An Investigation of the Difference in Student Achievement during the Middle School Transition Years

by

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This Dissertation has been approved as partial fulfillment of the requirements for the degree of Doctor of Education Lindenwood University, School of Education

Dr. Sherry DeVore, Dissertation Chair	6-11-14 Date
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Dr. Terry Reid, Committee Member	6-11-14 Date

Declaration of Originality

I do hereby declare and attest to the fact that this is an original study based solely upon my own scholarly work at Lindenwood University and that I have not submitted it for any other college or university degree or course.

Brandon Patrick Eggleston

Signature:  Date: 6/11/14

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Abstract

Transition years and grade configurations for middle level students have been a topic of debate since the onset of middle schools in the 1970s. With increased educational accountability, some school districts are beginning to change back to K-8 configurations. The purpose of this study was to investigate the difference in student achievement during the transition year and provide information to school administration as to the optimal year to transition students from elementary to middle school. Transition year achievement was examined among 5th -7th grade students in Missouri and grade configurations were compared by analyzing 8th grade achievement in three separate grade configurations. Significant differences in student achievement were uncovered during the analysis of the student achievement data. A significant decrease in student achievement was found between two independent fifth grade groups in English Language Arts and mathematics. Cohorts in sixth and seventh grade did not show a statistically significant difference in student achievement during the transition year. Significant decreases were found in English Language Arts scores between the transition year and pre-transition year along with the transition year and post transition year. In both scenarios the transition year score was significantly lower than the post and pre-transition year score. A significant difference in mathematics achievement was found between fifth and seventh grade transition year students with seventh grade transition year students attaining a higher mean score than fifth grade transition year students. Grade configuration and timing of the transition to middle school did not have an impact on eighth grade student achievement.

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Chapter One: Introduction

Background of Study

Public education in the United States is a 13-year compilation of learning that takes place during the most impressionable time of a person's life. Students' public educational careers usually begin at age five and conclude at age 18. During this time, the human body, mind, and spirit undergo drastic changes while in the care of public educators. Jensen (2005) stated in *Teaching with the Brain in Mind,* "attending school from kindergarten through grade 12 takes up more than 13,000 hours of the developing brain's time. During that time the brains of our students will be altered by the entire school experience" (p. 1). For this reason, educators are charged with providing a school experience that is appropriate physically, developmentally, and socially for all students.

School experiences are varied, and one example of this variance is displayed in the multiple grade configurations used to educate students in kindergarten through grade 12. Some school districts utilize elementary centers divided into two grade levels per building, while other school districts utilize neighborhood configurations in which students attend the same school in grades kindergarten through grade 5 or 6. A recent trend in education is the return of the kindergarten through eighth grade school configuration, or "elemiddle" school (Hough, 2009). Although freshman (ninth grade) and eighth to ninth grade centers exist, high school is typically configured with grades 9-12 housed one school (Hough, 2009).

Among the various educational settings, the configuration during the middle years of education presents challenges to school leaders, and the middle years of education has been a common target for educational reform (Earl, Hargreaves, & Ryan, 2013). Middle

school is the period between fifth and eighth grade in which students are transitioned out of the elementary school setting into a new atmosphere that is designed to address the individual needs of adolescents to prepare them for high school (McEwin & Greene, 2011). According to the National Center for Education Statistics (U.S. Department of Education, 2013), public schools have been shifting away from a junior high setting that includes seventh and eighth grades, as was common in the 1970s, toward a middle school setting that includes grades 5 to 8. The number of middle schools rose by 454% from 1970 to 2000 (U.S. Department of Education, 2013). In the 10-year span from 1999 to 2009, the number of middle schools rose by 13% to 13,200, while the number of junior high schools fell by 17% to 3,000 (U.S. Department of Education, 2013).

The No Child Left Behind (NCLB) Act of 2001 increased accountability and contributed to new educational reform to meet the standards set forth in the legislation. NCLB brought the federal government into education as a true regulator (Zhao, 2009). Since the world has moved from the Industrial Age and mass production to the Information Age and mass customization, public educators are challenged to meet the demands of the 21st century (Schwahn & McGarvey, 2012). McCain (2005) reported that 21st century technological skills are secondary to the importance of children learning problem-solving skills; therefore, educators must prepare students throughout their educational career to compete globally and possess the ability to solve unpredictable problems.

In 2012, the National Education Association (NEA, n.d) addressed the importance of middle school education in their 12-point action plan for reducing the high school

dropout rate (NEA, n.d.). Specifically, Point 6 of the 12-point plan highlights a kindergarten to 12th grade approach to improving dropout rates:

> Act early so students do not drop out with high-quality, universal preschool and full-day kindergarten; strong elementary programs that ensure students are doing grade-level work when they enter middle school; and middle school programs that address causes of dropping out that appear in these grades and ensure that students have access to algebra, science, and other courses that serve as the foundation for success in high school and beyond. (NEA, n.d., para. 6)

A study of students in the Pacific Northwest conducted during the 2003-2004 and 2004-2005 school years also underscored the importance of middle schools. The researchers McIntosh, Flannery, Sugai, Braun, and Cochrane (2008) concluded that behavior and academic performance of eighth-grade students leaving middle school were strong predictors for the students' success in the ninth grade.

Conceptual Underpinnings

The transition to a new school setting (middle school) is coupled with physical, emotional, and social changes that coincide with adolescence in which students are introduced to new peer groups, social settings, and higher expectations for independence and self-advocacy (Webb, 2012). Therefore, the concepts posed by researchers (Friedel, Cortina, Turner, & Midgley, 2010; Jensen, 2005; Kirst & Haertel, 2010; Manning & Bucher, 2012; San Antonio, Marcell, Tieken, & Wiener, 2011; Wilcox & Angelis, 2007; Wormeli, 2011) were selected as an appropriate framework for this study. These researchers reported a wide range of changes that occur in the lives of middle school students.

Physically, the students' brains are under construction during the middle school years and are undergoing changes that mirror infant brain development (Jensen, 2005). Adolescents enter middle school at various stages of puberty and are often unsure of themselves and where they fit in with their peers. Girls are growing faster than boys, bones are growing faster than muscles, and hormones are causing physical and sexual changes that add to the adolescents' uneasiness about themselves (Wormeli, 2011).

The prefrontal cortex is not fully developed in most 10- to 15-year-olds, and as a result, students struggle with decision making, impulse control, moral and abstract reasoning, planning, and understanding consequences of words and actions (Kolb, Mychasiuk, Muhammad, Li, Frost, & Gibb, R. (2012). Wormeli (2011) proposed that middle school students desire to spend more time with peers as opposed to family; seeking independence, with a desire to still fit in with the group. Abstract thinking begins to supersede concrete thinking skills, and adolescents start to challenge the authority of adults (Wormeli, 2011).

As students move into middle school, social groups change due to the addition of new students from different schools and backgrounds. The transition to middle school disrupts previous social groups at a time when adolescents have a greater focus on peers and the relationships that develop from associated social groups. Kingery, Erdly, and Marshal (2011) found that students who had few mutual friends had low peer acceptance when compared with children who had at least one mutual friend.

The transition to middle school brings about new opportunities for self-exploration and freedom. Although students look forward to the increased freedom in middle school, they also face anxiety about losing their way between classes and fitting

in with new peer groups (San Antonio et al., 2011). These two feelings are examples of conflicting emotions that the adolescent student deals with on a regular basis.

Parker (2010) indicated that middle school students are vulnerable to a wide range of change during this period of development, and perceptions of intellectual status, physical attributes, popularity, and behavior all undergo shifts. Middle school students are moving into adulthood and are searching for who they are and what they want to be. Their bodies and minds are experiencing change at a rapid pace, and they are beginning to see themselves as adults and not children (Jensen, 2005). Adolescents' wants, desires, and self-perceptions often conflict with their actions and words (Manning & Bucher, 2012).

A consistent characteristic of the middle school student is change. Prior to middle school, the last major transition students encountered was the transition from pre-kindergarten to elementary school. Six years later in the transition to middle school, students experience a change in schedule, transportation, friends, teachers, and school buildings (Parker, 2010).

Friedel et al. (2010) proposed that schools' operations and programs experience a shift at the middle school level with a larger emphasis placed on increased performance. Educational competition is introduced, which negates intrinsic motivation and mastery of goals (Friedel et al., 2010). The increased emphasis on performance creates strict grading policies and practices that change student perceptions of competence (Friedel et al., 2010). Students move from self-contained classrooms or pods to independent subjects taught by different teachers at various times during the day. Classrooms are changed more frequently, and content disciplines become less integrated with each other.

Middle schools are connected to students and community members in a different manner than elementary schools, and parental involvement declines (Hill & Tyson, 2009). Neighborhood elementary schools are embraced by a particular subset of the greater community, whereas, middle schools combine multiple subsets into one school community (Taylor, McGlynn, & Luter, 2013). The combination of multiple community subsets may create looser connections between the community and the middle school.

Middle schools provide opportunities for students to become highly involved with school outside of the regular school hours. Extra- and co-curricular activities begin to take priority in the middle school student's life, and students begin to relate with their school and take ownership and pride in where they attend (Schaefer, Simpkins, Vest, & Price, 2011). Districts go to great lengths to ease the transition to middle school through the implementation of transition programs that familiarize students to the school (Wilcox & Angelis, 2007).

Transition programs at middle schools involve parents, students, and community members. These programs are used to familiarize incoming students with their new building (Kingery et al., 2011). Recognizing the importance of the transition year, school districts implement strategies and programs to make the transition to middle school as smooth as possible for all stakeholders. Studies have shown that students who have a positive first year are likely to find success in middle school (Williams et al., 2010). There are a multitude of transition programs that range from one-day orientations to full-year mentoring programs designed to increase the likelihood of a successful transition to middle school (Williams et al., 2010).

For example, The Boomerang Project (2011) is focused on easing school transitions and includes Where Everybody Belongs (WEB), which is centered on the transition to sixth and seventh grade. WEB is a yearlong mentoring program that empowers students by establishing a mentoring structure in which Grade 8 students mentor Grade 6 students (The Boomerang Project, 2011). The mission of WEB is to establish connections between transition students and positive peer role models with a purpose of increasing student achievement, reducing bullying, and enhancing character development (The Boomerang Project, 2011).

Statement of the Problem

The timing of the transition year is dependent upon the school configuration that is employed by each school district. Beginning with the decrease in junior high schools in the 1960s to the rise of Grade 6 through Grade 8 middle schools in the 1970s (U.S. Department of Education, 2013) and continuing with a current trend back to kindergarten through Grade 8 schools, administrators have been searching for how to best organize schools' grade spans for middle level students. Wyant and Mathis (2007) indicated that school districts cite several reasons for switching back to the K-8 configurations, including student performance, dissatisfaction with traditional middle schools, wanting smaller schools and class sizes, dropout rate, behavior, and attendance issues.

Middle school students have been placed in several different grade configurations: they have been housed in elementary schools, segregated in their own school, or combined into newly-established schools that contain grades 6-12. The problem is that most of these decisions are based on transportation and fiduciary concerns and not what

is best for students (National Association of Secondary School Principals [NASSP], 2006).

Schools have employed multiple strategies, reform efforts, and transition programs to meet the individual needs of students in middle school. Coupled with an increase in accountability and meeting the needs of 21st century students is the technology explosion that has taken place over the last 15 years (Schwahn & McGarvey, 2012). Technology has created a vehicle that provides on-demand access to information; students are learning in new ways, and the settings in which they learn have to be relevant to meet their needs (Williams et al., 2010).

The common component among all grade configurations in every school district is the presence of a transition year. Regardless of the school configuration, at some point in a child's educational career a transition to a new school will occur. At the same time a transition to a middle school is taking place, students are undergoing a massive physical and mental change that affects the way in which they learn (Jensen, 2005). The timing of the transition year to a middle school is as varied as grade configurations. Students in K-8 settings have a transition year in the ninth grade; students in K-5 settings transition in the sixth grade; and students in K-6 schools or schools with two-grade centers usually transition to middle school in seventh grade. A 2008 study conducted in North Carolina found that sixth-grade students attending middle schools are more likely to be cited for behavioral problems than similar students attending elementary schools. Academic results complemented the behavioral findings (Cook, MacCoun, Muschkin, & Vigdor, 2008).

Educators are dealing with many issues that affect the timing of the transition year. Budget reductions and increased transportation costs play a role in where students attend school within a district. Paired with increased accountability, explosion of technology, and new systems of assessment, school configurations become highly philosophical, and the optimal year for transitions to take place may likely not have one right answer.

Significance of the Study

The change in America's public education system from a two- to three-tier system is now more than 100 years old. Regardless of the middle level grade configuration, students always experience a transition year. Researchers and policy makers have concentrated efforts on the transition to high school, but a 2011 study of Florida schools suggested the transition problem may occur upon entry to middle school (Sparks, 2011).

Significant dips in student performance for even one year are costly to the educational careers of children. The path for students who are at risk to drop out begins in middle school, and waiting until high school to address dropout concerns is almost too late (McIntosh et al., 2008). One-year drops in student achievement at the middle school level in math and English can push students closer to the path of dropping out. Howley (2002) studied 45 Missouri schools and compared timing of the transition year to dropout rate. The study concluded the dropout rate was lower when the transition year was earlier in a student's educational career (Howley, 2002). Milliken (2007) discussed the consequences of dropouts to society in the following way:

> The dire consequences for these young people are mirrored in the costs to American society to you, your children, and the future of our country. Dropouts

> are costing us billions of dollars in lost wages and increased social supports, including medical care and welfare benefits. Our nation is already operating with a huge deficit. The combined income and tax losses from a *single year's dropouts* is about $192 billion or 1.6 percent of the gross domestic product. (p. xxii)

Nationwide, one third of all students fail to graduate with their peers, and one third of those who do graduate are not prepared for employment or postsecondary education (Goodwin, 2010). Only half of the nation's minority students graduate on time, and graduation rates in some inner city school districts are as low as 17% (Goodwin, 2010). These statistics are just a few of the reasons educational leaders are searching for the optimal year to transition young adolescents.

From junior high schools to middle schools to K-8 schools, educators have tried many different models and grade configurations for middle-level students. The missing element is finding the single year that is optimal for transitioning students beyond elementary school. As grade configurations are evaluated and changed, transition years change. Educators need to have a base of knowledge surrounding the optimal year to transition students out of elementary school. Transition years are eminent, and information is needed so decision makers can minimize the dip in achievement that is associated with transitioning students from an elementary school setting.

Purpose of the Study

The purpose of this study was to investigate the difference in student achievement during the transition year in order to provide information to school administration as to the optimal year to transition students from elementary to middle school. To address the

purpose, a quantitative study was selected to investigate the difference in student achievement during transition years of middle school.

In this study, state assessment scores were analyzed to investigate the difference in student achievement between transition years and non-transition years. The analysis of data between transition and non-transition years was used to determine if there is a significant difference in student achievement during the transition year, regardless of timing of the transition year. Mathematics and English Language Arts assessment data were analyzed to compare the difference in student achievement between varying transition years across multiple grade configurations.

This study also sought to compare eighth grade achievement scores to grade configurations attended during the middle school years. The information from this analysis was used to provide insight on achievement levels of eighth-grade cohorts dependent on the middle school grade configuration attended. The data used were based on the Missouri Assessment Program (MAP) performance index scores attained by grade-level cohorts of schools under the jurisdiction on the Missouri Department of Elementary and Secondary Education (2013).

Research questions. The following research questions guided this study:

1. What is the difference in student achievement between the transition year and non-transition year?

2. What is the difference in student achievement among varying transition years?

3. What is the difference in eighth-grade achievement among varying grade configurations?

Null hypotheses. This is designated by the symbol H_0.

$H1_0$: There is not a significant difference in student achievement during the transition year when compared to non-transition years.

$H2_0$: There is not a significant difference in student achievement among varying transition years.

$H3_0$: There is not a significant difference in eighth-grade achievement across varying grade configurations.

Alternative hypotheses. This is designated by the symbol H_a.

$H1_a$: There is a significant difference in student achievement during the transition year when compared to non-transition years.

$H2_a$: There is a significant difference in student achievement among varying transition years.

$H3_a$: There is a significant difference in eighth-grade achievement across varying grade configurations.

Definitions of Key Terms

The following terms are included in this study:

Early adolescence. The stage of development between ages 11 and 13 when the student begins to reach puberty (Connolly & McIsaac, 2011).

Grade configuration. Range of grade levels in a school or district.

Junior high school. A school in the U.S. system that generally contains seventh and eighth grades.

MAP index score. The MAP performance index (MPI) calculation "… is a single composite number that represents the performance of every student in all MAP levels in a tested subject for a defined grade span" (Missouri Department of Elementary and Secondary Education, 2013, p. 1).

Middle school configuration. A school requiring a transition within Grade 5-8.

Middle school transitional grade level. Specific grade a student is enrolled in during the transition to middle school.

Missouri Assessment Program (MAP). A series of assessments for English Language Arts, mathematics, and science at grades 3-8; and English language Arts, mathematics, science, and social studies in high school. These assessments are designed to see if students in Missouri are meeting the Show-Me standards (Missouri Department of Elementary and Secondary Education, 2013).

