configurations and school-to-school transitions may be disruptive for students leaving a familiar, safe school environment to begin new adventures at a different school. Building new social relationships, learning new policies and procedures, assimilating into a new environment, and understanding the expectations of many new teachers can be very stressful, taking a toll on students' academic achievement. For students attending a K-8 school, the pressure of change related to the transition from school to school is minimal or does not exist entering the sixth grade.

Despite the obvious financial benefits of constructing, maintaining, and operating a K-8 school versus an elementary school and middle school, the question remains as to how these two learning environments differ in educational advantages to students. Many questions arise relative to academic achievement, high school readiness, transition adaptability, high school drop-out rates, and student discipline problems.

Policy makers and school district administrators must understand the effects of transition and grade span configurations on student achievement in the sixth, eighth, and ninth grades when making capital improvement decisions. Overall student achievement or lack of achievement in unique school settings could possibly inform the need for certain types of schools (i.e., K-8 schools or middle schools) to be constructed in the future. Questions remain as to whether transitions from elementary school to middle school, along with grade span configurations, affect student achievement as compared to K-8 schools which require only one transition to high school.

The results of this review of research literature were inconclusive but suggest that multiple school-to-school transitions and the 6-8 middle school grade span configuration lead to a negative impact on academic achievement. The data have indicated that school-to-school transitions early in students' educational experience have a negative effect on students during Grades 6-8 and continue into high school. Though inconclusive, some of the data imply that K-8 schools are the preferred method of educating students, underscoring a desire for no school-to-school transitions from early childhood through eighth grade.

In the Florida school district of focus for this study, school grade levels are configured by elementary K-5, middle 6-8, and high 9-12. Currently six of the 40 schools throughout the

district are K-8 schools, three of which opened in 2018. As the school district continues to grow at an extremely fast pace, many schools will need to be constructed in the near future. Besides the obvious reduction in cost to construct and operate a K-8 school, policy makers would like to understand the academic impact on sixth-grade students transitioning to a middle school or not transitioning while attending a K-8 school. This study was conducted to analyze K-8 and middle school student data scores in a targeted high-performing Florida school district to better understand the implications regarding grade configurations and school-to-school transition of sixth-grade students.

CHAPTER 3
METHODOLOGY

Introduction

The purpose of this study was to compare the academic achievement of sixth-grade students attending the traditional middle school model versus the K-8 model by analyzing sixth grade 2017 English language arts and mathematics scores. Information gathered from this study was intended to assist policy makers in this Florida school district when deciding which types of schools are most educationally sound to construct and, with cautious generalizations, potentially inform the decision-making of other school districts faced with the same questions and concerns in the future.

A causal-comparative research design was used for this study. This model was aimed at determining the cause for differences between two existing groups utilizing extant data, allowing the researcher to compare differences and/or relationships between the independent variables (Fraenkel et al., 2015). The causal-comparative study design was applied to discover the relationship between student achievement and grade span configurations, comparing 2017 mathematics and English language arts (ELA) scores of sixth-grade students in three K-8 schools to scores of sixth-grade students in three middle schools.

The research questions were tested and analyzed using the dependent variables consisting of 2017 extant data in the form of developmental scale scores, learning gain scores, and socioeconomic information to measure student performance in terms of excellence, growth, and equity in the distribution of achievement outcomes. The Statistical Package for the Social Sciences 23 (SPSS) statistical software program was utilized to calculate the results. This chapter reiterates the research questions, clarifies the participants, and explains the instrumentation used

for this study. The chapter also explains the data collection process and identifies the data analysis tools employed to analyze scores.

Research Questions

The following research questions for this study were used to guide the inquiry of student achievement in the K-8 school and middle school environments.

Research Question 1

What difference, if any, exists in the overall English/Language Arts (ELA) and mathematics performance of 6th grade students attending a K-8 school versus 6th grade students attending a traditional elementary-to-middle school model?

This question was intended to measure excellence in achievement outcomes by comparing developmental scale score (DSS) data from the Florida Standards Assessment (FSA) across the two different school types. It was answered by comparing the achievement levels of students in each of the two school categories. The results displayed whether students in one school category or the other, on average, produced higher scores on ELA and mathematics assessments.

Research Question 2

What difference, if any, exists in the proportion of 6^{th} grade students making learning gains in a K-8 school versus a traditional elementary-to-middle school model?

This question was designed to reveal which school model type embodied the largest proportion of students with learning gains. This information was valuable to school board members when making construction decisions regarding school type. The results revealed

whether students in one school category or the other, on average, produced higher learning gains on ELA and mathematics assessments using the FSA data.

Research Question 3

What difference, if any, exists in the strength and direction of the relationship between socioeconomic status (SES) and student achievement in K-8 schools versus middle schools?

To assess equity in the distribution of achievement outcomes, an analysis was performed to measure the strength and direction of the relationship between socioeconomic status (SES) and achievement for students in each of the two types of schools. The FSA results for the two school categories were compared in an effort to signify which type of school displayed greater SES-based equity in the distribution of student achievement (i.e., which type of school demonstrated narrower SES-based achievement gaps).

Participants

This study included the entire population of sixth-grade students from three K-8 schools and three middle schools in a high-performing, affluent Florida school district. The sample of schools chosen can be classified as cluster purposive because the three K-8 schools were selected based on their grade span configuration (i.e., they were the only K-8 schools in the school district), and the three middle schools were selected based on shared common student demographics, common student achievement levels, and common levels of SES that were most similar to the three K-8 schools (Fraenkel et al., 2015).

Low-SES students are categorized as living in a household with an overall income eligible for the free/reduced lunch program. The National School Lunch Program (NSLP), a

federally assisted meal program, provides low-cost or free lunch to students living at the poverty level (United States Department of Agriculture [USDA], 2018). Eligibility for free/reduced lunch is determined by salaries of households depending on the number of family members in the household. For example, the 2016-17 federal low-SES salary guideline for a family of three is $20,160 multiplied by 1.85 which equates to $37,296 annually to qualify for reduced lunch prices and/or multiplied by 1.30 which equates to $26,208 to qualify for free lunch (USDA, 2016, p. 15503). Another example for a family of eight ($40,890), would be eligible for reduced prices with a salary of $75,647 and/or would be eligible for free lunch with a salary of $53,147 (USDA, 2016, p. 15503). As shown in Table 1, the average percentage of students eligible for free and reduced lunch (FRL) in the three middle schools was 11.6%, almost mirroring the K-8 schools' rate of 11.4%.

The population for each of the three middle schools averaged 337 sixth-grade students, allowing the researcher to analyze ELA and mathematics scores of 1,010 sixth-grade middle school students. Each K-8 school contained an average of 178 sixth-grade students resulting in the examination of 534 sixth-grade student ELA and mathematics scores in the three K-8 schools.