Missouri Comprehensive Data System (MCDS). A resource provided by the Missouri Department of Elementary and Secondary Education (2013) that allows school personnel and the public to access education-related data.

Post-transition year. Second year at a middle school configuration.

Pre-transition year. The academic year prior to entering a middle school configuration.

Student achievement. Student achievement as defined by this study is performance on the MAP test and is summarized by the index calculation of individual school buildings.

Transition year. The first year upon entering the middle school configuration.

Limitations of the Study

The following were limitations of this study:

Many variables that contribute to student achievement during the middle school years were not controlled in this study, such as socio-economic status, transiency, ethnicity, gender, and special education status; implementation of academic, behavior, and transition programs; and quality of instruction. An additional limitation of this study is that academic achievement was based on students' performance on a single assessment during one school year. Factors not included in this study were: proper test-taking strategies, student health and well-being during the time of the assessment, and effort level given by students on the state assessment.

Student achievement was defined in this study as cohort performance on the MAP in English Language Arts and mathematics. Formative assessments, reading levels, mathematic aptitude, and letter grades were not used to determine student achievement. The utilization of a single set of data may be seen as a limitation to this study due to variables that are unable to control.

The MAP scores of the students for 2011-2012 may be considered a limitation. Since schools in Missouri had begun to implement changes in curriculum and instruction to align with the Common Core curriculum, a decrease in achievement may have occurred from new goals, objectives, and assessments. Fullan (2001) described a drop in achievement due to the application of new practices as an implementation dip.

Possible limitations of this study could relate to the model of special education inclusion of students receiving special education services each school or district in the state of Missouri elected to use. Each school or district may have defined inclusion

differently, therefore making it difficult to generalize. In addition, this study was conducted using public middle schools in Missouri; therefore, generalization from this one-state, public school sample is limited.

Summary

Educators have demonstrated the significance of the timing of transition years in the multiple grade configurations employed over the last 70 years (Wyant & Mathis, 2007). Specifically, the transition out of elementary school has been a focus of change (Earl, Hargreaves, & Ryan, 2013). Searching for the best time to educate early adolescents is significant because of the multiple changes students are experiencing at this point in their education.

Young adolescents are in a period of their life that is defined by change. This change is demonstrated physically, mentally, and socially (Wormeli, 2011). School facilities and expectations are different when comparing middle school to elementary school. Students are introduced to new peer groups and have the opportunity to participate in extra- and co-curricular activities. Researchers have noted a drop in academic achievement during the transition to middle school (Rockoff & Lockwood, 2010). Using a quantitative study, MAP index scores of cohorts in multiple transition years were analyzed to determine the optimal year, based on academic achievement, to transition students to middle school.

This study also compared non-transition years to transition years to determine if there is a significant difference in academic achievement during the transition year. In addition, eighth grade achievement scores across three different grade configurations

(grades 5-6, grades 6-8, and grades 7-8) were analyzed to determine if there were differences in academic achievement among grade configurations.

In Chapter Two, a review of related literature is presented. This review of literature on transition years and middle school grade configurations is divided into the following main topics:

1. current middle school grade configurations;
2. current middle school practices;
3. successful middle school practices; and
4. middle school student achievement.

The methodology of the research along with a description of the collection of data is highlighted in Chapter Three. Descriptive information is produced regarding the population, sample, instrumentation, and the collection of data. Data analysis and ethical considerations are also addressed.

Data analysis is presented in Chapter Four. The three research questions were analyzed according to the data acquired from the Missouri Comprehensive Data System (MCDS). Validity of sample size and data were also analyzed and are presented. Along with a summarization of the study, findings, conclusions, and recommendations for further research are presented in Chapter Five.

Chapter Two: Review of Literature

In order to answer the research questions posed in Chapter 1, this review of literature begins by analyzing four main topics of research. Beginning with current middle school grade configurations (Hanushek & Woessmann, 2010; Hussar & Bailey, 2009; McEwin & Greene, 2011; Wyant & Mathis, 2007), followed by current middle school practices (Andrews & Bishop, 2012; Huss & Eastep, 2011; McEwin & Greene, 2011; Yonezawa, McClure, & Jones, 2012) and highly successful middle school practices (Rockoff & Lockwood, 2010; Schwerdt & West, 2013) in the United States. This review of literature concludes with an examination of middle school student achievement and factors contributing to student achievement.

Although the research of this study was focused on student achievement on the Missouri Assessment Program (MAP), current and past research has indicated these subtopics play a role in the middle school experience (Juvonen, Le, Kaganoff, Augustine, & Constant, 2004; McEwin & Greene, 2011; Wilcox & Angelis, 2007). The education of young adolescents has been in a state of change since the inception of junior high schools. Researchers have performed studies and analyses on strategies, configurations, and models to determine the optimal time for transition; however, the social, emotional, and academic needs of middle school students must be considered.

Current Middle School Grade Configurations

The first junior high schools were established in the early 1900s in Columbus, Ohio, and in Berkley, California. The number of junior high schools grew to 7,000 by the 1970s (McEwin & Green, 2011). During the 1970s, middle schools became the popular configuration for teaching adolescents. District configurations were typically set

up as K-5 elementary schools, 6-8 middle schools, and 9-12 high schools (Wyant & Mathis, 2007). The number of pre-kindergarten through grade 8 and kindergarten through grade 8 school configurations has increased over the last 10 years, but are still in the minority when compared to the nation's public elementary and secondary schools (Barton & Klump, 2012). The grade 6 through grade 8 grade span is the most prevalent today, with nearly 10,000 public schools using this configuration (U.S. Department of Education, 2013).

School administrators make managerial decisions as to which is the best way to group students throughout the district and the decisions surrounding the education of early adolescents should focus on creating an atmosphere that is conducive to student success and learning (Meyer, 2011). Despite negative media attention and reports about the fall of middle schools, the predominant configuration of early adolescent education is in a middle school setting level (Mathews, 2010).

Students in the United States typically transition from elementary to middle school in grades 6, 7, or 8 before entering high school in grade 9, and the number of students housed in middle schools continues to increase due to larger kindergarten through grade 12 enrollment (Hussar & Bailey, 2009). Between 1993 and 2006 student enrollment raised 12%, and the trajectory of enrollment numbers is expected to increase by an additional 8% between 2006 and 2018 (Hussar & Bailey, 2009). School districts need to be prepared for this rise in enrollment. The increase in enrollment will make school configuration an important factor in the quality of education received by America's children.

Hanushek and Woessmann (2010) researched international educational achievement and noted German schools minimize the transition years by configuring their schools in a manner so students typically attend one school through grade 4 and complete their secondary education in grades 5-12. Finland has minimized transition years with students attending the same school in grades 2-10 (Hanushek & Woessmann, 2010). At the most basic level, grade configurations determine the amount of transitions students have to make during their educational career, and middle school transition years vary according to the grade configurations selected by the school district. The elimination of multiple transition years accounts for an increasingly popular change back to a kindergarten through eighth grade (K-8) model (Schwerdt & West, 2013).

Although the majority of students in the United States transition to middle school in grade 6 or grade 7, there are other variations for students in public schools (National Center for Educational Statistics, 2013). School districts in Oklahoma, Tennessee, Massachusetts, Pennsylvania, Ohio, Maryland, and New York are changing their grade configuration to minimize the number of transition years by moving to a K-8 model (Schwerdt & West, 2013). This trend is also noticed in private and charter schools that utilize a K-8 model over the more prevalent middle school model (Rockoff & Lockwood, 2010).

One reason for this trend is a belief that student achievement will improve if transitions are minimized (Yecke, 2006). Districts also cite other reasons for a preference to K-8 configurations. Byrnes and Ruby (2007) suggested the reasons for minimizing transitions are the negative impacts on enrollment due to students leaving the district after elementary; furthermore, K-8 schools are often smaller, and the perception is that a

school with lower enrollment may foster the implementation of better teaching strategies and teachers will get to know students at a deeper level. The smaller school allows for students to get to know their classmates on a more personal level and develop a stronger bond (Byrnes & Ruby, 2007). Also, teachers in smaller schools have the ability to get to know students who may not be in their classroom (Byrnes & Ruby, 2007).

Middle school configurations were designed to meet the specific needs of students who are at a common place in their physical and mental maturity. In a discussion paper written for the Hamilton Project, Jacob and Rockoff (2011) stated: "There is no single configuration that is optimal for every school district nationwide" (p. 12). While there may not be a single configuration that is best for all districts, school practices should match the unique needs of students during the transition years .

Current Middle School Practices

A wide range of strategies, programs, curricular, co-curricular, and extracurricular activities have been implemented to ease the transition to middle school for students. These research-based strategies are also used to enhance academic performance and increase attendance. The foundation of middle school is grounded in meeting the individualized needs of early adolescents. The personalization of learning has led to middle school practices based in the following main components: (a) interdisciplinary teaming; (b) advisory programs; (c) flexible scheduling; (d) student centered/evidence based instruction; and (e) a comprehensive transitional program (Andrews & Bishop, 2012; Fleischman & Heppen, 2009; Juvonen et al., 2004; McEwin & Greene, 2011; Wilcox & Angelis, 2007).

Huss and Eastep (2011) conducted a survey on the level of implementation of the main components of middle schools in 200 schools across Indiana, Kentucky, and Ohio. Although the study is a descriptive snapshot that cannot establish cause-and-effect or answer why middle school teachers believe the way they do about the specific level of implementation, findings indicated that levels of implementation are varied, and although many of the essential components of middle school are implemented, other components are being phased out (Huss & Eastep, 2011). George (2008) conducted a similar survey of principals and district directors in Florida and concluded that the main components of middle school are disappearing from the fabric of early adolescent education. The two surveys portrayed similar results in the beliefs of administrators and teachers.

Interdisciplinary teaming consists of more than one teacher from uncommon disciplines teaching the same students (Ellerbrock, 2012). Teachers within an interdisciplinary team plan, evaluate curriculum, coordinate instruction, and develop project-based units involving multiple core and non-core subject areas work collaboratively to enhance the curriculum (Ellerbrock, 2012). Huss and Eastep (2011) found that 67% of teachers surveyed believed interdisciplinary teaming was fully implemented in their schools.

A key component of interdisciplinary teaming is common plan time for teachers within a team. Drolet (2009) studied three middle schools in Rhode Island and defined common plan time as:

> Scheduled time during the day in which middle school teachers who share the same students meet to coordinate team policies and procedures, discuss students,

> meet with parents, plan team activities, plan thematic or cross-curricular units, look at student work, or participate in professional development. (p. 11)

The common plan time is set for teachers to meet and discuss students, strategies, and develop relationships. A misconception about common plan time is that a teacher's personal plan time is at the same time as other teachers within his or her grade level (Cook & Faulkner, 2010). Common plan time is in addition to a teacher's individual plan time and is used to promote learning, collaboration, and focus on specific objectives revolving around increasing student achievement (Cook & Faulkner, 2010). Researchers agree that high quality teacher teams in an organizational structure foster teacher learning and require the support of building leadership (Drolet, 2009).

Advisory programs are designed to connect each student to a caring adult within the school who tracks student achievement and maintains a positive relationship with his or her assigned advisees (Yonezawa et al., 2012). While there are many types of advisory programs with similar goals of creating smaller groups of connected students within the school community, few are fully implemented. According to Huss and Eastep (2011), only 33% of schools surveyed had fully implemented advisory programs.

Yonezawa et al. (2012) agreed with Huss and Eastep (2011) in noting that advisory programs are implemented to personalize education for students. The programs are designed to be a smaller community within the larger school that allows adults to make personal connections with individual students (Yonezawa et al., 2012). Advisory teachers act as counselors, academic advisors, and mentors for students within their groups with a core purpose of enabling a connection between students and teachers (Yonezawa et al., 2012).

Flexible scheduling is a shift from traditional scheduling philosophies that allows classes to be structured around learning time needed for students to grasp the material (Manning & Bucher, 2102). If an objective requires more time within the day for mathematics than for other subject areas, for example, the flexible schedule allows for teachers to lengthen the mathematics class in order to meet the daily objective, therefore creating longer learning times not marked by set bell schedules (Manning & Bucher, 2012). Block scheduling is a version of flexible scheduling that involves four periods that alternate from day to day, but it includes a set time for class length, so it is not an authentic version of flexible scheduling (Manning & Bucher, 2012). Huss and Eastep (2011) found that 47% of schools never implemented a flexible schedule within a middle school setting.

There are multiple strategies that will allow for a schedule to be flexible to meet the individual needs of each student in the school. One option is for the length of class periods to be adjusted to allow for more time during the day to focus on core subject areas, such as math, English, reading, science, and social studies (NASSP, 2006). Non-core subjects can be minimized to fewer days of the week, and the school day can be adjusted to include longer days periodically (NASSP, 2006).

According to Manning and Bucher (2012) the benefits of flexible scheduling are the provision of more time for core subject instruction and learning. Project-based learning is increased by quality and quantity, resulting in students having more time for deeper learning of critical learning targets and concepts (Manning & Bucher, 2012). Teacher teams have the flexibility to alter the length of their classes according to specific

learning goals, because time-on-task is not pre-determined by a bell schedule (Manning & Bucher, 2012).

While there are many great benefits to flexible scheduling, the NASSP (2006) suggested there are many implementation and logistical challenges associated with the practice, including choosing programs of study and content that lead to friction between core and non-core teachers; furthermore, teachers must be provided with training and on-going professional development to effectively utilize the additional time the schedule has allowed.

Flexible scheduling may limit the amount of time spent on the non-core subject areas. Schwahn and McGarvey (2011) and Zhao (2009) argued that the non-core subject areas are critical and need to be protected to ensure the education of the whole child. They advocated for the education of the whole child sparked by individual interest areas to foster innovation and creation of new ideas and theories (Schwahn & McGarvey, 2011; Zhao, 2009).

Student-centered, evidence-based instruction is focused on the students rather than the subject matter. One example of how schools implement these practices is through the use of multiple formative assessments to identify areas of strengths and weaknesses to determine whether the students are enriched or remediated, based on the results of the assessments (Blankenstein, 2010). Teacher teams then meet to discuss the assessment results and create a plan to meet the individual needs of the student (Blankenstein, 2010). Similarly, Lent (2012) described assessment as teacher teams working together to design material based on what they know about their students and the subject matter in which they teach.

Moss and Brookhart (2012) focused on targeted instruction and the impact it has on student achievement within the classroom in their book, *Learning Targets: Helping Students Aim for Understanding in Today's Lesson.* Moss and Brookhart (2012) contended that instructional objectives are too large to clearly identify what the purpose of each day will be; therefore, creating learning targets provides a focus that guides decisions schools make about what works, what does not work, and what needs to be changed or improved within the school. Educators are enabled to set goals based on the learning target and measure achievement against the goals leading to more effective teaching and learning that is based on individual student needs (Moss & Brookhart, 2012).

Transition programs are designed to assimilate student to a new school with early introduction to the building, staff, students, and programs. Induction programs serve students by easing the anxieties of transitioning, such as starting the transition to new schools early in the spring prior to the transition year (Baker & Narula, 2012). Although these programs may ease students' anxieties, comprehensive transitional programs for incoming students entering and exiting middle school were fully implemented by only 42% of the schools surveyed by Huss and Eastep (2011).

In a 2012 study on transitional programs in New Zealand, the United Kingdom, and the United States, Andrews and Bishop (2012) discussed how transition practices are executed and established successfully to ease adjustment from elementary to middle school. Andrews and Bishop (2012) cited three practices that effectively smooth the transition to middle school: (a) sharing of academic data, (b) implementing collaborative projects, and (c) attending to vulnerable populations. The sharing of academic data from

one school to the next, or from grade to grade, helps to ease the transition of students by operating on the premise that teachers and principals will have accurate prior knowledge of students successes and struggles before the students arrive on the first day of school (Wormeli, 2011). Teachers will be aware of strengths and weaknesses so they will be able to personalize instruction for students from the first day of school (Andrews & Bishop, 2012).

The implementation of collaborative projects between the pre-transition and transition schools allows students to work together prior to and during the transition year. Collaborative projects can range from social events to cross-curricular units (Swan, Vahey, van't Hooft, Kratcoski, & Rafanan, 2013). The students in the transition year will also have the ability to work with students who are in their post-transition year and develop a relationship with students who have already been through the transition process (Andrews & Bishop, 2012).

At-risk students are increasingly becoming a focus in education. During the transition years, vulnerable student populations, such as minority students, English Language Learners, students from poverty, and special education students will need specific transition plans that address their unique needs (Wormeli, 2011). All school employees need to be trained in how to recognize these students and implement research based strategies to ease the transition for these fragile learners (Andrews & Bishop, 2012).

Results from two national random samples were published by McEwin and Greene (2011). The report reflected the implementation level of recommended practices and programs advocated by experts in the field of education (McEwin & Greene, 2011).

Schools were randomly selected from 827 public middle schools in the United States, and the study focused on interdisciplinary teaming, advisory programs, common plan time, scheduling, and time spent during the day on core subjects (McEwin & Greene, 2011).

Results were compared to a similar survey conducted by McEwin and Greene (2009). Interdisciplinary teams were utilized in 72% of the schools, which was down 5% when compared to 2001. Advisory programs were utilized in 53% of the selected schools, and common plan times were utilized in 28% of schools that operated on a ten-period day and in 47% of schools with at least five periods per day (McEwin & Greene, 2009). Seventy-seven percent of schools provided core teachers with five or more common plan periods per week, and 72% of the schools utilized uniform periods as opposed to a flexible schedule (McEwin & Greene, 2009). Language arts received the largest allotment of time with an average of 71 minutes per day, and mathematics received an average of 55-60 minutes per day (McEwin & Greene, 2009) The average amount of time spent on the core subjects was 229 minutes for fifth grade, 226 minutes for sixth grade, and 219 minutes for seventh and eighth grades combined (McEwin & Greene, 2011).

A comparison of fully-implemented common elements in the Huss and Eastep (2011) study and the McEwin and Greene (2011) study is shown in Table 1. The common elements found between the two studies were interdisciplinary teaming, advisory programs, and flexible scheduling.

Table 1

Percentage of Fully-Implemented Middle School Components

Components	Huss and Eastep (2011)	McEwin and Greene (2011)
Interdisciplinary Teaming	67%	72%
Advisory Programs	33%	53%
Flexible Scheduling	47%	28%

Successful Middle School Practices

Five critical common elements of best practices were found in successful middle schools in the state of New York. Researchers Wilcox and Angelis (2007) compared 16 middle schools that consistently achieved at high levels on New York State Assessments to six schools that consistently produced average results. The five successful elements are summarized:

1. trusting and respectful relationships;
2. students' social and emotional well-being;
3. teamwork;
4. evidence-based decision-making; and
5. shared vision of mission and goals. (Wilcox & Angelis, 2007, p. 13)

Knowing one's students is more than just understanding the academic strengths and weaknesses. Adults in a middle school building need to create emotional links with students to enhance learning and improve behavior (Scaddan, 2009). Teachers and administrators should connect with students on a personal level and understand what tools students use to acquire knowledge (Jackson, 2009). Highly effective middle

schools have trusting and respectful relationships fostered by building leaders with an openness to share successes and struggles (Villavicencio & Grayman, 2012). All stakeholders in the school (parents, students, teachers, administrators, custodians, and cooks) are held to a high expectation for respect of others; clear expectations are related to stakeholders for what respect looks like, thus creating a school community that shares responsibility for student successes and failures (Wilcox & Angelis, 2007).

As documented by McEwin and Greene (2011), Wilcox and Angelis (2007), and Goodwin (2010), teamwork and collaboration that focus on student achievement are expected. Highly successful school administrators and teachers meet often to discuss and analyze data based on student performance through team time that is utilized effectively (Lent, 2012). Decisions are based on ongoing formative and summative assessments rather than mandated yearly state assessments and used to make changes in curriculum and instructional strategies (Moss & Brookhart, 2012).

The school community should have a shared vision of student success with the board of education, community, students, teachers, and administrators sharing the vision (Wilcox & Angelis, 2007). All stakeholders have input in developing the vision and mission, and leaders focus their evaluations on the implementation of the mission and goals (Wilcox & Angelis, 2007). Robbins and Searby (2013) added that parents are a valuable component of the school community in high performing schools. Most educators believe that academic success is not only correlated to the performance of principals and teachers but to the amount of parental and community involvement in education (Bryk, Sebrin, Allensworth, Luppescu, & Easton, 2009). Researchers recommend middle schools experiment with different types of activities and programs to

foster improved communication between home and school (Bryk et al., 2009). Although most middle school principals believe that a lack of parental involvement is a problem, fewer than one-half of the middle schools in a 2004 study offered any supports or learning opportunities for parents (Juvonen et al., 2004). One third of the schools mandated that teachers provide suggestions and learning activities for students to do at home (Juvonen et al., 2004). The middle school years are a time when parents have the most questions regarding the development of their children, because young adolescents are going through social, physical, and emotional changes; therefore, parents need multiple forms of support during this pivotal time of their children's lives (Bryk et al., 2009; Hargreaves & Shirley, 2009; Juvonen et al., 2004; Kowal, Hassel, & Hassel, 2009).

In Hattie's 2009 book, *Visible Learning,* three of the five components to high performing schools were shown to have a medium to high correlation with student learning. Parental involvement had higher effects on learning when it was focused on aspirations, expectations, and parents taking an active approach to learning (Hattie, 2009). Hattie (2009) also researched teacher-student relationships, and there was a high correlation between teacher-student relationships and student learning. Developing those relationships requires listening, empathy, and caring skills that must be developed by the teacher (Hattie, 2009). Professional development that is obtained by teachers working in high functioning teams was also shown to have a high correlation with student learning (Hattie, 2009).

Successful middle schools have high expectations for parents, students, teachers, administrators, and staff members. Lemov (2010) spoke to the need for high expectation in his book *Teach Like a Champion: 49 Techniques that Put Students on the Path to*

College. Lemov stated, "One consistent finding of academic research is that high expectations are the most reliable driver of high student achievement, even in students who do not have a history of successful achievement" (p. 27). High expectations are communicated every minute of the school day by the way teachers require quality work, ask questions, accept answers, and follow procedures that are not just limited to students (Lemov, 2010). Teachers, parents, and staff must hold themselves to the same measure of accountability in order to create an atmosphere and culture of high expectations within the school (Robbins & Searby, 2013).

The NASSP (2006) presented nine cornerstone strategies for successful middle schools in their , *Breaking Ranks in the Middle: Strategies for Middle Level Reform*:

1. Establish the academically rigorous essential learnings that a student is required to master.
2. Create dynamic teacher teams that are afforded common planning time.
3. Provide structured planning time that allows teachers to align the curriculum across grades and schools.
4. Implement a comprehensive advisory program.
5. Ensure that teachers assess individual learning needs of students.
6. Entrust teachers with the responsibility of implementing schedules that are flexible to accommodate teaching strategies that are consistent with the way students learn.
7. Institute structural leadership systems that allow for involvement by students, teachers, family members and the community.

8. Align all programs and structures so that all social, economic, and racial groups have equal access.
9. Align school-wide comprehensive, ongoing professional development program and Personal Learning Plans. (p. 8)

Williams et al. (2010), in a study conducted in California, examined strategies that correlate to higher performing middle grade schools. Their study of 303 middle schools in 2010 compared school and district practices/policies to student performance. The study concluded that higher-performing schools (schools that scored a full standard deviation above the mean), as measured by the California state assessment in math and English, had several common practices. Successful schools had a focus on improving student outcomes (Williams et al., 2010). Measurable goals were established on standardized tests and benchmark assessments. The higher performing schools created a mission and vision that was focused on the future (Williams et al., 2010). Academic improvement was a factor in the evaluation of teachers, principals, and superintendents (Williams et al., 2010). Parents and students are responsible for learning including turning in homework, attending class, and asking questions (Williams et al., 2010)

A study conducted in Redwood City, California, examined two middle school classroom practices that placed two opposing priorities on learning (Strobel & Borsato, 2012). The first emphasis was on producing good grades and high test scores with a focus on performance outcomes. The opposing practice was to press students to embrace academic challenge with a focus on deep learning and understanding. The two practices were measured by achievement scores in math. Research findings were significant when relating math achievement to a practice that pressed students to embrace academic

challenge (Stroebel & Borsato, 2012). Practices that emphasized grades and test scores, separately, did not significantly relate to math achievement; however, researchers did find that when both practices were combined, there was an association with high math achievement (Strobel & Borsato, 2012).

Basic standards are needed for middle schools to create an atmosphere that is conducive to social and academic growth of adolescent students. Research has shown that student-centered and targeted research based instruction improves academic achievement (NASSP, 2006). Schools need a mission and vision centered on success and the future (Williams et al., 2010). Teachers should collaborate and work together in productive teams led by both teachers and principals (NASSP, 2006). Schools must meet the individual needs of students by implementing teacher teams consisting of groups of teachers analyzing student data and creating collaborative and cross-curricular units (Hattie, 2009; Wilcox & Angelis, 2007).

Teacher professional development and training includes instructional strategies that are specifically targeted to meet the needs of adolescent children (Hattie, 2009). Parental involvement is a two-way street, and schools need to take advantage of this period of time when parents are looking for direction and suggestions to support their child (Robbins & Searby, 2013; Williams et al., 2010). Learning goals need to be focused on a deep understanding of material (Strobel & Borsato, 2012). These basic concepts need to be fully implemented with fidelity and buy-in from all stakeholders to create an effective middle school (Hattie, 2009; Lemov, 2010; NASSP, 2006; Searle, 2013; Strobel & Borsato, 2012; Williams et al., 2010).

Middle School Student Achievement

Decisions made by educators must be based on what is best for students and student achievement. There have been many studies conducted on the social, physical, and emotional changes incurred by adolescent students; in contrast there have been few studies that provide evidence that the transition to middle school is associated with a drop in academic achievement, increased suspension rates, and reduced self-esteem (Byrnes & Ruby, 2007; Cook et al., 2008).

According to Harter (1999), author of *The Construction of the Self: A Developmental Perspective*, there is often confusion about self-concept and self-esteem which may play a role in student achievement at the middle level. Harter (1999) discusses the notion that self-concept refers to a student's perception of how he or she fits into academic and non-academic settings. Harter (1999) continued to discuss that self-esteem is more about a self-evaluation and how a student feels about himself or herself. Harter (1999) evaluated how students in elementary school often overestimate their own abilities due to a lack of maturity, and as students mature, their self-perception grows and their ability to evaluate self also becomes more pronounced. Harter (1999) discussed the notion that a transition from elementary to middle school is often difficult because of a lack of maturity and readiness to make such a transition. Harter (1999) found that the transition from middle school to high school is often not as difficult. as students very often mature and understand the connection between their efforts and abilities.

Research regarding student achievement during the transition year has been mixed (Cook et al., 2008). New York and Florida studies indicated there is a drop in student performance both academically and behaviorally during the transition year (Rockoff &

Lockwood, 2010). A similar study conducted in Arkansas did not indicate a drop in student achievement during the transition year (Dove, Pearson, & Hooper, 2010).

Dove et al. (2010) conducted a study in Arkansas that examined the relationship between grade span configuration and student achievement by sixth-grade students. Student achievement was defined by performance on the Arkansas Benchmark Examination. Non-significant findings were attained when determining a relationship between grade configuration and academic achievement. Dove et al. (2010) concluded that factors other than grade configuration might affect student achievement. Factors, such as newly implemented practices, may have improved mathematics achievement but did not have an effect on literacy achievement (Dove et al., 2010). Results from the study indicated district financial resources should be focused on areas other than grade configuration to improve student achievement (Dove et al., 2010).

Two major studies examining grade configuration and academic achievement were conducted in New York and Florida (Rockoff & Lockwood, 2010; Schwerdt & West, 2013). The studies compared transition year middle school students to students in the same grade in a K-8 school. Both studies indicated a drop in student achievement during the transition to middle school in grades 6 and 7 when compared to peers who did not transition during these grade levels. Also, these studies submitted there is not a correlation with gender and middle school academic achievement (Rockoff & Lockwood, 2010; Schwerdt & West, 2013).

In addition to the New York study, the Florida study suggested academic achievement drops were greater for students transitioning in grade 7 when compared to students transitioning in grade 6 (Schwerdt & West, 2013). Schwerdt and West (2013)

found structural school transitions (or being the youngest cohort in a school) adversely impacted student performance in Florida. Their research indicated math achievement fell by 0.221 standard deviations and reading achievement fell by 0.148 standard deviations when the transition year was in grade 6 or grade 7 (Schwerdt & West, 2013).

Rockoff and Lockwood (2010) stated transitioning students in grades 6 or 7 creates a significant drop in student achievement; 0.15 standard deviations for math and English Language Arts (Rockoff & Lockwood, 2010). The results gained from the New York study led to the recommendation of a return to the K-8 school configuration (Rockoff & Lockwood, 2010). The study also indicated middle school regression in academic achievement is associated with grade 10 dropouts. Fink's (2010) research coincided with New York and Florida by concluding middle school students performed better on mathematics when they were enrolled in a K-8 grade configuration.

Meyer (2011) found in the 1995 Third International Mathematics and Science Study fourth-grade students far outscored students who had already entered middle school. Eighth graders ranked 18th among 26 countries while their fourth-grade counterparts ranked 14th among those 26 countries (Meyer, 2011). Meyer (2011) stated editors of *Phi Delta Kappan* found it troubling when they determined, in a 1997 issue devoted to middle school, there was a great deal of observational studies but very little quantitative information about the success of the middle school model (Meyer, 2011).

In Meyer's 2011 article, he argued middle schools in America were born out of a speech given by William Alexander, who in 1963 was the chairman of the Department of Education at George Peabody College for teachers in Nashville. At a conference for administrators at Cornell University, Alexander argued that the current school

configuration did not meet the needs of students. Meyer (2011) stated Alexander believed schools had lost touch with the needs of preadolescent students, and junior high schools were not designed to accommodate the developmental needs of those preadolescents. Alexander believed that junior high schools were a mere reflection of what high schools were about (Meyer, 2011). Alexander described that students needed exploratory experiences rather than a greater focus on academic subjects (Meyer, 2011). Meyer (2011) offered, in part, Alexander was reacting to the academic scare of Sputnik. Meyer (2011) described how Alexander believed that the greater focus on math, science, and more homework after following Sputnik took away from any emphasis on the fine arts. Alexander believed that subjects, such as music, journalism, drama, and homemaking were obviously suffering as a result of pushing math and science (Meyer, 2011).

Summary

Research on middle schools, junior highs, and educational strategies for adolescent children has amassed since the inception of the first junior high school in the 1960s. Researchers have focused studies on the development of the adolescent brain, student achievement, and analyses of successful schools (Wormeli, 2011; Wyant & Mathis, 2007). Some studies have shown that academic achievement drops when students transition to middle school (Fink, 2010; Rockoff & Lockwood, 2010; Schwerdt & West, 2013). These studies also compared students in middle schools to students in K-8 schools.

Education is changing at a rapid pace, and studies have shown that decreases in academic achievement in preadolescent years leads to higher grade 10 dropout rates

(Hough, 2009). In a book co-authored by Schwahn and McGarvey (2011), *Inevitable: Mass Customized Learning: Learning in the Age of Empowerment,* the authors contended that students are expected to not only compete locally, but globally, in a mass customized society. With students now competing globally for jobs, one- or two-year drops in academic achievement due to school configuration will be costly (Schwahn & McGarvey, 2011). Additional research is needed surrounding the transition year to middle school; therefore, this study examined the optimal year for transitioning students to middle school by comparing achievement data between different middle school transition years.

The methodology of the study and a description of how the data were collected are specified in Chapter Three. Details about the population, sample, and instrumentation used to collect the data are outlined, as well as any legal or ethical concerns involved in the study.

In Chapter Four, the results of this study are presented in a descriptive format with accompanying tables and figures. The results are divided into three sections: (a) description of the study sample and instrumentation used for the study, (b) investigation of assumptions as they relate to inferential analysis, and (c) tests of hypotheses. In Chapter Five are the summary of the findings, responses to research questions, and conclusions with implications for practice and recommendations for further research.

Chapter Three: Methodology

A detailed description of the research methodology used for this study is provided in Chapter Three. In this chapter, the research design and its appropriateness are included. Information on the research design, study population and sample, data collection procedures and rationale, analytical methods, and limitations are discussed in this chapter.

Research Perspective

The research was based on a quantitative, comparative, retrospective analysis of the middle school population in Missouri during the 2011-2012 school year. The purpose of the study was to examine differences in student achievement during transition years to middle school. Student achievement was determined by using index scores from the Missouri Assessment Program (MAP) test in English Language Arts and mathematics. The study was quantitative, and index scores were analyzed and compared between transition and non-transition years.

Research Questions

The three research questions addressed in this study and their associated statistical hypotheses were as follows:

1. What is the difference in student achievement between the transition year and non-transition year?
2. What is the difference in student achievement among varying transition years?
3. What is the difference in eighth-grade achievement among varying grade configurations?

Null hypotheses. This is designated by the symbol H_0.

$H1_0$: There is not a significant difference in student achievement during the transition year when compared to non-transition years.

$H2_0$: There is not a significant difference in student achievement among varying transition years.

$H3_0$: There is not a significant difference in eighth-grade achievement across varying grade configurations.

Alternative hypotheses. This is designated by the symbol H_a.

$H1_a$: There is a significant difference in student achievement during the transition year when compared to non-transition years.

$H2_a$: There is a significant difference in student achievement among varying transition years.

$H3_a$: There is a significant difference in eighth-grade achievement across varying grade configurations.

Research Design

A quantitative, comparative research method was appropriate for this study due to the nature of the variables of interest (Bluman, 2008). In a comparative study, at least two independent groups are compared on at least one dependent variable or measure of performance, but the independent variable (the cause) has already occurred or cannot be manipulated (Bluman, 2008). A comparative methodology necessitates that the independent variable is categorical and that dependent variables are continuous (Bluman, 2008). In this study, the categorical independent variable was middle school transitional grade level, or the first year upon entering the middle school configuration, and included

three grade levels: (a) fifth grade, (b) sixth grade, and (c) seventh grade. The continuous dependent variables were the English Language Arts and mathematics MAP performance index scores for the individual school districts within each of the middle school grade-level configurations. Comparative methodology is used to determine if there are significant mean differences in dependent variables, depending on the group (Creswell, 2012). However, in comparison to experimental research, confidence levels cannot be assumed for this methodology (Creswell, 2012). An experimental design was not appropriate to this study due to ethical limitations on the ability to manipulate the study groups to achieve desired answers to the questions of this study.