Table 3

Description of Participants

School Type	Number of Schools	Average Number of Sixth-grade Students Enrolled in Each School	Total Population of Sixth-grade Student Scores Analyzed	Percentage of Low-SES Students
Middle	3	337	1,010	11.6
K-8	3	178	534	11.4
Total	6		1,544	

Instrumentation

Statewide assessments in Florida began in the 1970s with a high school graduation test in 1976. The Florida Writing Assessment program was implemented in the 1990s including the High School Competency Test (HSCT) followed by the Florida Comprehensive Assessment Test (FCAT) in 1998. School grades began to be issued in 1999 based on FCAT performance (FDOE, 2018a). In 2001, FCAT learning gains became part of the school grade, and passing the FCAT Reading and Mathematics examinations was a requirement for high school graduation. Florida implemented the Florida Standards Assessment (FSA) in 2014 which included English Language Arts and Mathematics, measuring mastery of the Florida Standards.

Still currently administered at the time of the present study, the FSA is a criterion-referenced standardized test given annually to measure mastery of the Florida standards for ELA and mathematics in Grades 3-10 (FDOE, 2018a). Committees, including Florida educators, psychometrics experts, and Florida citizens review and accept test items each year while appraising for potential bias. Test items are written with item specifications based on the Florida

standards to ensure alignment between course descriptions and the FSA. Different types of questions are developed utilizing Webb's Depth of Knowledge.

Webb's Depth of Knowledge (DOK) consists of four levels, depicting cognitive complexity generated by a student to explore a certain topic or standard (FDOE, 2018c). The levels include: Level 1 (recall) facts or definitions, Level 2 (skill/concept) follow a set procedure or steps, Level 3 (strategic thinking) reasoning, planning, explaining, and Level 4 (extended thinking) connections, combining, synthesizing, critiquing (Webb, 2007). While writing test items using Webb's DOK, developers do not base the DOK level on the difficulty of a question but rather the complexity of cognitive thought needed to answer the question (Wyse & Viger, 2011). For example, Wyse and Viger (2011) suggested that "a test item may be difficult for examinees to answer, but the test item may require a low level of cognitive processing" (p. 188) such as recalling the name of a past president. Assessment items for the FSA are developed and sorted into three levels using Webb's DOK: Level 1 items reflect low complexity, level 2 items reflect moderate complexity, and level 3 items indicate high complexity (FDOE, 2018c). Table 4 displays the percentages of types of question items/points for each test relative to the three DOK levels.

Table 4

Percentage of Points by Depth of Knowledge (DOK)

Grade/Subject	DOK Level 1	DOK Level 2	DOK Level 3
Grades 3-10 ELA	10%-20%	60%-80%	10%-20%
Grades 3-10 Mathematics	10%-20%	60%-80%	10%-20%

Source. FDOE (2018c)

The sixth-grade ELA portion of the FSA is comprised of a writing component and a reading component based on Reading, Literature, and Language strands of the Florida Standards (FDOE, 2018b). The ELA reading section assesses reading comprehension through a wide variety of text and evaluates key ideas and details, craft and structure, integration of knowledge and ideas, language and editing, and text-based writing (FDOE, 2018b). Sixth-grade FSA Mathematics assesses ratio and proportion, expressions and equations, Geometry, statistics and probability, and the number system (FDOE, 2018b).

To measure the progress of students in the areas of ELA and mathematics, the FDOE created achievement levels as displayed in Table 5. Level 1 is the lowest level denoting that a student's understanding of the standards is inadequate and in need of substantial support. Mastery of the standards is indicated by a level 5, the highest level, signifying that a student is likely to excel.

Table 5

Florida Standards Assessment (FSA) Achievement Levels

Level #	Level Descriptor	Level Indicator
1	Inadequate	Needs substantial support
2	Below Satisfactory	Likely needs substantial support
3	Satisfactory	May need additional support
4	Proficient	Likely to excel
5	Mastery	Highly likely to excel

Source. FDOE (2018a)

Each level is aligned to a certain range of three-digit scores (DSS data). Ranges for the five levels are displayed in Table 6. Using DSS data, the FDOE converted scores to five levels, with level 5 reflecting the highest DSS range and level 1 the lowest DSS range, indicating inadequate performance in meeting the standards. After taking the FSA each school year, students earn three-digit scores (DSS) for the ELA examination and the mathematics examination.

Table 6

FSA Scale Scores for Each Achievement Level

Grade 6 Assessment	Level 1	Level 2	Level 3	Level 4	Level 5
English Language Arts	259-308	309-325	326-338	339-355	356-391
Grade 6 Mathematics	260-309	310-324	325-338	339-355	356-390

Source. (FDOE, 2016c)

Learning gains are required by law in s. 1008.34 F.S. and are calculated by the Florida Department of Education for both ELA and mathematics utilizing the FSA (FDOE, 2016c; Florida Statutes, 2017). There are three different scenarios in which students may obtain a learning gain:

1. Improve one or more achievement levels from one year to the next (e.g., move from Level 1 to Level 2, Level 2 to Level 4, etc.).
2. Maintain a Level 3, Level 4, or Level 5 from one year to the next and the student's scores in Level 3 and Level 4 must have improved from one year to the next.
3. Split Levels 1 and 2 into multiple subcategories (Level 1 into thirds and Level 2 in half) and require the student to improve from one subcategory to a higher subcategory within the Level (e.g., move from the bottom third of Level 1 to the middle third of Level 1). (FDOE, 2016c, p. 1)

Data Collection

Developmental scale score (DSS) data from the 2017 FSA were collected by this targeted Florida school district's assessment and accountability department using the Florida Department of Education (FDOE) website. English Language Arts (ELA) and mathematics scores for all 2017 sixth-grade students from the six chosen schools in this study were analyzed. The DSS data and learning gains for ELA and mathematics were calculated for each sixth-grade student. In addition to ELA and mathematics DSS data and learning gains, Socioeconomic Status (SES) information was collected.

ELA data were displayed on two separate spreadsheets. Table 7 reflects an example of a portion of the ELA spreadsheet. The spreadsheet signifies the type of school as 1 = middle schools and 2 = K-8 schools. In addition, the spreadsheet reveals SES (i.e., eligibility for free/reduced lunch (FRL) as 1 = yes and 2 = no). The calendar year of the data, the subject area, student grade level, student achievement level, DSS data, and learning gains expressed as 1 = yes and 2 = no were collected and displayed on the spreadsheet as well.