Quantitative research addresses questions about relationships between measured variables for the purpose of explaining, predicting, and controlling events (Creswell, 2012). The quantitative approach was appropriate for this study because it reduces potential biases by focusing on direct measurement without interpretation. Quantitative research involves the use of specific and narrow criteria targeted toward measuring and explaining variable relationships (Bluman, 2008). Qualitative research design was not selected for this study because the process analyzes words or text from participants, and inquiries are conducted in a more subjective and biased manner (Creswell, 2012).

A variety of methods are available to examine relationships between middle school transition year configuration and academic performance. A retrospective, observational study method was chosen for this study. Other methods include experiments, survey sampling, focus groups, case studies, or interviews (Creswell, 2012). A retrospective study was chosen due to the fact that the analyzed scores were achieved in the past, during the 2011-2012 school year (Creswell, 2012). The data set used for this

study was collected by submitting an online data request form to the Missouri Department of Elementary and Secondary Education. The Missouri Department of Elementary and Secondary Education website provided more detailed information than could be collected by survey sampling or with focus groups due to temporal and cost considerations. Also, use of these data allowed for more objective data collection than could be done if collecting more subjective participant answers on surveys or with focus groups.

Participants in the Study

Schools under the jurisdiction of the MODESE, which enrolled students in grades 4 through 8, were included in the population of this study. District, school, or student characteristics, such as ethnicity, socioeconomic status, at-risk behaviors, and gender did not eliminate school participants from the study

The sample participants in the study varied according to the research question. For analyses and reporting of Research Question 1, two independent groups or participants were analyzed. The first independent group was randomly selected from all schools under the jurisdiction of the MODESE meeting the grades four through eight population requirement. Cohorts comprising the first group were randomly selected and assigned to one of three categories: (a) pre-transition year, (b) transition year, and (c) post transition year. Grade level was not a variable in defining the groups. Pre-transition year cohorts were all grade levels that were in the academic year prior to entering a middle school configuration. Transition year included all grade levels in the first academic year of a middle school setting, and post-transition year included all grade levels in the second academic year of a middle school configuration. Timing of the

transition to a middle school setting was the variable used to disaggregate the three categories.

To select the sample, an automated randomization tool was utilized. Each school was assigned a number between 1 and 562 to randomly select 159 schools. Bluman (2008), summarizing the Central Limit Theorem, stated:

> If a large number of samples of a given size are selected from a normally distributed population, or if a large number of samples of a given size that is greater than or equal to 30 are selected from a population that is not normally distributed, and the sample means are computed, then the distribution of sample means are computed. (p.331)

Bluman (2008) determined to achieve a 95% confidence interval the sample size for research must be at least 30.

The second independent group of participants studied in Research Question 1 included all middle school cohorts in the state of Missouri. Cohorts were disaggregated based on the grade level of the transition to middle school and included three categories of (a) fifth grade, (b) sixth grade, and (c) seventh grade. The same groups of participants were used to respond to Research Question 2. Fifth, sixth, and seventh grade cohorts were grouped based on the presence of a transition year within the grade level and assigned to groups within the grade level accordingly. For Research Question 3, all middle schools with grade configuration of either (a) fifth through eighth grades, (b)sixth through eighth grades, or (c) seventh through eighth grades were examined.

Power analysis for sample size. An *a priori* power analysis was conducted to calculate the required sample size for the study. Three factors are considered when

calculating sample size: the desired effect size of the study, the power of the study, and level of significance. Effect size is the measurement of the strength or magnitude of the relationship between the independent and dependent variables in the analysis (Cohen & Cohen, 1984). Effect size for multiple-group means is usually defined as small ($f = 0.10$), medium ($f = 0.25$), or large ($f = 0.40$). Based on the literature, a medium effect size is commonly used for *a priori* power calculations, and therefore the medium effect size of $f = 0.25$ was used for this study (Cohen & Cohen, 1984).

Level of significance is represented by alpha level. The alpha level corresponds to the probability of a Type I error; in other words the probability of rejecting the null hypothesis given that the null hypothesis is actually true. Usually the alpha (α) level is set at 0.05 or 95% confidence interval (Bluman, 2008). The power of the study represents the probability of being able to reject a false null hypothesis. A power of 80% is conventionally used for quantitative research.

The sample size for this study was calculated using G*Power, a computer program designed to calculate sample sizes for numerous statistical methods. For this study, settings used to determine sample size were power = 0.80, effect size $f = 0.25$, and $\alpha = 0.05$. The number of groups was three. *A priori* calculations were performed for a one-way between groups ANOVA, which would require a larger sample than the repeated measures ANOVA used for Research Question 1. Based on these parameters, the sample size required for this study was $n = 159$ for Research Questions 2 and 3.

Instrumentation

Public schools in Missouri are required to assess students on a yearly basis by using the Missouri Assessment Program (MAP). The MAP data set used for this study

was collected by submitting an online data request form (see Appendix A) to the MODESE to access the Missouri Comprehensive Data System (MCDS) portal. The data set included information collected for the 2011-2012 school year.

The MAP includes a series of assessments administered to students in Missouri from grades three through eight (MODESE, 2013). Students are assessed against a set of grade-level and content standards called the Show Me Standards (MODESE,2013). Multiple-choice, machine scored items, and constructed response items are included in the yearly assessment (MODESE,2013). Some items on the test are nationally normed questions developed by CTB/McGraw-Hill (MODESE,2013). The TerraNova portion allows a comparison of Missouri students to other students who take the same test in participating states (MODESE, 2013).

Each grade level is assigned a MAP performance index (MAP index) score in each tested content area (MODESE, 2013). Index points are calculated by multiplying the percentage of reportable students scoring in each achievement level for each subject and grade span by values assigned to each achievement level (Advanced, Proficient, Basic, and Below Basic) (MODESE, 2013). The number of students scoring Advanced is multiplied by 5, Proficient by 4, Basic by 3, and Below Basic by 1 (MODESE, 2013). The products are then summed, divided by the total number of reportable students, multiplied by 100, and then rounded to the nearest tenth to produce the MAP index (MODESE, 2013).

The actual MAP index scores for each district were used as dependent variables in this study. Students in grade 5 and grade 8 took assessments in English Language Arts, mathematics, and science, and students in grades 6 and 7 took assessments in English

Language Arts and mathematics only (MODESE, 2013). This study analyzed English Language Arts and mathematics index scores for grades 5-8. English Language Arts and mathematics MAP index scores were collected across these grade spans and categorized according to timing of transitions, presence of a transition year, and school grade configuration.

Data Collection

Ethical assurances. Before any data were collected, Institutional Review Board (IRB) approval from Lindenwood University was obtained (see Appendix B). This study is a retrospective observational design and only school district data about middle school configuration type and English Language Arts and mathematics MAP index scores were collected. No identifying information of individual student characteristics or demographic information was collected. All data will be kept in a secure location for three years, and after three years, all data will be appropriately destroyed. Data were reported in a respectful and honest manner, with minimal or no risk to participants.

Obtaining and collecting the data. The data for this study were collected from the MCDS located on the MODESE website. Archival MAP performance data in mathematics and English Language Arts for grades 5-8 were examined for the 2011-2012 school year.

Data Analysis

The purpose of this study was to examine differences in student achievement during the transition year to middle school. Index scores from the MAP test were utilized. An ANOVA and *t*-tests were used to address the research questions and statistical hypotheses of this study. The continuous dependent variables were the English

Language Arts and mathematics MAP index scores for the individual school districts within each of the middle school grade-level configurations. The IBM SPSS version 22 was used for all descriptive and inferential analyses. A 95% level of significance was set for hypothesis testing. The data analyses and variables used to answer each of the three research questions and associated statistical hypotheses are presented below.

Research question 1. What is the difference in student achievement between the transition year and non-transition year?

$H1_0$: There is not a significant difference in student achievement during the transition year when compared to non-transition years.

$H1_a$: There is a significant difference in student achievement during the transition year when compared to non-transition years.

Two within-groups repeated measures ANOVAs were performed to test Research Question 1. The first within-groups repeated measures ANOVA was performed for the dependent variable of English Language Arts MAP index score and the second for the dependent variable of mathematics MAP index score. Both ANOVA analyses included a within-groups independent variable of "year" with three levels: (a) pre-transition year, (b) transition year, and (c) post-transition year. The results of the two within-groups repeated measures ANOVAs were presented according to each of the two dependent variable outcomes of the English Language Arts MAP index score and the mathematics MAP index score. Significant findings resulting from the two repeated measures ANOVA analyses were followed up with a series of paired samples *t*-tests to confirm which of the three independent transition year groups significantly differed on the associated mean MAP index score outcomes.

Research Question 1 was also tested to determine if significant differences in student achievement were present within grade levels based on transition status. Fifth-, sixth-, and seventh-grade cohorts were disaggregated into two categories with the transition year to middle school serving as the independent variable. All Missouri fifth-, sixth-, and seventh-grade cohorts during the 2011-2012 school year were labeled as transition year "yes" or transition year "no." Mean MAP index scores were compared using *t*-tests to investigate the mean differences for each of the dependent variables of English Language Arts MAP index scores and mathematics MAP index scores.

Research question 2. What is the difference in student achievement among varying transition years?

$H2_0$: There is not a significant difference in student achievement among varying transition years.

$H2_a$: There is a significant difference in student achievement among varying transition years.

Two one-way between groups analysis of variance tests (ANOVAs) were performed to address Research Question 2. The two ANOVA analyses each included the independent variable of transitional grade level with three categories: (a) fifth grade, (b) sixth grade, and (c) seventh grade. The two dependent variables used in each of the analyses respectively were English Language Arts MAP index scores and mathematics MAP index scores. Significant findings found on the one-way between groups ANOVA tests were followed up with Tukey's honestly significant difference (HSD) tests to investigate significant mean difference between pairs of the independent variable classifications (Abdi & Williams, 2010).

Research question 3. What is the difference in eighth-grade achievement among varying grade configurations?

$H3_0$: There is not a significant difference in eighth-grade achievement across varying grade configurations.

$H3_a$: There is a significant difference in eighth-grade achievement across varying grade configurations.

Two analysis of variance tests (ANOVA) were performed to address Research Question 3. Both of the ANOVA analyses included the independent variable of middle school grade configurations with three categories: (a) fifth through eighth grades, (b) sixth through eighth grades, or (c) seventh through eighth grades. The two dependent variables used in each of the analyses were eighth grade English Language Arts MAP index scores and eighth grade mathematics MAP index scores. Significant findings found on the one-way between groups ANOVA tests were followed up with Tukey's HSD tests to investigate significant mean difference between pairs of the independent variable classifications.

Summary

In Chapter Three, the research design and approach, sample, instrumentation, and statistical analysis were discussed. Contained in Chapter Four is an analysis of the data. The summary of the study, findings, conclusions, implications, and recommendations are presented in Chapter Five.

Chapter Four: Analysis of Data

In Chapter Four, an analysis of the data is presented in a descriptive format as well as with tables and figures. After reporting the results of the investigation of assumptions for using *t*-tests and ANOVA, results of the hypotheses tests for the research questions are presented. Bar graphs and box and whisker plots to represent the data according to the disaggregated groups are grouped by research question. The IBM SPSS version 22.0 was used for all descriptive and inferential analyses. A 95% level of significance ($\alpha = .05$) was set for all inferential analyses.

The purpose of this quantitative study was to investigate the difference in student achievement during the transition years of middle school based on index scores on the Missouri Assessment Program (MAP) test.

Research Questions

The three research questions addressed in this study and their associated statistical hypotheses are as follows:

1. What is the difference in student achievement between the transition year and non-transition year?
2. What is the difference in student achievement among varying transition years?
3. What is the difference in eighth-grade achievement among varying grade configurations?

Null hypotheses. This is designated by the symbol H_0.

$H1_0$: There is not a significant difference in student achievement during the transition year when compared to non-transition years.

$H2_0$: There is not a significant difference in student achievement among varying transition years.

$H3_0$: There is not a significant difference in eighth-grade achievement across varying grade configurations.

Alternative hypotheses. This is designated by the symbol H_a.

$H1_a$: There is a significant difference in student achievement during the transition year when compared to non-transition years.

$H2_a$: There is a significant difference in student achievement among varying transition years.

$H3_a$: There is a significant difference in eighth-grade achievement across varying grade configurations.

Population

This study was conducted in Missouri using data collected from the MODESE. Individual grade cohorts were studied based on achievement levels, and participants were disaggregated based solely on grade. Due to the fact that this study only analyzed student achievement, characteristics such as ethnicity, socioeconomic status, at-risk behaviors, and gender did not eliminate participants from the study.

Instrumentation

The study used MAP index scores as a measure of student achievement. The MAP is a series of assessments for English Language Arts, mathematics, and science at Grades 3 to 8. These assessments were designed to determine if students in Missouri are meeting the Show-Me Standards. This study utilized English Language Arts and mathematics MAP index scores for each district included in the study. Grades four

through eight English Language Arts and mathematics scores were targeted due to their relationship to middle school grade configurations and transition years of early adolescent students in the state of Missouri.

Assumptions

Statistical analyses of Research Question 1 included analysis of variance (ANOVA) and follow-up independent samples *t* -tests. The ANOVA was also used for Research Questions 2 and 3. The following assumptions were made for the inferential analysis: (a) absence of outliers, (b) normality, and (c) homogeneity of variances.

Outliers in a data set have the potential to distort results of an inferential analysis (Pallant, 2013). A check of boxplots for the two dependent variables of English Language Arts MAP index scores and mathematics MAP index scores was performed to visually inspect for outliers. Nineteen outliers (1%) were found on the English Language Arts variable and 13 outliers (< 1%) were found on the mathematics variable. The variables were standardized to check for the presence of extreme outliers (*z* score of +/- 3.3; Pallant, 2013).

The English Language Arts variable had eight extreme outliers (0.4%) and the mathematic variable had six extreme outliers (0.3%). The scores of the outliers were confirmed to be within the possible ranges of the MAP index. The median and mean values of the MAP index scores for both variables were close in value, indicating that outliers were not adversely affecting the data set. Since all outliers were in acceptable ranges of their associated variables, means and medians were similar for each variable, and less than 5% of the data were missing on any one variable, it was determined that all

records would be retained for analysis and that the absence of outlier assumption was met.

Normality for the scores of both dependent variables was investigated with SPSS Explore. The Kolmogorov-Smirnov test (K-S) for normality indicated that all variables were not normally distributed ($p < .0005$). However, the K-S test is sensitive to larger sample sizes, with significant findings returned when sample sizes are larger than $n > 50$ (Pallant, 2013). A visual check of histograms and Normal Q-Q plots for both variables indicated distributions that appeared normal. A comparison of the mean, 5% trimmed mean, and medians relating to each of the variables indicated numbers close in value for the measures according to indicating that outliers and skew were not adversely affecting the distribution of the variables. Therefore, the assumption of normality was not considered violated and parametric tests were used during inferential analysis.

Levine's test of equality of variances was performed to investigate violations of the equal variance assumption for the independent samples *t*-tests and the ANOVA tests. The assumption of equal variances was violated for the independent *t*-test involving the fifth-grade level on the English Language Arts MAP index variable ($p < .0005$) and the mathematics MAP index variable ($p = .008$). SPSS provides a result with adjusted degrees of freedom when the equality of variances assumption is violated (Garson, 2012), and this result was reported in the findings for the independent *t*-test with unequal variances. The assumptions of equal variances were met for the remaining two *t*-tests and two analyses of variances (ANOVAs) performed in this study.

Research Question 1

What is the difference in student achievement between the transition year and non-transition years?

$H1_0$: There is not a significant difference in student achievement during the transition year when compared to non-transition years.

$H1_a$: There is a significant difference in student achievement during the transition year when compared to non-transition years.

The first method used to answer Research Question 1 utilized two within-groups repeated measures ANOVAs. The results of the ANOVAs are presented according to English Language Arts and mathematics content areas. The second method utilized six independent samples *t*-tests. One *t*-test for the mathematics MAP index score and one for the English Language Arts MAP index score were performed for each middle school transition year of fifth grade, sixth grade, and seventh grade (two tests for each of the three years). The results of the *t*-tests are presented according to each of the three middle school transition-year grade levels. Two separate but related conclusions were drawn from each method used to test the hypothesis. Conclusions will be presented following each method of testing.

Fifth grade middle school transition year. The first series of *t*-tests investigated mean differences for each of the dependent variables of English Language Arts MAP index scores and mathematics MAP index scores between the two independent fifth-grade groups of transitional year versus non-transitional year.