Table 7

English Language Arts Spreadsheet Example

Year	Subject	MS=1 K-8=2	Grade	Achievement Level	DSS	Learning Gain Yes=1 No=0	FRL Yes=1 No=
2017	ELA	1	6	4	340	1	0
2017	ELA	2	6	3	337	1	1
2017	ELA	1	6	1	298	0	0

Note. MS = middle school; DSS = developmental scale score, FRL = free/reduced lunch.

Data Analysis

Using the extant data set previously described, the research questions were addressed using several statistical techniques: independent samples t-test, cross-tabulations, and point bi-serial correlation analysis. The first research question for this study investigated differences in the level of excellence in achievement outcomes of ELA and mathematics scores by comparing DSS data (i.e., the dependent variables) across the two different school types (i.e., the independent variables)

To answer Research Question 1 1, ELA DSS data were used to run an independent samples *t*-test to calculate the ELA mean for each school type. This test determined whether students in one school category or the other, on average, produced a higher mean score on the ELA assessment (Steinberg, 2011). To analyze the mean score differences in mathematics performance between the middle schools and the K-8 schools, the same procedure was conducted using the mathematics DSS data.

Because the data set included the full population, there was no need to make inferences from a sample to the larger population. Although statistical significance was, strictly speaking, irrelevant to the investigation, significance levels were nevertheless reported and treated as indicators that an observed relationship might be of practical significance (Bickel, 2007).

The second research question compared the difference in the proportion of learning gains (dependent variables) between the K-8 schools and the middle schools (independent variables). The results of this analysis displayed whether students in one school category or the other, on average, produced a higher proportion of students who earned learning gains on the ELA assessment. To answer Research Question 2, cross-tabulation was used to examine ELA learning gains data reflected as 1 = yes and 0 = no for each independent variable (middle schools and K-8 schools). The percentage of scores revealing ELA learning gains or no learning gains (dependent variables) for middle schools and also for K-8 schools were noted for ELA and compared between the two school types. This process was repeated using mathematics learning gains data to calculate the proportion of learning gains for each school category.

The third research question compared the strength and direction of the relationship between student achievement and low-SES in K-8 schools versus middle schools. To assess equity in the distribution of achievement outcomes, the analysis measured the direction and strength of the relationship between SES and achievement scores for students in each of the two types of schools. The results were compared between the two school categories in an effort to signify which type of school displayed the smallest negative relationship between student achievement and low-SES, in essence, which school category was more effective in narrowing the achievement gap.

FDOE data signifying students as participating or not participating in the free and reduced lunch (FRL) program were placed into SPSS as 0 = no FRL and 1 = yes FRL. A two tailed bi-serial correlation was computed to measure the strength and direction of the relationship between the ELA DSS data and SES information for each school category. Squaring the Pearson's r coefficient (r^2) yielded a measure of the proportion of variance (a percentage that can be interpreted to represent an effect size), indicating the strength of the relationship between ELA performance and the students' SES designation for each school category (Steinberg, 2011). The smaller the r^2 value, the weaker the relationship between SES and student achievement and thus, the greater success in disrupting the relationship and closing the achievement gap. This process was repeated using the mathematics DSS scores for each school type.

Summary

This chapter reaffirmed the purpose of this causal-comparative study and reiterated the research questions framing the study. The extant data were collected from the FDOE by the assessment and accountability team of the Florida school district of focus for this study. Data were sorted and renamed for the purpose of entering it into the SPSS software program to be analyzed. Certain data were analyzed to answer each of the three research questions, and the methods were discussed. An independent samples t-test was used to discover the difference in mean scores of student achievement between the K-8 schools and the middle schools (Steinberg, 2011). Cross-tabulations displayed results of the proportion of learning gains in mathematics and ELA scores documenting the differences between both school types and possibly indicating which school type more successfully influenced student achievement relative to learning gains. To capture the direction and strength of the negative effects of low-SES on student achievement,

a bi-serial correlation test produced a Pearson's r value including a variance or relationship effect size possibly indicating which school environment may afford students of low-SES a better opportunity for success while closing the achievement gap (Steinberg, 2011). The results of this data analysis are presented and discussed in Chapter 4.

CHAPTER 4
PRESENTATION AND ANALYSIS OF DATA

Introduction

This study was conducted to investigate the 2017 ELA and mathematics achievement scores of sixth-grade students in three middle schools compared to those in three K8 schools in a high-performing, affluent Florida school district. Developmental Scale Score (DSS) data from the Florida Standards Assessment (FSA) examination regarding proficiency and learning gains in ELA and mathematics were used as the dependent variables. The researcher accomplished the purpose of this study by analyzing the extant data produced by students in two different independent variables (i.e., middle schools and K-8 schools) to determine which environment afforded the best opportunity for student achievement. The information in this chapter reports on the results of data tested relative to the three research questions which guided the study.

These research questions were addressed employing several statistical techniques: independent samples t-test, cross-tabulations, and point bi-serial correlation analysis. The first research question: "What difference, if any, exists in the overall English/Language Arts (ELA) and mathematics performance of sixth-grade students attending a K-8 school versus sixth-grade students attending a traditional elementary-to-middle school model?" was answered employing an independent samples t-test to discover the difference of the DSS means between the two school types using ELA data. The independent samples t-test was repeated, analyzing the mathematics data between the two school models as well.

DSS cut score ranges, established by the FDOE, created levels in which student learning gains could be achieved and documented (Level 1 signifying the lowest level of mastery and Level 5 denoting the highest). Cross-tabulation was used to analyze differences in the proportion

of students earning learning gains in mathematics and ELA data comparing middle schools to K-8 schools. This analysis rendered results for the second research question: "What difference, if any, exists in the proportion of sixth-grade students making learning gains in a K-8 school versus a traditional elementary-to-middle school model?"

SES data and DSS data provided the information needed to conduct a bi-serial correlation describing the direction and strength of the relationship between low-SES and student achievement in the middle school model and the K-8 school model. The results of this analysis answered the third research question: "What difference, if any, exists in the strength and direction of the relationship between socioeconomic status (SES) and student achievement in K-8 schools versus middle schools?"

Descriptive Statistics

Demographic Variables

The population of sixth-grade students and their socioeconomic status (SES) percentage were necessary sources of data related to school type. Table 8 displays the number of student scores analyzed for the entire sixth-grade population and the percentage of low-SES students for each grade span category. A total of 1,544 student scores were analyzed in this study, 1,010 from the middle schools and 534 from the K-8 schools. There were 117 sixth-grade middle school students of low-SES, reflecting 11.6% of the sixth-grade population. K-8 students of low-SES numbered 61, 11.4% of the sixth-grade population.