Investigation of the mean English Language Arts MAP index scores for each transition group indicated districts that did not transition students to middle school in fifth

grade had a mean score of 761.60 with a standard deviation of 34.79. Districts that did transition students to middle school in the fifth grade had a mean score of 755.61 with a standard deviation of 17.26. The *t* score measuring the difference of the means between the fifth-grade groups of transition versus non-transition was determined to be 2.195. This score exceeded 1.96 required to be significant at the $\alpha = .05$ value and, therefore, indicated the difference was significant. The results are presented in Table 2 and Figures 1 to 3.

Table 2

Independent Samples t-Test for Fifth Grade English Language Arts MAP Index Scores by Transition Year Status

	English Language Arts MAP Index Scores				
Fifth Grade Transition Year	*M*	*SD*	Mean difference	*t*(67.81)	*p*
No	761.60	34.79	5.99	2.195	.032
Yes	755.61	17.26			

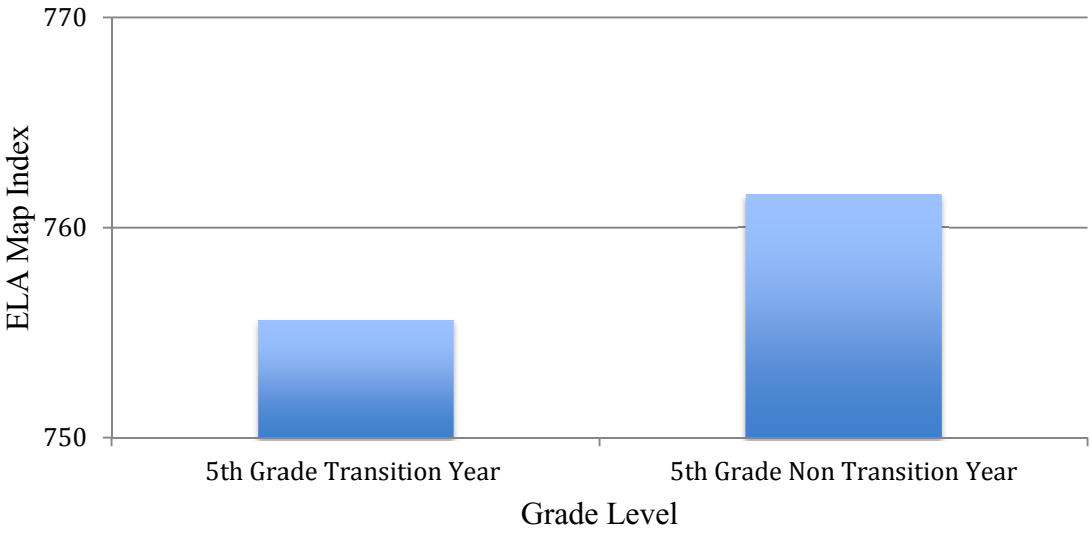

Figure 1. Bar graph showing mean English Language Arts MAP index scores of all fifth grade transition and non-transition year cohorts during the 2011-2012 school year.

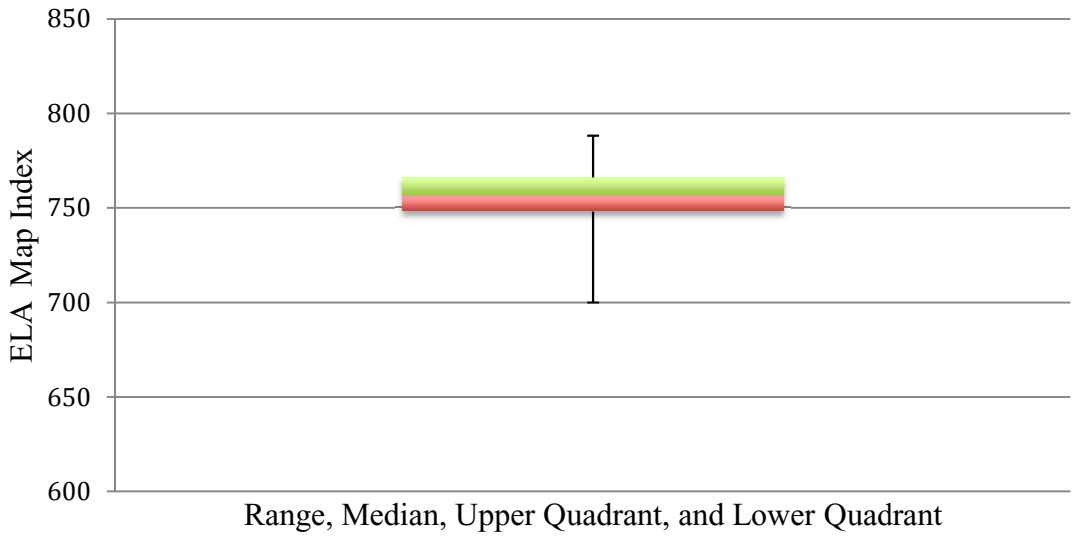

Figure 2. Box and whisker plot showing the range, median, upper quadrant, and lower quadrant of English Language Arts MAP index scores of schools in which fifth grade is a transition year.

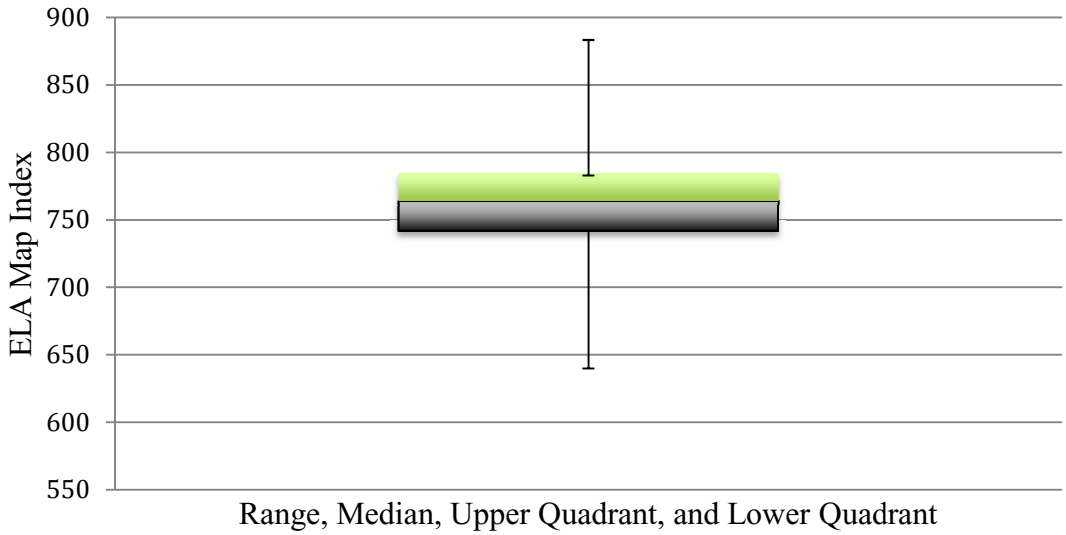

Figure 3. Box and whisker plot showing the range, median, upper quadrant, and lower quadrant of English Language Arts MAP index scores of schools in which fifth grade is a non-transition year.

Investigation of the mean mathematics MAP index scores for each transition group indicated districts that did not transition students to middle school in fifth grade had a mean score of 764.11 with a standard deviation of 35.91. Districts that transitioned students to middle school in the fifth grade had a mean score of 752.89 with a standard deviation of 24.71. The *t* score measuring the difference of the means between the fifth-grade groups of transition versus non-transition was determined to be 2.99. This score exceeded 1.96 required to be significant at the $\alpha = .05$ value and, therefore, indicated the difference was significant. Results are displayed in Table 3 and in Figures 4, 5, and 6.

Table 3

Independent Samples t-Test for Fifth Grade Mathematics MAP Index Scores by Transition Year Status

Fifth Grade Transition Year	Mathematics MAP Index Scores		Mean difference	*t*(57.37)	*p*
	M	*SD*			
No	764.11	35.91	11.22	2.99	.004
Yes	752.89	24.71			

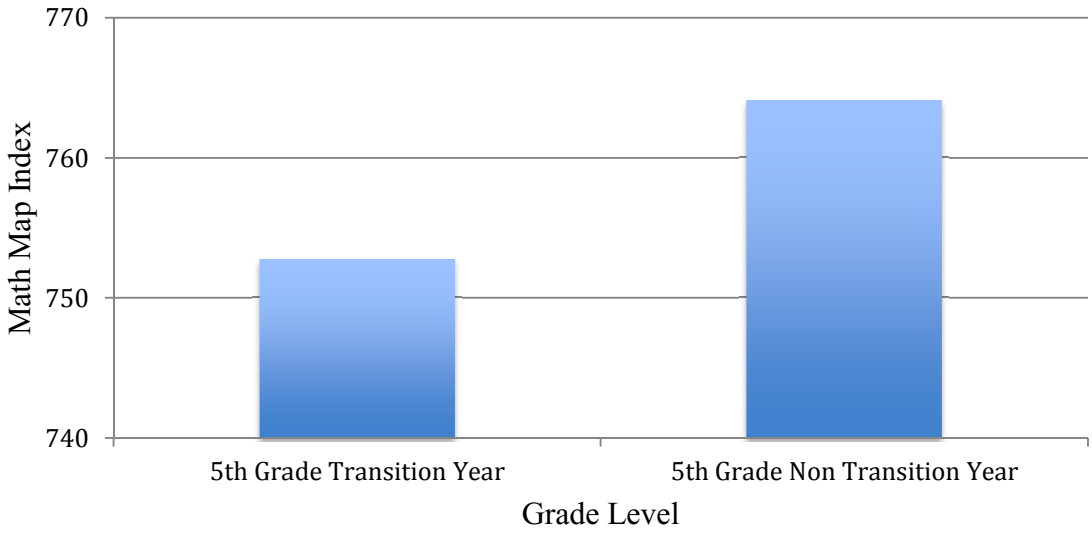

Figure 4. Bar graph showing mean Mathematics MAP index scores of all fifth grade transition and non-transition year cohorts during the 2011-2012 school year.

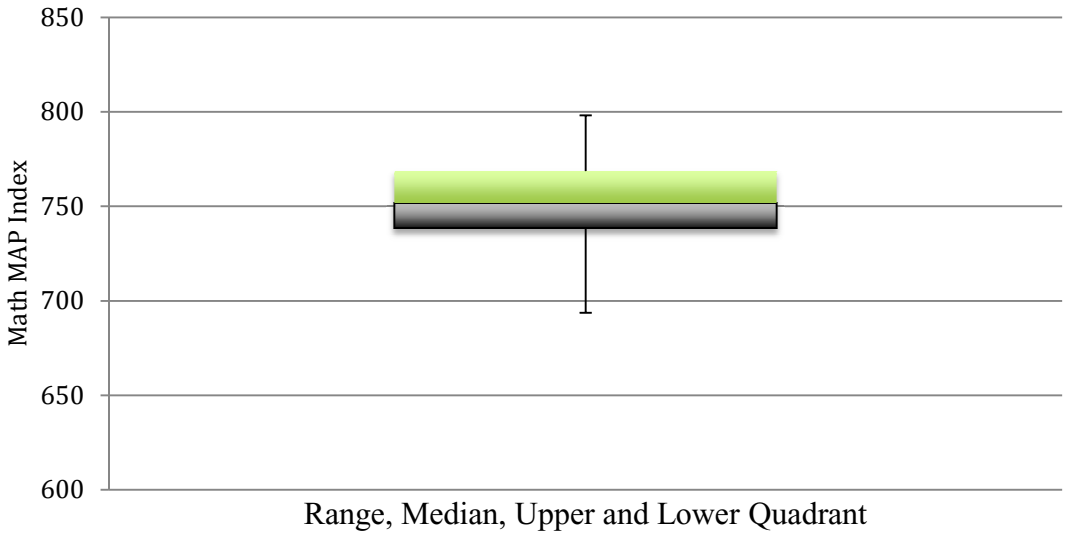

Figure 5. Box and whisker plot showing the range, median, upper quadrant, and lower quadrant of Mathematics MAP index scores of schools in which fifth grade is a transition year.

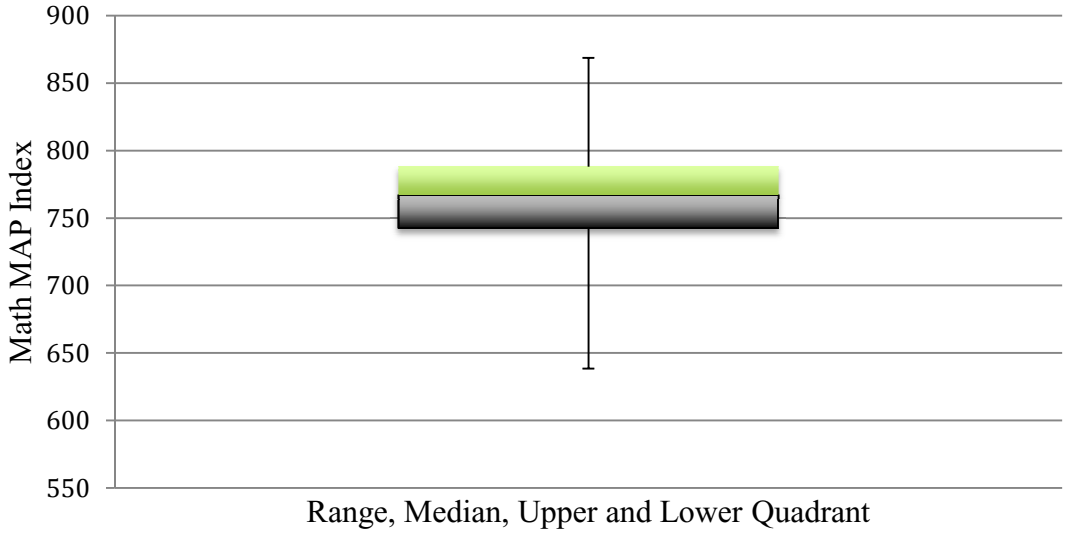

Figure 6. Box and whisker plot showing the range, median, upper quadrant, and lower quadrant of Mathematics MAP index scores of schools in which fifth grade is a non-transition year.

Sixth grade middle school transition year. The second series of *t*-tests investigated mean differences for each of the dependent variables of English Language Arts MAP index scores and mathematics MAP index scores between the two independent sixth-grade groups of transitional year versus non-transitional year.

Investigation of the mean English Language Arts MAP index scores for each transition group indicated districts that did not transition students to middle school in sixth grade had a mean score of 754.90 with a standard deviation of 21.18. Districts that transitioned students to middle school in the sixth grade had a mean score of 758.39 with a standard deviation of 26.32. The *t* score measuring the difference of the means between the sixth-grade groups of transition versus non-transition was determined to be -0.81. This score did not exceed 1.96 required to be significant at the $\alpha = .05$ value and, therefore, indicated there was not a significant difference in student achievement. Results are displayed in Table 4 and Figures 7, 8, and 9.

Table 4

Independent Samples t-Test for Sixth Grade English Language Arts MAP Index Scores by Transition Year Status

	English Language Arts MAP Index Scores				
Sixth Grade Transition Year	*M*	*SD*	Mean difference	*t*(234)	*p*
No	754.90	21.18	-3.49	-0.81	.417
Yes	758.39	26.32			

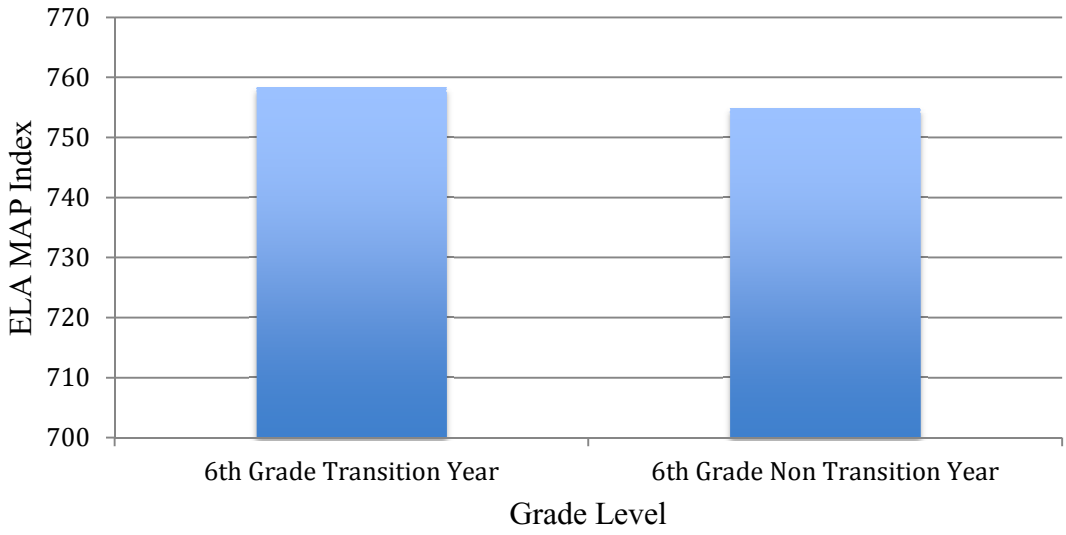

Figure 7. Bar graph showing mean English Language Arts MAP index scores of all sixth grade transition and non-transition year cohorts during the 2011-2012 school year.