Table 8

Summary of Descriptive Statistics for Sixth-grade Student Population and Socioeconomic Status (SES)

Variable	N	Low-SES	Low-SES %
Middle Schools	1010	117	11.6
K-8 Schools	534	61	11.4
Totals	1544	178	11.5

Student Achievement Variables

Student ELA and mathematics DSS data from the 2017 FSA were collected from the FDOE and were represented as the DSS data for the sixth-grade population in each school type. Table 9 reports the number of student scores analyzed, the DSS mean, and the standard deviation for student achievement in each school type for mathematics. The 1,010 middle school scores were used to compute a mean of 346.12 with a standard deviation of 18.67. The 534 K-8 mathematics scores were used to calculate a mean of 344.35 with a standard deviation of 20.31. These calculations suggest that middle school students scored slightly higher overall on the mathematics portion of the FSA than did the K-8 students.

Table 9

Summary of Descriptive Statistics for Mathematics Achievement by Grade Span Category

Variable	N	Mean	Standard Deviation
Middle	1010	346.12	18.67
K-8	534	344.35	20.31

Tables 10 reports the number of student scores analyzed, the DSS mean, and the standard deviation for student achievement in each school type for ELA. The 1,010 middle school scores were used to compute a mean of 342.34 with a standard deviation of 17.56. The 534 K-8 ELA scores were used to calculate a mean of 340.08 with a standard deviation of 17.95. These calculations suggest that middle school students scored slightly higher overall on the ELA portion of the FSA than did the K-8 students.

Table 10

Summary of Descriptive Statistics for English Language Arts (ELA) Achievement by Grade Span Category

Variable	N	Mean	Standard Deviation
Middle	1010	342.34	17.56
K-8	534	340.08	17.95

Learning gains are required by law in s. 1008.34 F.S. and have been calculated by the Florida Department of Education for both ELA and mathematics utilizing the FSA (FDOE, 2016c; Florida Statutes, 2017). There are three different scenarios in which students may obtain a learning gain:

1. Improve one or more achievement levels from one year to the next (e.g., move from Level 1 to Level 2, Level 2 to Level 4, etc.).
2. Maintain a Level 3, Level 4, or Level 5 from one year to the next and the student's scores in Level 3 and Level 4 must have improved from one year to the next.
3. Split Levels 1 and 2 into multiple subcategories (Level 1 into thirds and Level 2 in half) and require the student to improve from one subcategory to a higher subcategory within the Level (e.g., move from the bottom third of Level 1 to the middle third of Level 1) (FDOE, 2016, p. 1).

The ELA frequencies of each level in each school type are displayed in Table 11. The middle school ELA achievement data revealed 160 scores in Levels 1 & 2 with 850 scores residing in Level 3 and above. The ELA percentage of Levels 1 and 2 in middle school represented 15.9% of the 1,010 scores; 84.1% of the scores earned Level 3 and above. The K-8 school ELA achievement data revealed 110 scores in Levels 1 & 2, and 426 scores resided in Level 3 and above. The ELA percentage of Levels 1 & 2 in K-8 schools represented 20.5% of the 536 scores, and 79.5% of the scores reached Level 3 and above.

Table 11

Summary of Frequencies of English Language Arts (ELA) Achievement Levels by Grade Span Category

Descriptors		Level 1	Level 2	Level 3	Level 4	Level 5	Total
Middle	Count	32	128	236	388	226	1010
	Percent	3.2%	12.7%	23.4%	38.4%	22.4%	100%
K-8	Count	20	90	137	174	115	536
	Percent	3.7%	16.8%	25.6%	32.5%	21.5%	100%
Total	Count	52	218	373	562	341	1546
	Percent	3.3%	14.1%	24.1%	36.3%	22%	100%

The mathematics frequencies of each Level in each school type are displayed in Table 12. The middle school mathematics achievement data revealed 128 scores in Levels 1 and 2, and 882 scores resided in Level 3 and above. The mathematics percentages of Levels 1 and 2 in middle school represented 12.7% of the 1,010 scores; 87.3% of the scores earned Level 3 and above. The K-8 school mathematics achievement data revealed 87 scores in Levels 1 and 2, and 447 scores resided in Level 3 and above. The mathematics percentage of Levels 1 and 2 in K-8 schools represented 16.3% of the 534 scores; 83.7% of the scores earned Level 3 and above.

Table 12

Summary of Frequencies of Mathematics Achievement Levels by Grade Span Category

Descriptors		Level 1	Level 2	Level 3	Level 4	Level 5	Total
Middle	Count	30	98	203	396	283	1010
	Percent	3%	9.7%	20.1%	39.2%	28%	100%
K-8	Count	30	57	112	189	146	534
	Percent	5.6%	10.7%	21%	35.4%	27.3%	100%
Total	Count	60	155	315	585	429	1544
	Percent	3.9%	10%	20.4%	37.9%	27.8%	100%

Testing the Research Questions

This study was conducted to answer three research questions using DSS ELA data and mathematics data. To respond to the first research question, an independent samples t-test was used to calculate the mean scores for mathematics and ELA separately for the middle school category and then for the K-8 category. Cross-tabulation was used in responding to the second research question and measuring the proportion of learning gains in ELA and then in mathematics for each grade span category. To measure the direction and strength of the relationship between low-SES students and their achievement, a bi-serial correlation was conducted for each school type separately using ELA scores and then mathematics scores.

Research Question 1

What difference, if any, exists in the overall English/Language Arts (ELA) and mathematics performance of sixth-grade students attending a K-8 school versus sixth-grade students attending a traditional elementary-to-middle school model?

This research question was used to examine the overall results of the DSS data for ELA and mathematics in each of the two school types. An independent samples t-test was utilized to compare DSS ELA scores in the middle schools to the scores of students in the K-8 schools to determine the extent of the difference between the mean scores. Another t-test was conducted in the same manner relative to the mathematics DSS data.

Table 13 illustrates the results of the independent samples *t*-test used to compare ELA DSS data in the middle schools and the ELA DSS data in the K-8 schools' conditions. The 2.27 mean score difference was significant in the ELA scores for the middle school model (M = 342.34, SD = 17.56) and the K-8 school model (M = 340.08, SD = 17.95) conditions; t (1544) = 2.398, p = .017. These results suggest that middle school students, on average, scored higher than K-8 students.