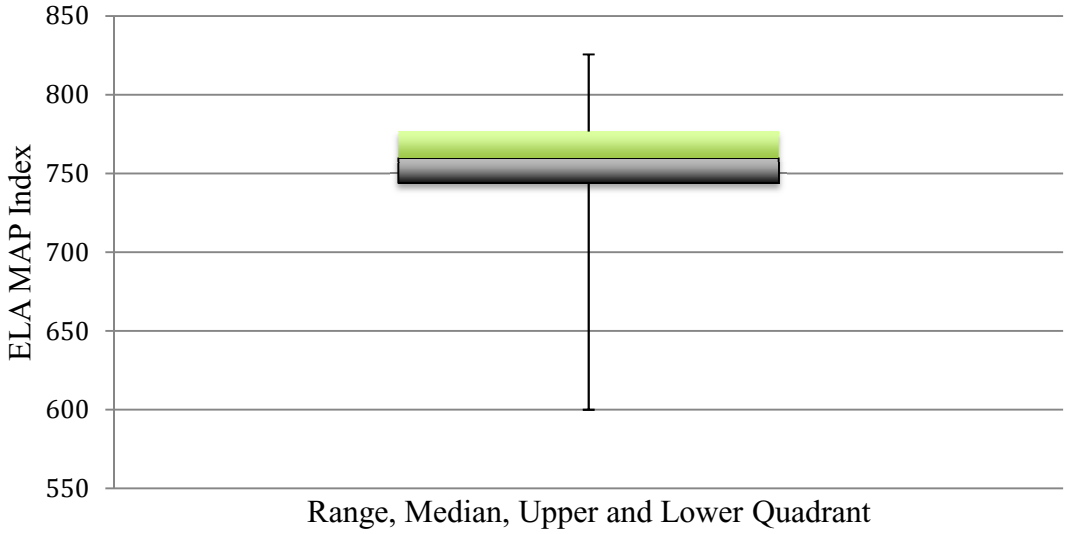

Figure 8. Box and whisker plot showing the range, median, upper quadrant, and lower quadrant of English Language Arts MAP index scores of schools in which sixth grade is a transition year.

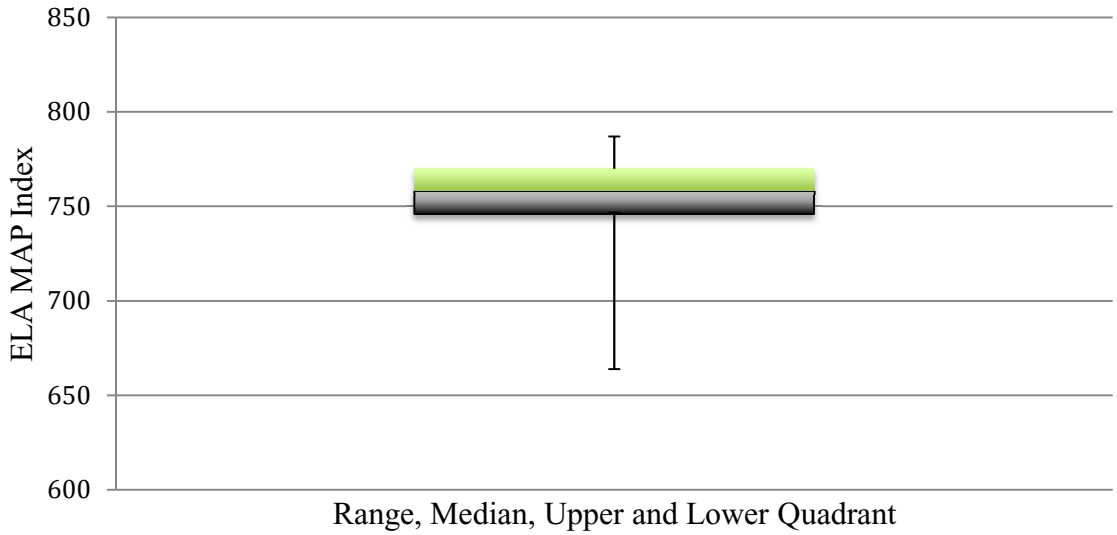

Figure 9. Box and whisker plot showing the range, median, upper quadrant, and lower quadrant of English Language Arts MAP index scores of schools in which sixth grade is a non-transition year.

Investigation of the mean mathematics MAP index scores for each transition group indicated districts with students that did not transition to middle school in sixth grade had a mean score of 754.49 with a standard deviation of 24.68. Districts that transitioned students to middle school in the fifth grade had a mean score of 763.55 with a standard deviation of 29.96. The *t* score measuring the difference of the means between the sixth-grade groups of transition versus non-transition was determined to be -0.83. This score did not exceed 1.96 required to be significant at the $\alpha = .05$ value and, therefore, indicated the difference was not significant. Results are displayed in Table 5 and in Figures 10, 11, and 12.

Table 5

Independent Samples t-Test for Sixth Grade Mathematics MAP Index Scores by Transition Year Status

Sixth Grade Transition Year	Mathematics MAP Index Scores		Mean difference	*t*(234)	*p*
	M	*SD*			
No	759.49	24.68	-4.06	-0.83	.409
Yes	763.55	29.96			

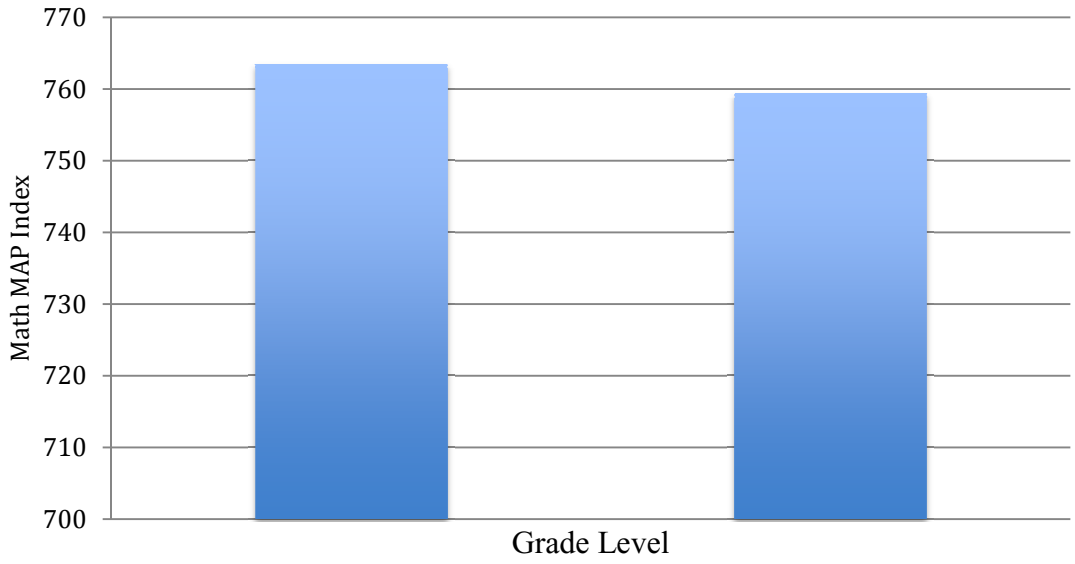

Figure 10. Bar graph showing mean Mathematics MAP index scores of all sixth grade transition and non-transition year cohorts during the 2011-2012 school year.

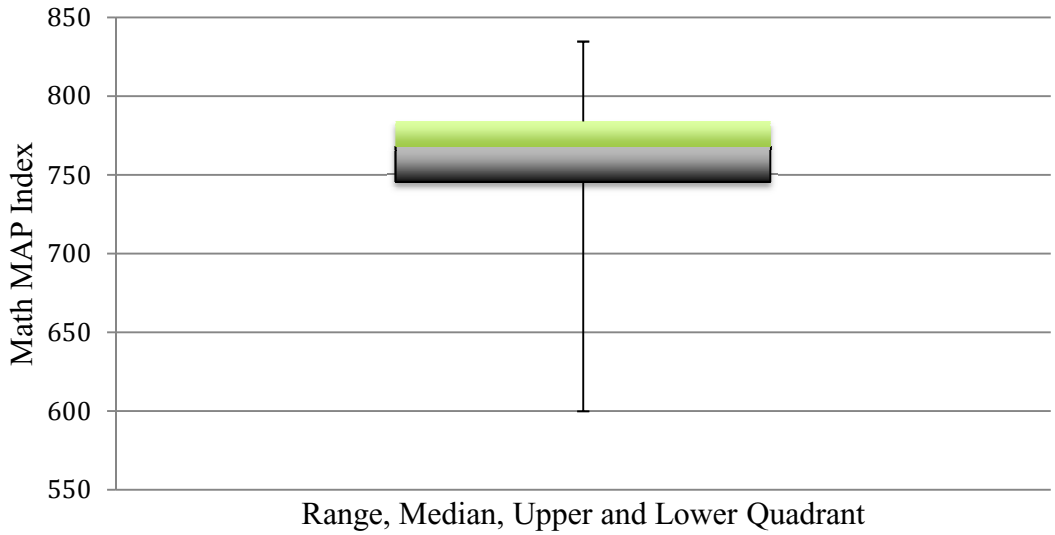

Figure 11. Box and whisker plot showing the range, median, upper quadrant, and lower quadrant of mathematics MAP index scores of schools in which sixth grade is a transition year.

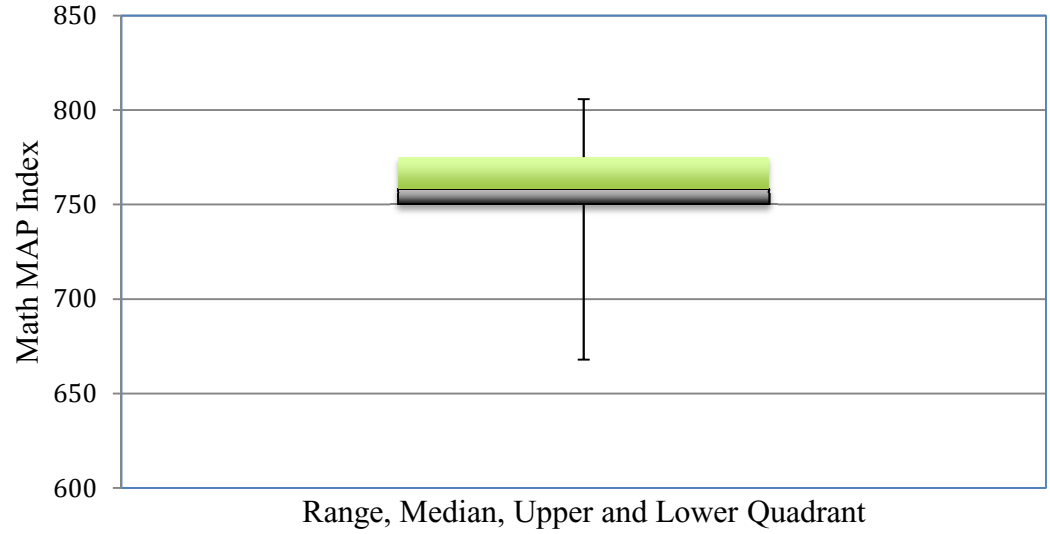

Figure 12. Box and whisker plot showing the range, median, upper quadrant, and lower quadrant of mathematics MAP index scores of schools in which sixth grade is a non-transition year.

Seventh grade middle school transition year. The third series of *t*-tests investigated mean differences for each of the dependent variables of English Language Arts MAP index scores and mathematics MAP index scores between the two independent seventh-grade groups of transitional year versus non-transitional year.

Investigation of the mean English Language Arts MAP index scores for each transition group indicated districts that did not transition students to middle school in seventh grade had a mean score of 766.59 with a standard deviation of 27.23. Districts that transitioned students to middle school in the seventh grade had a mean score of 769.21 with a standard deviation of 24.09. The *t* score measuring the difference of the means between the seventh-grade groups of transition versus non-transition was determined to be -0.68. This score did not exceed 1.96 required to be significant at the α = .05 value and, therefore, indicated the difference was not significant. Results are displayed in Table 6 and in Figures 13, 14, and 15.

Table 6

Independent Samples t-Test for Seventh Grade English Language Arts MAP Index Scores by Transition Year Status

	English Language Arts MAP Index Scores				
Seventh Grade Transition Year	*M*	*SD*	Mean difference	*t*(294)	*p*
No	766.59	27.23	-2.62	-0.68	.499
Yes	769.21	24.09			

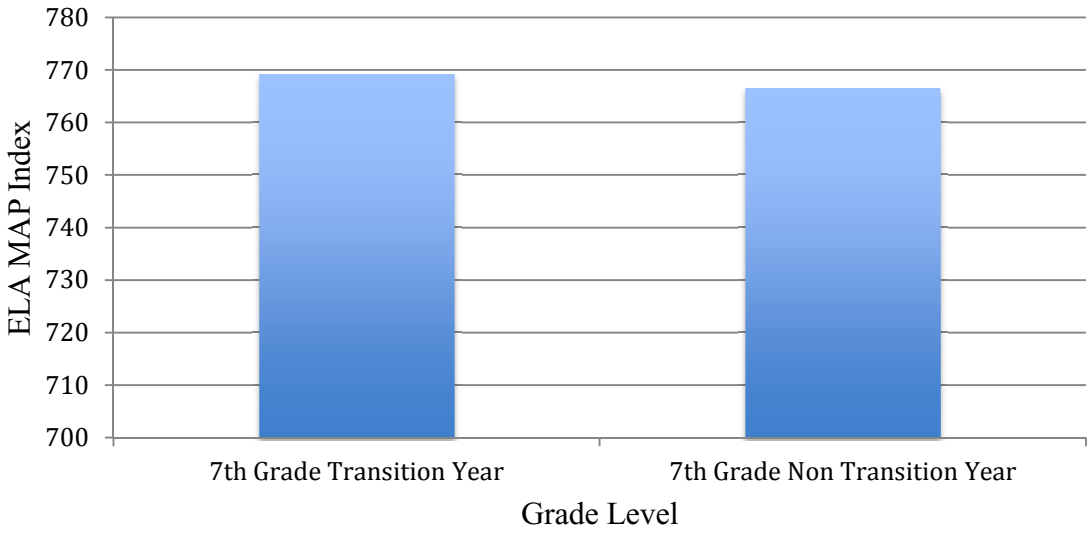

Figure 13. Bar graph showing mean English Language Arts MAP index scores of all seventh grade transition and non-transition year cohorts during the 2011-2012 school year.

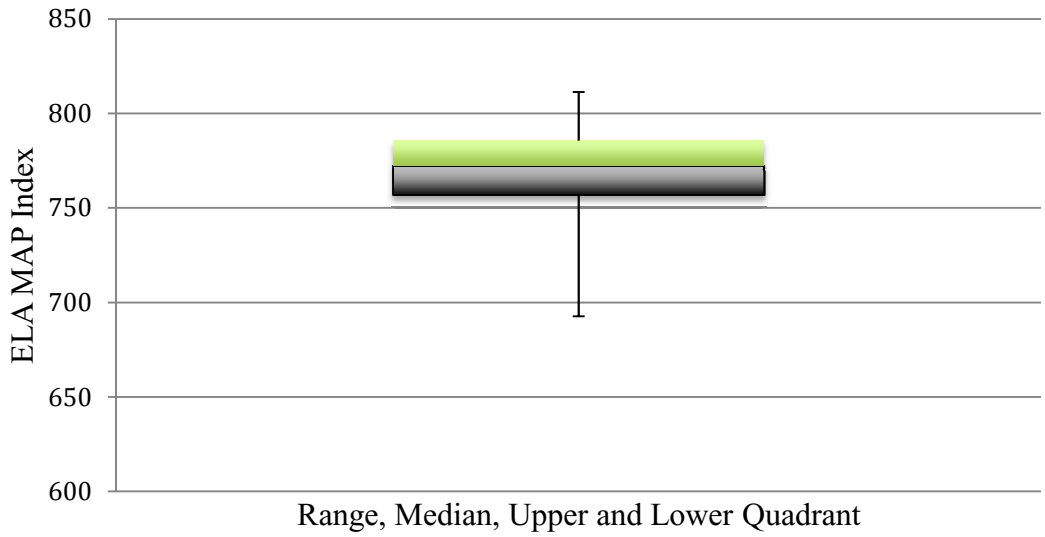

Figure 14. Box and whisker plot showing the range, median, upper quadrant, and lower quadrant of English Language Arts MAP index scores of schools in which seventh grade is a transition year.

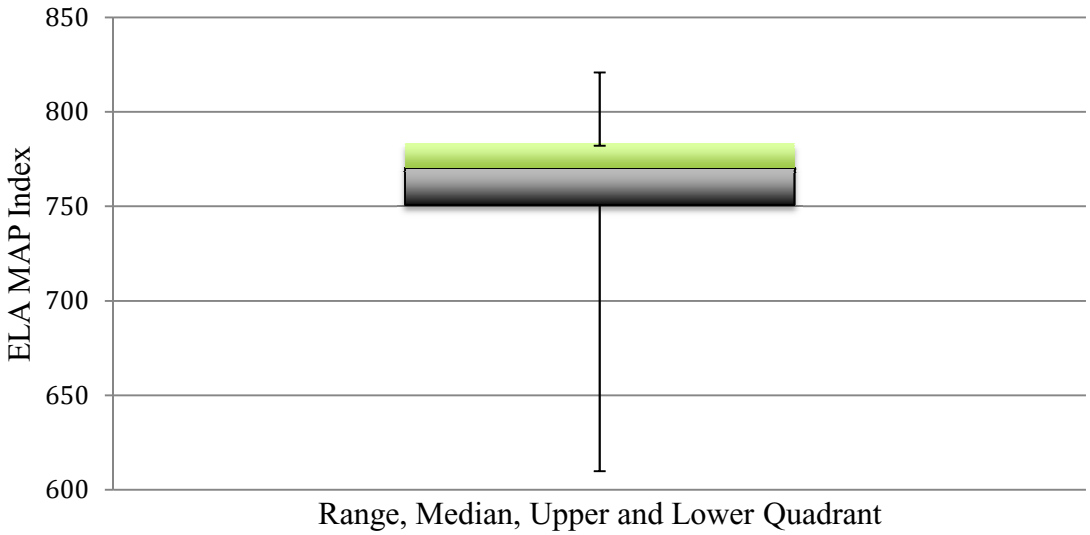

Figure 15. Box and whisker plot showing the range, median, upper quadrant, and lower quadrant of English Language Arts MAP index scores of schools in which seventh grade is a non-transition year.

Investigation of the mean mathematics MAP index scores for each transition group indicated districts that did not transition students to middle school in seventh grade had a mean score of 770.18 with a standard deviation of 30.50. Districts that transitioned students to middle school in the seventh grade had a mean score of 773.33with a standard deviation of 27.27. The *t* score measuring the difference of the means between the seventh-grade groups of transition versus non-transition was determined to be -0.72. This score did not exceed 1.96 required to be significant at the $\alpha = .05$ value and, therefore, indicated the difference was not significant. Results are displayed in Table 7 and in Figures 16, 17, and 18.

Table 7

Independent Samples t-Test for Seventh Grade Mathematics MAP Index Scores by Transition Year Status

Seventh Grade Transition Year	Mathematics MAP Index Scores		Mean difference	*t*(294)	*p*
	M	*SD*			
No	770.18	30.50	-3.15	-0.72	.470
Yes	773.33	27.27			

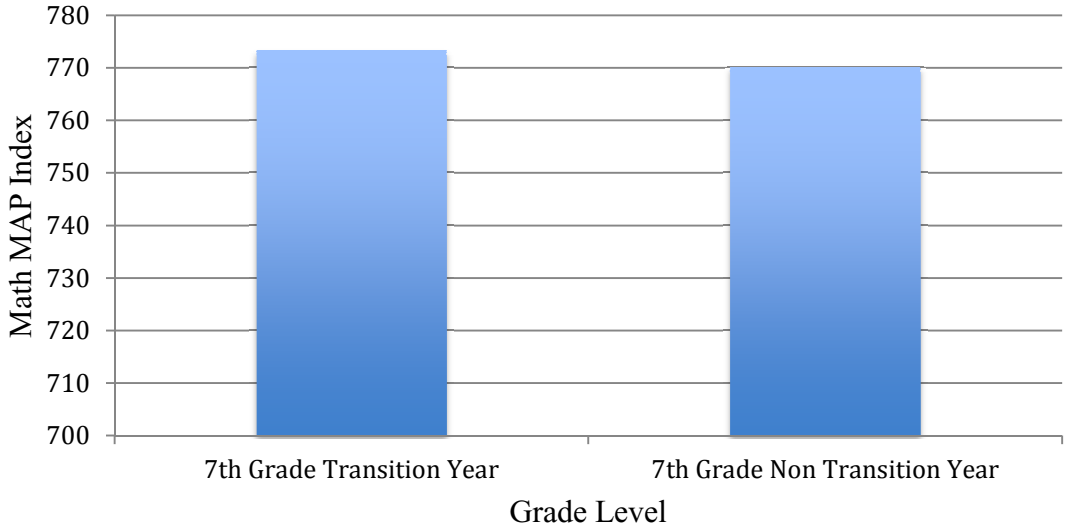

Figure 16. Bar graph showing mean Mathematics MAP index scores of all seventh grade transition and non-transition year cohorts during the 2011-2012 school year.

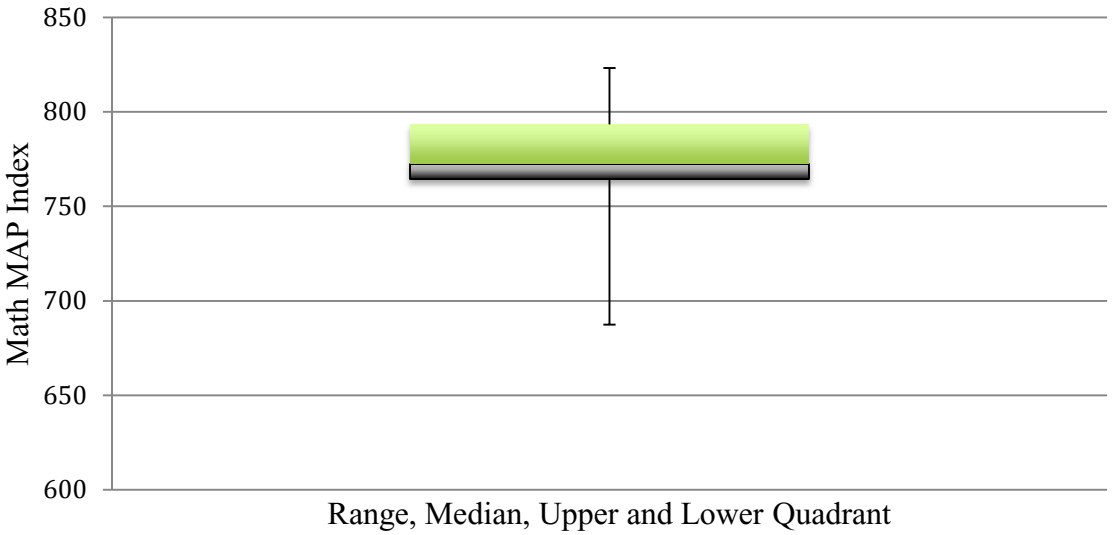

Figure 17. Box and whisker plot showing the range, median, upper quadrant, and lower quadrant of mathematics MAP index scores of schools in which seventh grade is a transition year.

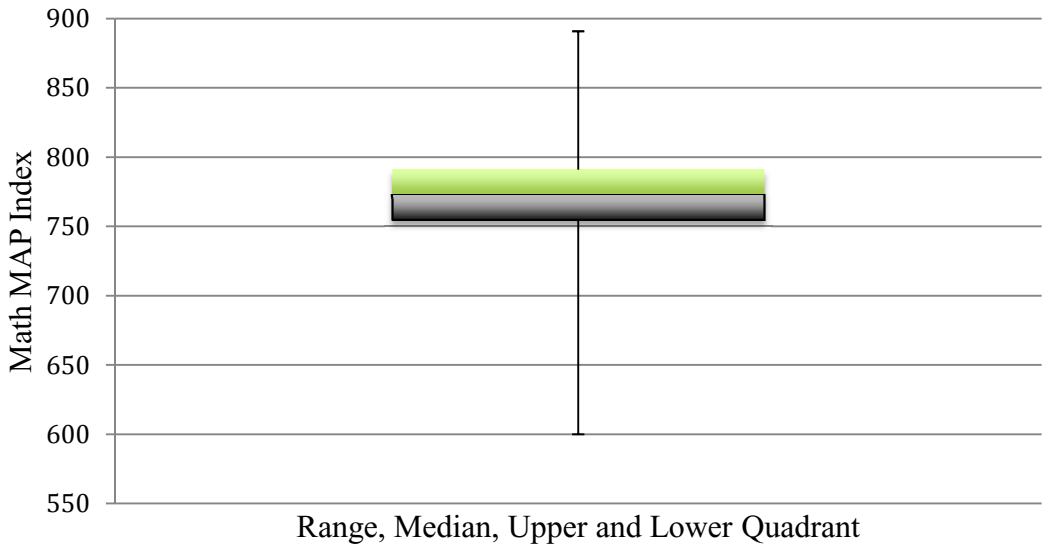

Figure 18. Box and whisker plot showing the range, median, upper quadrant, and lower quadrant of mathematics MAP index scores of schools in which seventh grade is a non-transition year.

Conclusion 1 as it relates to research question 1. Analyses via a series of independent samples *t*-tests indicated significant mean differences in English Language Arts MAP index scores between the fifth-grade groups of transition year versus non-transition year. A significant mean difference was also found in the mathematics MAP index scores between the two fifth-grade student groups; therefore, null hypothesis 1 was rejected. There was sufficient evidence to indicate a difference in student achievement during the transitional year when compared to non-transitional years.

The second method selected to test Research Question 1 was two within groups repeated measures ANOVAs. The first within groups repeated measures ANOVA was performed for the dependent variable of English Language Arts MAP index score and the second for the dependent variable of mathematics MAP index score. Both ANOVA analyses included a within-groups independent variable of *year* with three levels: (a) pre-transition year; (b) transition year; and (c) post-transition year. The results of the within-groups repeated measures ANOVAs are presented according to each of the two dependent variable outcomes of the English Language Arts MAP index score and the mathematics MAP index score.

ANOVA for dependent variable of English Language Arts MAP index scores. A within groups repeated measures ANOVA was performed to investigate differences in mean English Language Arts MAP index scores over the three time periods: (a) pre-transition year; (b) transition year; (c) post-transition year. Grade level was not a variable in defining the groups. Grade level or timing of the transition year did not affect the categorization into the three groups. Results indicated a significant within-

groups main effect; therefore, a series of three paired samples *t*-tests were performed to compare the mean scores between time periods in order to determine which years significantly differed on the mean English Language Arts MAP index score.

A paired samples *t*-test was performed to compare the mean scores on the English Language Arts MAP index for the transition year versus pre-transition year. The mean transition year English Language Arts MAP index score was 762.69 with a standard deviation of 21.56. The mean pre-transition year English Language Arts MAP index score was 766.79 and the standard deviation was 22.68. With a t value of 2.83 at $\alpha = .01$ results were statistically significant and indicated a significant decrease in the scores on the English Language Arts MAP index for the transition year ($M = 762.69$, $SD = 21.56$) compared to the pre-transition year ($M = 766.79$, $SD = 22.68$; $t[148] = 2.83$, $p = .005$. Results are presented in Table 8 and in Figures 19, 20, 21, and 22.

Table 8

Paired Samples t-Test for English Language Arts MAP Index Scores, Pre-Transition and Transition Years

	English Language Arts MAP Index Scores				
Year	*M*	*SD*	Mean difference	*t*(148)	*p*
Pre-Transition	766.79	22.68	4.1	2.83	.005
Transition	762.69	21.56			

The second paired samples *t*-test was performed to compare the mean scores on the English Language Arts MAP index for the transition year versus the post-transition year. The mean transition year English Language Arts MAP index score was 762.69 with a standard deviation of 21.56. The mean post-transition year English Language Arts MAP index score was 767.84 and the standard deviation was 24.24. With a *t* value of -3.50 at $\alpha = .01$ results were statistically significant and indicated a significant increase in the scores on the English Language Arts MAP index scores for the post-transition year ($M = 767.84$, $SD = 24.24$) compared to the transition year ($M = 762.69$, $SD = 21.56$; $t[148] = -3.50$, $p = .001$). Results are presented in Table 9 and in Figures 19, 20, 21, and 22.

Table 9

Paired Samples t-Test for English Language Arts MAP Index Scores, Transition and Post-Transition Years

	English Language Arts MAP Index Scores				
Year	*M*	*SD*	Mean difference	*t*(148)	*p*
Transition	762.79	21.56	-5.05	-3.50	.001
Post-Transition	767.84	24.24			

The third paired samples *t*-test was performed to compare the mean scores on the English Language Arts MAP index for the pre-transition year versus the post-transition year. Results were not statistically significant between the two years $t(148) = -0.69$, $p = .490$. Results are presented on Table 10 and in Figures 19, 20, 21, and 22.

Table 10

Paired Samples t-Test for English Language Arts MAP Index Scores, Pre- and Post-Transition Years

	English Language Arts MAP Index Scores				
Year	*M*	*SD*	Mean difference	*t*(148)	*p*
Pre-Transition	766.79	22.68	-1.05	-0.69	.490
Post-Transition	767.84	24.24			

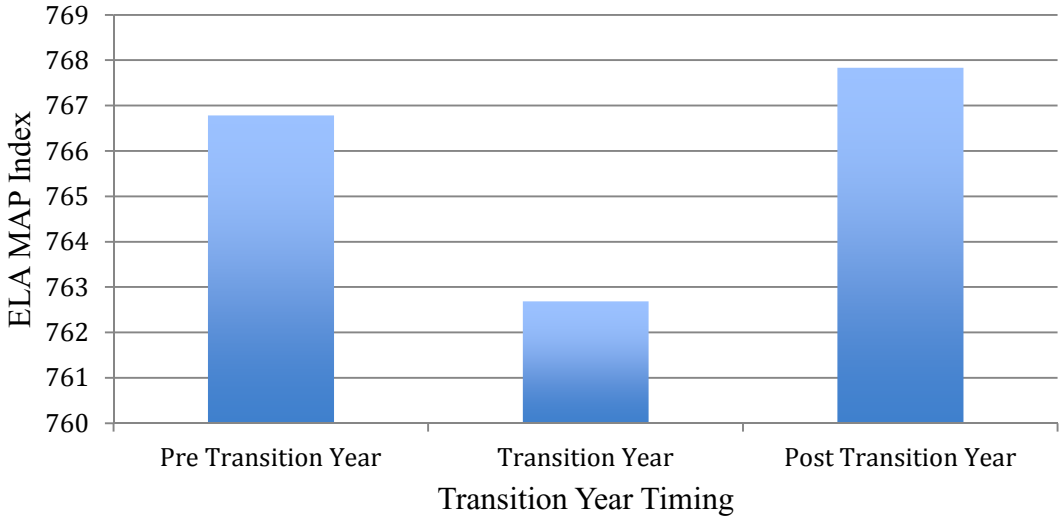

Figure 19. Bar graph showing mean English Language Arts MAP index scores of all pre-transition, transition, and post-transition year cohorts during the 2011-2012 school year.

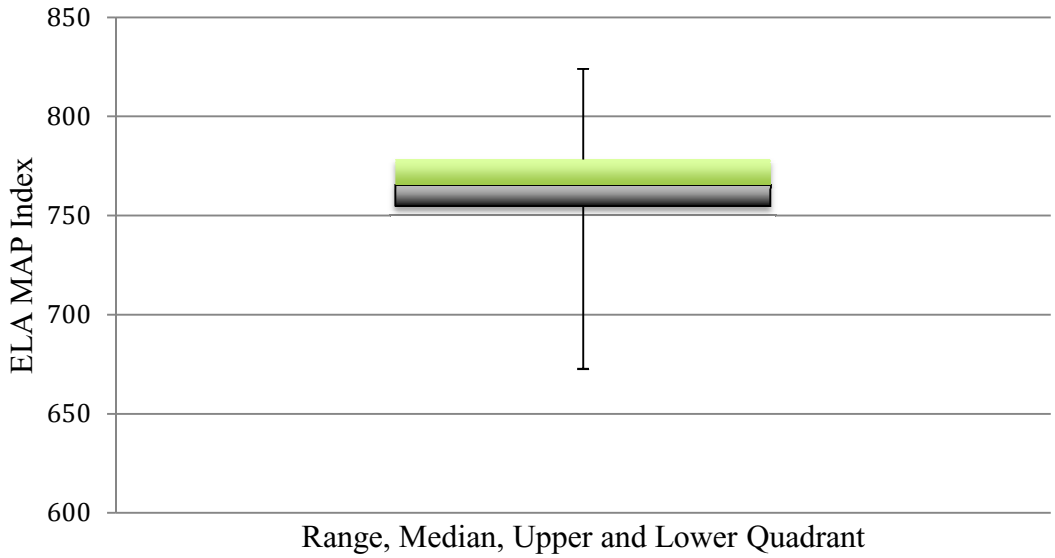

Figure 20. Box and whisker plot showing the range, median, upper quadrant, and lower quadrant of pre-transition year English Language Arts MAP index scores during the 2011-2012 school year.