Table 13

Summary of Results of Independent Samples t-test for English Language Arts (ELA) Comparison by School Configuration

					t-test for Equality of Means	
Variable	School Configuration	N	Mean	SD	Sig.	Mean Difference
ELA	K-8	536	340.08	17.95	.017	2.27
	Middle Schools	1,010	342.34	17.56		

Table 14 illustrates the results of the independent samples *t*-test used to compare mathematics DSS data in the middle schools and the mathematics DSS data in the K-8 schools' conditions. The 1.77 mean score difference was not significant in the mathematics scores for the middle school model (M = 346.12, SD = 18.67) and the K-8 school model (M = 344.35, SD = 20.31) conditions; t (1542) = 1.72, p = .086. These results suggest that there was no real difference between mathematics scores of students in the middle school model and the scores of the students in the K-8 model.

Table 14

Summary of Results of Independent Samples t-test for Mathematics Comparison by School Configuration

						t-test for Equality of Means
Variable	School Configuration	N	Mean	SD	Sig.	Mean Difference
Mathematics	K-8	534	344.35	20.31	.086	1.77
	Middle Schools	1,010	346.12	18.67		

Research Question 2

What difference, if any, exists in the proportion of sixth-grade students making learning gains in a K-8 school versus a traditional elementary-to-middle school model?

This research question was used to analyze which school type had a larger proportion of students making learning gains in ELA based on the FDOE criteria described in Chapter 3. A cross-tabulation statistical analysis was conducted using the ELA learning gains data from the

middle schools and the K-8 schools. Cross-tabulation was repeated for the mathematics learning gains data.

Table 15 reveals that 686 middle school students earned a learning gain in ELA, reflecting 67.9% of the 1,010 middle school students. No learning gain was reported for 324 middle school students, reflecting 32.1% of the total middle school scores. Table 15 also shows that 357 K-8 school students earned a learning gain in ELA, reflecting 66.6% of the 536 K-8 school students. No learning gain was reported for 179 K-8 school students, reflecting 33.4% of the total K-8 school scores. After analyzing the proportion of students earning learning gains in ELA, these results indicated there was little difference between students earning learning gains in the K-8 model and those earning learning gains in the middle school model.

Table 15

Summary of Results of Cross-tabulation Analysis: Percentage of Students Earning English Language Arts (ELA) Learning Gains Within Grade Span Category

Learning Gain		Middle School	K-8 School	Total
Yes	Count	686	357	1043
	% within School	67.9%	66.6%	67.5%
No	Count	324	179	503
	% within School	32.1%	33.4%	32.5%
Total	Count	1010	536	1546
	% within School	100%	100%	100%

Table 16 reveals that 683 middle school students made a learning gain in mathematics, reflecting 67.6% of the 1,010 middle school students. No learning gain was reported for 327 middle school students, reflecting 32.4% of the total middle school scores. Table 16 also shows that 391 K-8 school students earned a learning gain in mathematics, reflecting 73.2% of the 534 K-8 school students. No learning gain was reported for 143 K-8 school students, reflecting 26.8% of the total K-8 school scores. After analyzing the proportion of students earning learning gains in mathematics, these results indicated that K-8 schools may afford a better opportunity than middle schools for students to earn learning gains in mathematics.

Table 16

Summary of Results of Cross-tabulation Analysis: Percentage of Students Earning Mathematics Learning Gains Within Grade Span Category

Learning Gain		Middle School	K-8 School	Total
Yes	Count	683	391	1074
	% within School	67.6%	73.2%	69.6%
No	Count	327	143	470
	% within School	32.4%	26.8%	30.4%
Total	Count	1010	534	1544
	% within School	100%	100%	100%

Research Question 3

What difference, if any, exists in the strength and direction of the relationship between socioeconomic status (SES) and student achievement in K-8 schools versus middle schools?

This question sought to determine the relationship between student performance data and low-SES. A bi-serial correlation was used to analyze the direction and strength of the relationship between ELA DSS data and students of low-SES in the middle school model and then again in the K-8 school model. Results were compared to investigate the possibility of differences between the two school models in terms of the influence of low-SES on achievement. The same process was used to examine the mathematics data as well.

As seen in Table 17, the r^2 coefficient for the relationship between ELA achievement scores and low-SES classification was .04 among middle school students and .01 among K-8 students. The difference of three percentage points can be interpreted to suggest that the negative influence of low-SES on ELA achievement was four times stronger among middle school students than it was among K-8 students.

Table 17

Summary of Results of Bi-serial Correlation Between English Language Arts (ELA) Achievement and Low-SES

Variable	*r*	r^2	Sig.
Middle Schools	-.204**	.04	.000
K-8 Schools	-.098*	.01	.023

*p < .05; **p < .01.

As shown in Table 18, the r^2 coefficient for the relationship between mathematics achievement scores and low-SES classification was .052 among middle school students and .017 among K-8 students. The difference of 3.5 percentage points can be interpreted to suggest that the negative influence of low-SES on mathematics achievement was slightly more than three times stronger among middle school students than it was among K-8 students.

Table 18

Summary of Results of Bi-serial Correlation Between Mathematics Achievement and Low-SES

Variable	*r*	r^2	Sig.
Middle Schools	-.228**	.052	.000
K-8 Schools	-.133*	.017	.002

*p < .05; **p < .01.

Summary

In this chapter, the researcher reiterated the purpose of the study, explained the statistical tests and tools used to analyze the data, and reported the results of the investigation. A demographic analysis of the student population attending the middle school model and the K-8 model was conducted. Each research question was answered and reported through tables and text. This study utilized independent sample t-tests to analyze the difference in the mean scores between grade span categories. Cross-tabulation analyses were conducted to examine the difference in the proportion of learning gains between school type categories. The direction and

strength of the relationship between low-SES and student achievement in each school category were analyzed through bi-serial correlation tools.

Results from the analysis to respond to the first research question displayed only a small difference in ELA DSS data between school categories, with middle school scores slightly higher than K-8 schools. The same results were apparent after examining the mathematics DSS data. Data reflecting the difference in the mean scores for both ELA and mathematics were inconclusive in the comparison between the middle school model and the K-8 model.

After analyzing ELA learning gains between grade span categories to answer the second research question, results revealed that the middle school model and the K-8 model were very similar in the proportion of learning gains. However, the difference in the proportion of learning gains relative to mathematics was dissimilar, favoring the K-8 school type by almost six percentage points.

The negative influence of low-SES on achievement was tested in the third research question of this study. Results suggested that the negative relationship between low-SES and student ELA achievement was four times stronger among middle school students than among K-8 students. Likewise, the negative mathematics achievement to low-SES relationship was three times stronger among middle school students than K-8 students. These results suggest that students of low-SES were more likely to be successful in the K-8 grade span model.

The next chapter expands on the results of this study, comparing the findings to those of previous researchers. Inferences and implications of the findings are discussed regarding different grade span configurations and their impact on student success. In addition, recommendations for extended research are considered.

CHAPTER 5
SUMMARY, DISCUSSION, AND RECOMMENDATIONS

Introduction

This final chapter includes a summary of the study, discussion of the findings, implications for practice, recommendations for further research, and a final summary. These sections allowed for expanded discussion of the research question findings in the context of results and other information gleaned from prior research studies. The overall exploration of the study summarized in this chapter is intended to provide further understanding of grade span configuration and transition effects on student achievement in an effort to (a) inform and assist policy makers in one school district with educational decisions and planning for construction, and (b) contribute to the relevant literature.

Summary of the Study

As student growth has continued to rise rapidly in the Florida school district identified in this study, policy makers have been faced with the challenge of building multiple schools. The K-8 model has been viewed as the best option financially while accommodating the explosive growth of elementary and middle school populations. The resounding question around large scale school construction has been whether or not the K-8 model provides the best education when compared to the school-to-school transition of the traditional elementary to middle school model.

Gibson's (1979) affordance theory suggests that a certain environment will foster a certain outcome. With affordance theory in mind, policy makers have struggled to decide which school atmosphere promotes the optimal setting for student learning. Research into past studies

surrounding the academic achievement of students attending K-8 schools versus middle schools has been inconclusive. As stated by Becker (2007), "Research about the impact of alternative organizational structures has not been clear and consistent" (p. 29). Conflicting results from studies conducted across North America regarding the effect of grade span configuration on student achievement have complicated the issue as well (Alspaugh et al., 2015; Bickel et al., 2001; Byrnes & Ruby, 2007; Connolly et al., 2002; Fink, 2010; Johnson et al., 2016; Weiss & Kipnes, 2006; Whitley et al., 2007; Yeck, 2006).

In light of the inconclusive results found in previous studies, the purpose of this study was to compare the academic achievement of sixth-grade students attending the traditional middle school model versus the K-8 model by analyzing 2017 English language arts (ELA) and mathematics scores in a high-performing Florida school district. Results from the Florida Standards Assessment were collected and analyzed. Mathematics and ELA scores from 1,534 students in three middle schools and three K-8 schools were examined and compared to answer the following three research questions.

1. What difference, if any, exists in the overall English/Language Arts (ELA) and mathematics performance of 6th grade students attending a K-8 school versus 6th grade students attending a traditional elementary-to-middle school model?
2. What difference, if any, exists in the proportion of 6th grade students making learning gains in a K-8 school versus a traditional elementary-to-middle school model?
3. What difference, if any, exists in the strength and direction of the relationship between socioeconomic status (SES) and student achievement in K-8 schools versus middle schools?

Data to respond to Research Question 1 were analyzed using an independent samples t-test to compare ELA developmental scale scores (DSS) in the middle schools to the scores in the K-8 schools, determining the extent of the difference between the mean scores. Another t-test was conducted in the same manner relative to mathematics scores.

To respond to Research Question 2, a cross-tabulation was conducted using the ELA learning gains data (dependent variable) and school configuration (middle schools or K-8) as the independent variable. Cross-tabulation was repeated for the mathematics learning gains.

A bi-serial correlation procedure was used to answer Research Question 3, analyzing the direction and strength of the relationship between ELA scores and students' SES status in the middle school model and again in the K-8 school model. Results were compared to investigate the possibility of differences between the two school models in terms of the influence of low-SES on achievement. The same process was used to examine the mathematics scores.

Discussion of the Findings

Although inconclusive, the results of most past research have suggested that school-to-school transition and narrower grade span configurations negatively affect student achievement. The goal of this study was to compare ELA and mathematics student achievement between two different grade span categories: the middle school model and the K-8 model.

Research Question 1

What difference, if any, exists in the overall English/Language Arts (ELA) and mathematics performance of 6th grade students attending a K-8 school versus 6th grade students attending a traditional elementary-to-middle school model?

As a reminder, the data set used for analysis included all cases (i.e., students) in the population of interest; thus, there was no need to make inferences from a sample to a population, and observed differences were *real* by definition. Although statistical significance was then, strictly speaking, irrelevant to the investigation, significance levels were reported and were treated as indicators that an observed relationship might be of practical significance (Bickel, 2007). The findings from the analysis of data to respond to Research Question 1 suggested a small but informative difference in overall ELA student achievement between the middle school model and the K-8 model. Students enrolled in the middle school model fared slightly better (with a DSS mean of 342.34) than those enrolled in the K-8 model (with a DSS mean of 340.08).

This outcome aligned with those of studies in Quebec, Ontario, and Texas where middle school scores were higher than K-8 school scores, suggesting that scores were not negatively impacted by school-to-school transition (Whitley et al., 2007; Wilson & Slate, 2015). McEwin et al. (2005) agreed, claiming that based on their study, "The typical middle school is more likely to meet the educational and developmental needs of young adolescents than is the typical K-8 school" (p. 27).

Overall, mathematics student achievement between the middle school model and the K-8 model also suggested a small difference. Students enrolled in the middle school model fared

slightly better (with a DSS mean of 346.12) than those enrolled in the K-8 model (with a DSS mean of 344.35).

Observed differences were statistically non-significant (again, interpreted here as an indication that observed differences lack practical significance) and thus did not offer conclusive evidence for determining which school type promotes better student academic achievement. One study in which the results aligned with those of the researcher in the present study was that of Byrnes and Ruby (2007). In their study of 40,883 students in Philadelphia, Byrnes and Ruby surmised that although the K-8 students outperformed the middle school students, "There were no discernable differences between K-8 schools and middle schools in terms of academic achievement" (p. 128). Additionally, in agreement with this finding, Dove et al. (2010) found no relationship between grade span configuration and academic achievement utilizing the Arkansas Benchmark Examination.

Contrary to these findings, however, many previous researchers found that students enrolled in K-8 settings outperformed middle school students (Alspaugh, 1998; Becker, 1987; Collins, 2006; Connolly et al., 2002; Franklin & Glascock, 1998; Keegan, 2000; Moore, 1984 Tucker & Andrada, 1997; Wihry et al., 1992; Yecke, 2006). Johnson et al. (2016) suggested that broader grade spans such as the K-8 model warrant smaller grade level cohort sizes allowing for better achievement (or, at least, on average, the K-8 structure does not negatively affect academic achievement).

A possible reason for the small difference observed in student outcomes between students of the middle school model and the K-8 school model in this study may be the common delivery of instruction by the teachers. In St. John County School District, teachers of middle schools and

K-8 schools grow and collaborate in the same professional development surrounding the understanding and instructional delivery of the Florida State Standards. The school district is committed to ensuring that teachers in both types of school settings understand the needs of the middle school child and ensure students are introduced to and engaged in the state standards. Hough (2005) stated, "Any school with a nurturing learner-centered environment, staffed by competent, caring teachers who fully implement promising practices should be able to document positive student outcomes" (p. 7). In addition, Epstein and MacIver (1990) contended that grade span configuration does not matter when a school district truly supports the academic and social development of students.

Research Question 2

What difference, if any, exists in the proportion of 6th grade students making learning gains in a K-8 school versus a traditional elementary-to-middle school model?

The results from the analysis of data to answer Research Question 2 indicated that both the middle school model and the K-8 model had high proportions of students making ELA learning gains, both at approximately 67%, but did not display a meaningful difference. The difference in the proportion of students making learning gains in the area of mathematics between the middle school model and the K-8 model, however, was more pronounced (middle school at 67.6% and the K-8 school at 73.2%). Students enrolled in the K-8 school model displayed a notably higher proportion of students making mathematics learning gains than students in the middle school model.

The number of school transitions, the timing of school transitions, the stability of students, and the size of school classes are all possible reasons that academic achievement of

students in the K-8 model outperformed that of students enrolled in the middle school model (Schwartz et al., 2017). The notable difference in the proportion of students making learning gains in mathematics was possibly due to the fifth- to sixth-grade school-to-school transition that students encountered moving from elementary school to middle school. School-to-school transitions may cause performance and motivation declines resulting in loss of academic ground and a dip in test scores (Alspaugh, 1998; Collins, 2006; Delviscio, 2013; Poncelet, 2004; Rockoff & Lockwood, 2010; Schwartz et al., 2017; Schwert & West, 2011; Simmons et al., 1987; Sparks, 2011; Weiss & Baker-Smith, 2010). Students in the K-8 school model remain in the same school building surrounded by familiar faces and positive relationships. The K-8 schools afford a longer time for students to build relationships and trust among teachers and friends (Coladarci & Hancock, 2002; Eccles et al. 1993; Moore, 1984; Offenberg, 2001; Wren, 2003). Because transitioning from school to school causes stress, anxiety, lower self-esteem, and anonymity (Booth et al., 2005; Carnegie Council on Adolescent Development, 1989; Coladarci, 2002; Larson et al., 2002; Poncelet, 2004; Seidman et al. 1994), continuing to function in the same building with familiar rules, policies, and procedures reduces anxiety, possibly promoting learning gains and less residual loss due to a changing atmosphere.

Research Question 3

What difference, if any, exists in the strength and direction of the relationship between socioeconomic status (SES) and student achievement in K-8 schools versus middle schools?

Cohen's measure of effect size, ($r < .10$ = trivial; r .10-.30 = small to medium; r .30-.50 = medium to large; $r > .50$ = large to very large) aids in the understanding of the findings in this study (Cohen, 1992). The analysis conducted to answer Research Question 3 produced results

showing the relationship between low-SES and ELA achievement were weak for both the K-8 schools and middle schools at r = .09 and r = .2 respectively. The relationship between low-SES and mathematics achievement was also weak for the K-8 schools and middle schools at r = .13 and r = .22 respectively. These findings suggest that this high-performing school district, as a whole, delivers instruction at a high level and appears to be effective at focusing on each child's needs for improvement creating an individualized plan that possibly mediates the influence of poverty. Aligning with this sentiment from their study, Burris and Welner (2005) suggested that "when all students were taught the high-track curriculum, achievement rose for all groups of students--majority, minority, special education, low-SES, and high-SES" (p. 598).

However, when comparing the results of the middle school model to the K-8 model, substantial differences existed. The r^2 value of .041 between ELA student achievement and low-SES for students in the middle school model (indicating that low-SES accounted for 4.1% of the variance in student achievement) was notably different than the r^2 value of .009 in the K-8 model (indicating that low-SES accounted for less than 1% of the variance in student achievement). This considerable difference can be interpreted to suggest that the negative influence of low-SES on ELA achievement was more than four times stronger among middle school students than it was among K-8 students.

In addition, mathematics DSS data results implied a similar finding. The r^2 value of .052 between mathematics student achievement and low-SES for students in the middle school model (indicating that low-SES accounted for 5.2% of the variance in student achievement) was markedly different than the r^2 value of .017 in the K-8 model (indicating that low-SES accounted for only 1.7% of the variance in student achievement). This substantial difference can be

interpreted to suggest that the negative influence of low-SES on mathematics achievement is slightly more than three times stronger among middle school students than it is among K-8 students.

The results of the data analysis to respond to this research question aligned with those of Johnson et al. (2016), who analyzed grade span configuration effects on student achievement across the state of Florida. These researchers found that grade span configuration indirectly influenced academic achievement by moderating the negative effects of low-SES. Large grade span schools (i.e. K-8 schools) resulted in smaller grade level cohort sizes which afforded "greater equity in the distribution of achievement" for all students, including those of low-SES (Johnson et al., 2016, p. 395). In similar studies, Lee and Smith (1993) and Wren (2003) found that schools with small grade spans (i.e., 6-8 middle schools) negatively affected achievement because of large grade level cohort sizes.

Researchers have noted that smaller class sizes, well developed student-teacher relationships, and familiarity of the environment over a longer period of time enhance student achievement (Booth et al., 2005; Carnegie Council on Adolescent Development, 1989; Coladarci, 2002; Coladarci & Hancock, 2002; Eccles et al. 1993; Larson et al., 2002; Moore, 1984; Offenberg, 2001; Poncelet, 2004; Seidman et al.; 1994; Wren, 2003). Fiaschetti and Slate, (2014), Howley (2001), and Johnson et al. (2016) agreed that students of low-SES especially benefited academically from these institutional traits provided by small grade level cohort groups in a larger grade span configuration such as a K-8 school.

Implications for Practice

As Florida's population has increased, the public school system has continued to struggle with the construction of more schools to gain needed student work stations for the increasing student population. The school district in this study was no exception, planning to construct over 20 schools during the next two decades. The K-8 school model is cheaper to build, manage, and operate than a separate elementary school and middle school due to less land to purchase, lower construction costs, less employee compensation, etc. (Herman, 2004). Although cost effective, the question for policy makers is, "What are the educational implications of building K-8 schools versus the elementary school-to-middle school model?"

Research Questions 1 and 2 answered this query. The findings in this study revealed very little difference in overall student achievement scores relative to ELA and mathematics, suggesting that the K-8 model does not impair academic achievement in these areas when compared to the middle school model. In addition, the proportion of students making learning gains in ELA in the K-8 schools was almost identical to that found in the middle school model. Because the proportion of students making learning gains in mathematics was notably higher among students enrolled in the K-8 schools than for students in the middle school model, policy makers should feel confident that constructing K-8 schools when necessary is a very appropriate option. Through the suggestions of these findings and past research in other studies, policy makers can be somewhat assured that the K-8 and the middle school models both fulfill the needs of the students in this high-performing Florida school district.

The Florida Department of Education (FDOE) has had a goal in recent years of closing the achievement gap between certain subgroups (e.g., race, ethnicity, and low-SES). Which

grade span configuration affords a better chance for students in certain subgroups to find success currently exists. The findings from Research Question 3 may provide important information that could lead to discussions among policy makers regarding the grade span configuration that may best provide opportunities for success for students of low-SES. Research from past studies and the results from this study suggest that the familiar K-8 setting with no school-to-school transitions and more time to build meaningful relationships with teachers and students may positively impact students of low-SES. Revealing a particularly weaker relationship between negative student achievement and low-SES than that of the middle school model, the K-8 schools in this school district possibly defy the well-known notion that low-SES negatively affects academic achievement. This finding aligned with studies conducted by Fiaschetti and Slate (2014), Howley (2001), and Johnson et al. (2016) who suggested that small grade level cohort groups created from larger grade span configurations benefit low-SES students academically. FDOE Policy makers may have an opportunity or even an obligation to investigate the implications from this study and others (Johnson et al. 2016) that illuminate the positive effects possibly afforded by broader grade span configurations and smaller grade level cohorts through the adoption of K-8 environments.

Recommendations for Further Research

The goal of this study was to compare 2017 sixth-grade student achievement data of the middle school model and the K-8 model. Data were collected and analyzed to answer three research questions.

The study was delimited to English language arts and mathematics. Other content areas (e.g., science and social studies) were not included in the study and possibly could have led to

different results had they been included. The researcher used 2017 sixth-grade learning gains data in the analysis. Seventh-grade, eighth-grade, and high school data were not included in the study which did not address longitudinal trends of achievement. Additionally, the study was limited by investigating the only three existing K-8 schools in the school district, all of which encompassed an enrollment of mostly affluent students. These delimitations present possible areas of study for future study.

The first research question was concerned with the analysis of ELA scores to discover and compare the mean of the middle school model and that of the K-8 school model. The same was accomplished for the mathematics scores. Aligning with inconclusive evidence in past studies, the findings revealed little difference in student achievement between both school types. A suggestion for further study would be to analyze data from schools with different student demographics (e.g., Title 1 schools) to discover if one school type showed more of a difference in academic achievement than the other. Also, in an effort to understand the differences between the middle schools and K-8 schools, analyzing achievement data for sixth-, seventh-, and eighth-grade would create a more comprehensive picture of student achievement. Conducting a qualitative study using teacher and administrator interviews to analyze differences in environment, teaching strategies, teacher collaboration, student-teacher relationships, and overall philosophies between K-8 schools and middle schools, could reveal reasons for certain differences in student achievement. In addition, further research should be conducted at the high school level to compare student data (i.e. graduation rates, DSS data, attendance rates, and discipline occurrences) of students who attended the middle school model and students who attended the K-8 school model prior to the transition to high school.

Research Question 2 focused on the difference in the proportion of students making learning gains between the middle schools and the K-8 schools. Though no difference was found in the ELA data, there was a meaningful difference in the mathematics data. Most researchers have suggested that school-to-school transitions have a negative effect on student achievement (Alspaugh, 1998; Collins, 2006; Delviscio, 2013; Poncelet, 2004; Rockoff & Lockwood, 2010; Schwartz et al., 2017; Schwert & West, 2011; Simmons et al., 1987; Sparks, 2011; Weiss & Baker-Smith, 2010). The Florida school district in this study has given close attention to school-to-school transitions, offering a student mentor program *Where Everyone Belongs* (WEB) in which eighth-grade students are trained to be mentors for sixth-grade students as they transition from elementary school to middle school. Professional development for teachers focused on the middle school concept and the need to build relationships with students and decrease student anxiety have been conducted. Because student anxiety and behavior could affect student achievement, further research investigating the number and types of student discipline referrals to determine any difference between K-8 schools and middle schools should be performed. A qualitative study interviewing students, teachers, and administrators may inform educators as to why there may or may not be a dip in the proportion of students making learning gains after transitioning to the middle school versus no school-to-school transition within the K-8 schools. A study analyzing ninth grade student data following the school-to-school transition from a middle school or a K-8 school to the high school may reveal useful information regarding the extent of the learning gain dip.

In addition to examining DSS data from all sixth-grade students enrolled in six specific schools, the researcher analyzed data for one subgroup (students of low-SES). The results of the

analysis to respond to Research Question 3 suggested that the relationship between low-SES and lower student achievement was notably stronger in the middle school model than the K-8 model. Although these results may imply that a Title 1 K-8 school may benefit students of low-SES more than the middle school model, additional research should be conducted to delve deeper into these results to discover the reasons associated with this finding. The FDOE has recently presented a goal of closing the achievement gap related to certain subgroups. Though the results of this single school district study may not be generalizable, further research should be conducted across the state to better understand the possible positive effects larger grade span configurations (i.e., K-8 schools) have on low-SES and academic achievement. Additional studies in this particular school district targeting certain groups of students such as students with disabilities or English language learners would perhaps inform policy makers as to the grade span configuration that may be a better fit for specific student groups.

Summary

Most of the findings from previous researchers regarding the effects of grade span configuration and school-to-school transitions suggest that the K-8 environment offers the best opportunity for student achievement. However, findings remain inconclusive due to other studies revealing that the middle school model allows students to perform better.

The findings in this study regarding overall scores in ELA and mathematics displayed no distinguishable difference between the middle school model and the K-8 model of sixth grade students. Similarly, the proportion of ELA learning gains made by students was of no consequence. However, a notable difference in the proportion of students making learning gains in mathematics was discovered, favoring students enrolled in the K-8 schools.

Most remarkable in this study were the findings associated with the relationship between academic achievement and students of low-SES. The ELA and mathematics scores revealed a substantially stronger negative relationship between academic achievement and low-SES in the middle school model than in the K-8 school model. These results suggested that the K-8 model may afford students of low-SES a better opportunity for academic success.

The literature review of grade span configuration and transition research did not definitively confirm which school type best promotes student achievement. The findings in the present study did suggest, however, that the K-8 model in this Florida school district has not negatively impacted student achievement. Thus, in the case of low-SES students, the K-8 model may actually be a positive factor for student learning. As policy makers consider cost while deciding which types of schools to construct in the future, they can feel confident that the K-8 school is less costly to build and operate (Herman, 2004). Most importantly, this study suggests that the K-8 school structure, on average, does not negatively affect student achievement.

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