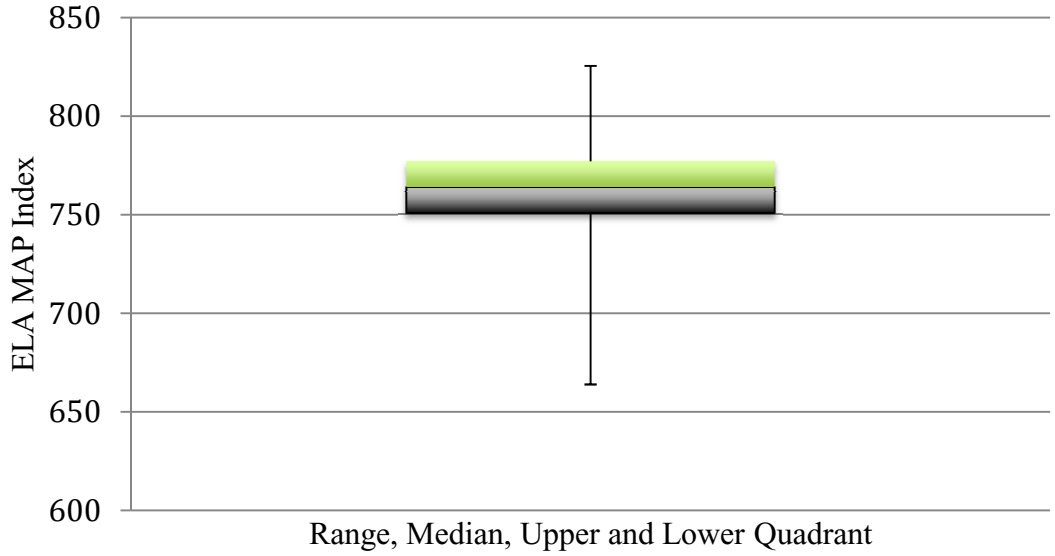

Figure 21. Box and whisker plot showing the range, median, upper quadrant, and lower quadrant of transition year English Language Arts MAP index scores during the 2011-2012 school year.

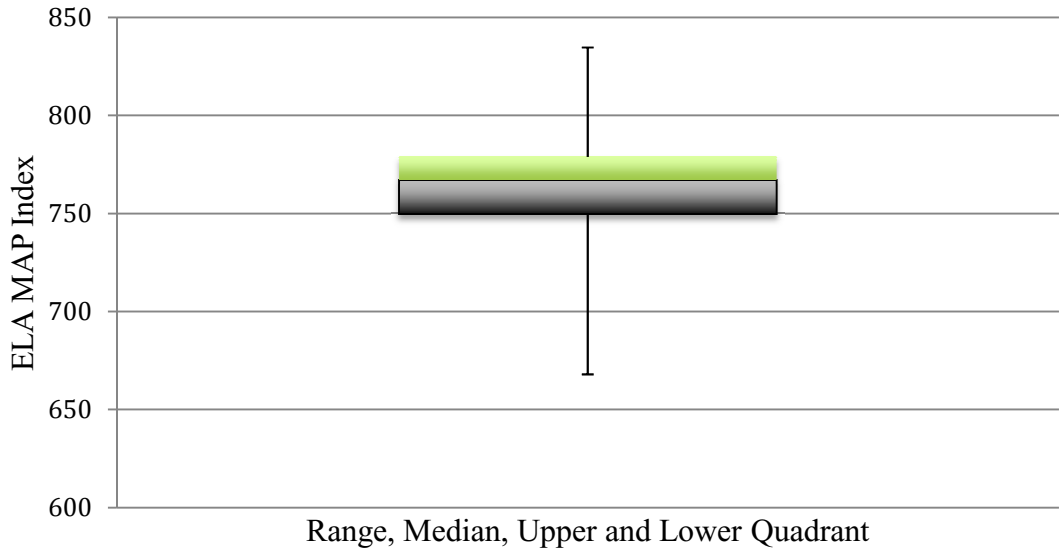

Figure 22. Box and whisker plot showing the range, median, upper quadrant, and lower quadrant of post-transition year English Language Arts MAP index scores during the 2011-2012 school year.

ANOVA for dependent variable of Mathematics MAP index scores. A within groups repeated measures ANOVA was performed to investigate differences in mean mathematics MAP index scores over the three time periods. Results indicated a significant within-groups main effect for time; therefore, three paired samples *t*-tests were performed to compare the mean scores between time periods in order to determine which years significantly differed on the mean mathematics MAP index score.

A paired samples *t*-test was performed to compare the mean scores on the mathematics MAP index for the transition year ($M = 764.09$, $SD = 25.92$) versus the pre-transition year ($M = 761.75$, $SD = 62.64$). Results were not statistically significant, $t(148) = -0.46$, $p = .646$. Results are presented in Table 11 and in Figures 23 to 26.

Table 11

Paired Samples t-Test for Mathematics MAP Index Scores, Pre-Transition and Transition Years

	Mathematics MAP Index Scores				
Year	*M*	*SD*	Mean difference	*t*(148)	*p*
Pre-Transition	761.75	62.64	-2.34	-0.46	.646
Transition	764.09	25.92			

A second paired samples *t*-test was performed to compare the mean scores on the mathematics MAP index for the transition year versus the post-transition year. The mean transition year mathematics MAP index score was 764.09 with a standard deviation of 25.92. The mean post-transition year mathematics MAP index score was 770.09 and the standard deviation was 28.08. With a *t* value of -3.13 at a *p* value of .002 results were statistically significant and indicated a significant increase in the scores on the mathematics MAP index scores for the post-transition year ($M = 770.09$, $SD = 28.08$) compared to the transition year ($M = 764.09$, $SD = 25.92$; $t = -3.13$, $p = .002$). Results are presented in Table 12 and in Figures 23, 24, 25, and 26.

Table 12

Paired Samples t-Test for Mathematics MAP Index Scores, Transition and Post-Transition Years

	Mathematics MAP Index Scores				
Year	*M*	*SD*	Mean difference	*t*(148)	*p*
Transition	764.09	25.92	-6.0	-3.13	.002
Post-Transition	770.09	28.08			

A third paired samples *t*-test was performed to compare the mean scores on the mathematics MAP index for the pre-transition year versus the scores on the mathematics MAP index for the post-transition year. The mean pre-transition year score 761.75 with a standard deviation of 62.64. The mean post-transition year score was 770.09 with a standard deviation of 28.08. The mean difference was -8.34 with a *t* value of -1.74 at a *p* value of .084. Results were not statistically significant between the two years, $t(148) = -1.74$, $p = .084$. Results are presented in Table 13 on page 84 and in Figures 23, 24, 25, and 26.

Table 13

Paired Samples t-Test for Mathematics MAP Index Scores, Pre- and Post-Transition Years

Year	Mathematics MAP Index Scores		Mean difference	*t*(148)	*p*
	M	*SD*			
Pre-Transition	761.75	62.64	-8.34	-1.74	.084
Post-Transition	770.09	28.08			

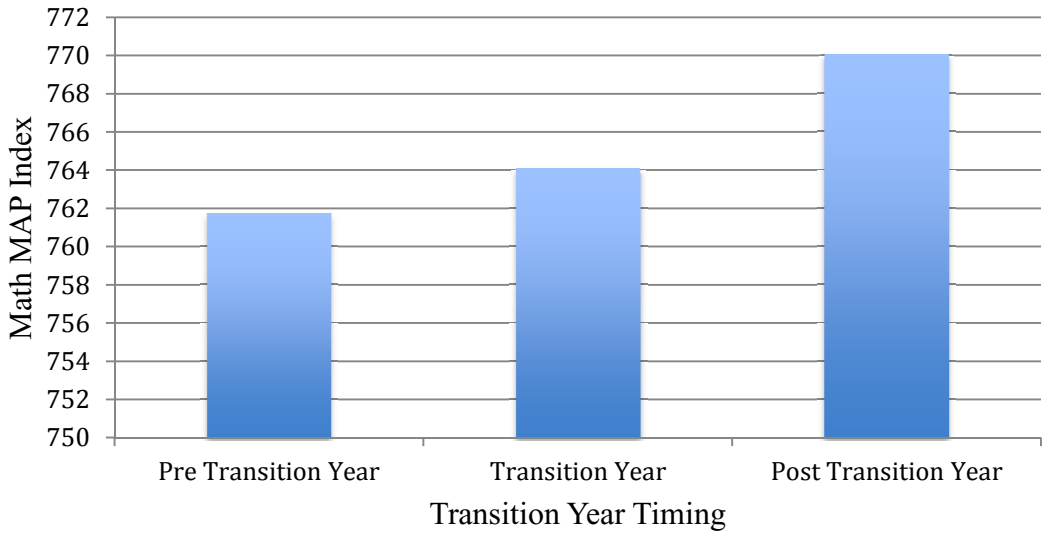

Figure 23. Bar graph showing mean Mathematics MAP index scores of all pre-transition, transition, and post-transition year cohorts during the 2011-2012 school year.

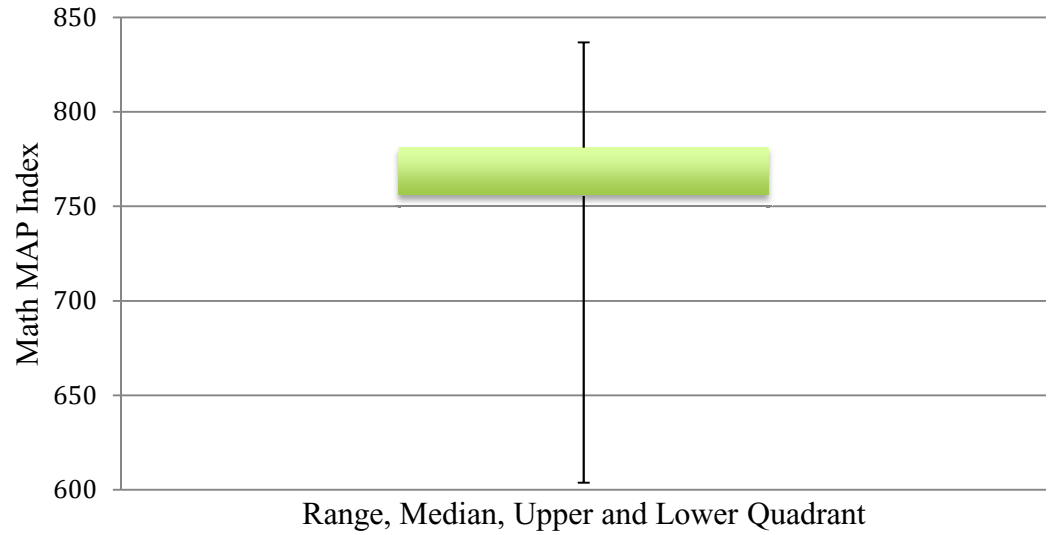

Figure 24. Box and whisker plot showing range, median, upper quadrant, and lower quadrant of pre-transition year mathematics MAP index scores during the 2011-2012 school year.

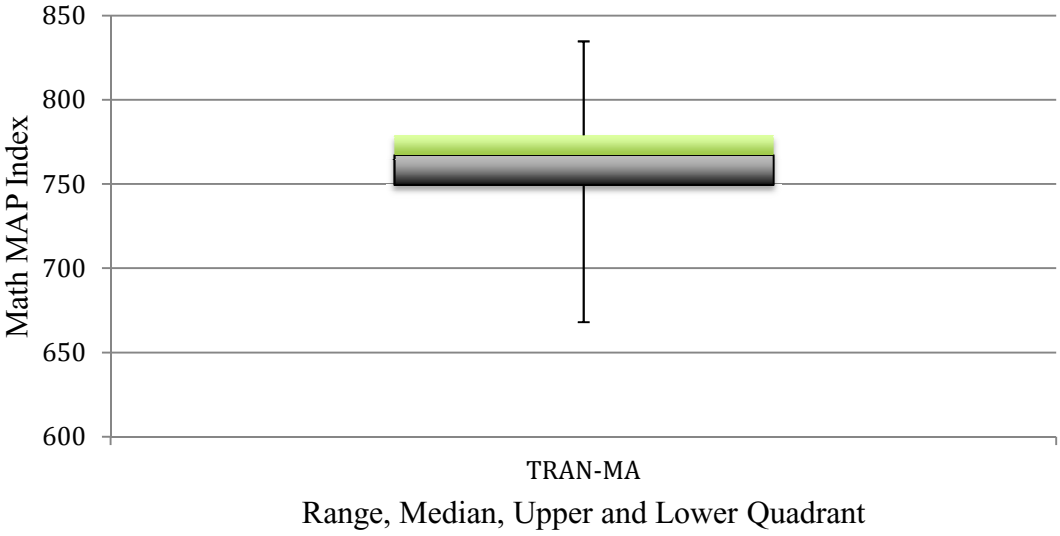

Figure 25. Box and whisker plot showing range, median, upper quadrant, and lower quadrant of transition year mathematics MAP index scores during the 2011-2012 school year.

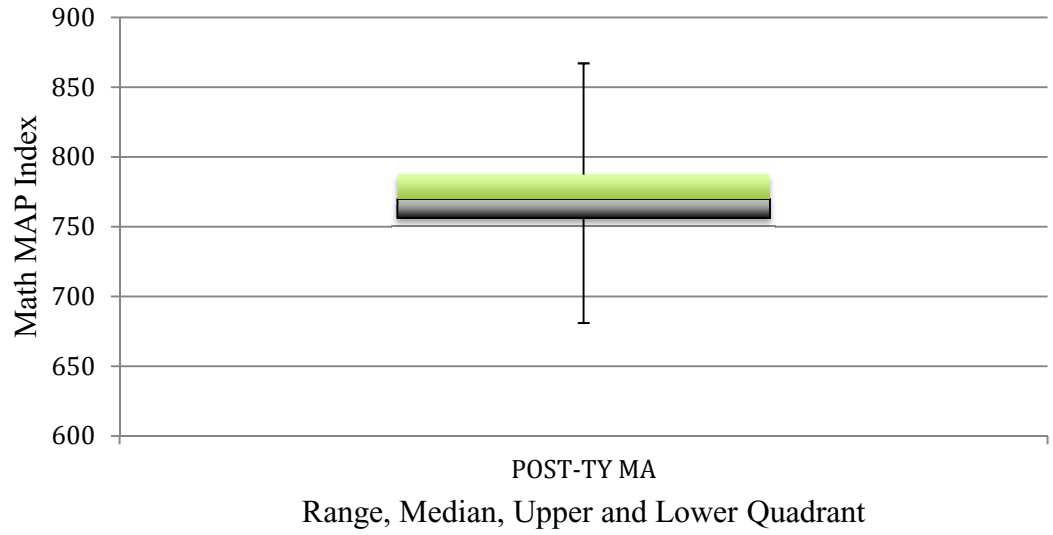

Figure 26. Box and whisker plot showing range, median, upper quadrant, and lower quadrant of post-transition year mathematics MAP index scores during the 2011-2012 school year.

Conclusion 2 as it relates to research question 1. Inferential analyses via two within groups repeated measures ANOVAs, followed by a series of paired samples *t*-tests, indicated that a significant decrease in the scores were found on the English Language Arts MAP index between the transition year and the pre-transition year. A significant increase was found in the scores on the English Language Arts MAP index between the post-transition year and the transition year. A significant increase was found in the scores on the mathematics MAP index between the post-transition year and the transition year; therefore, null hypothesis 1 was rejected. There was sufficient evidence to indicate a difference in student achievement during the transitional year when compared to non-transitional years.

Research Question 2

What is the difference in student achievement among varying transition years?

$H2_0$: There is not a significant difference in student achievement among varying transition years.

$H2_a$: There is a significant difference in student achievement among varying transition years.

Two one-way between groups analysis of variance tests (ANOVAs) were performed, one for each of the dependent variables of English Language Arts MAP index scores and mathematics MAP index scores.

The two ANOVA analyses included the independent variable of transitional grade level with three categories of (a) fifth grade, (b) sixth grade, and (c) seventh grade. The two dependent variables used in analysis were English Language Arts MAP index scores and mathematics MAP index scores. Tables 13 and 15 present a summary of the ANOVA overall model fit. Tables 14 and 16 present a summary of findings for the post hoc analyses of the ANOVA results via Tukey's honestly significant difference (HSD) tests.

The first one-way between groups ANOVAs was conducted to explore the impact of year of grade transition on the English Language Arts MAP index score variable. The grade levels were divided into three cohorts (Cohort 1: fifth-grade transition year; Cohort 2: sixth-grade transition year; Cohort 3: seventh-grade transition year. Cohen and Cohen (1984) defined strength of association defined by correlation coefficients (effect size) as small (+/- .10 to .29), medium (+/- .30 to .49) and large (+/- .50 to 1.0). The effect size of the mean score differences between the cohort groups was small ($\eta^2 = .03$). Results were

significant for the model, indicating there was a statistically significant mean difference in the English Language Arts MAP index score among the three transition year cohorts, $F(2,297) = 5.29$, $p = .006$. Post hoc comparisons using Tukey's HSD test indicated that the mean score for the seventh-grade transitional year ($M = 769.21$, $SD = 24.09$) was significantly greater than both fifth-grade transitional year ($M = 755.61$, $SD = 17.26$) and the sixth-grade transitional year ($M = 758.39$, $SD = 26.32$). There was not a significant difference of the means found between the fifth-grade transitional year and the sixth-grade transitional year. Results are presented in Tables 14 and 15 and in Figure 27.

Table 14

Repeated Measures Analysis of Variance for English Language Arts MAP Index Scores by Transitional Grade Level

	English Language Arts MAP Index Scores				
Transition Year	*M*	*SD*	*F*(2, 297)	*p*	η^2
Fifth Grade	755.61	17.26	5.29	.006	.03
Sixth Grade	758.39	26.32			
Seventh Grade	769.21	24.09			

Table 15

Post Hoc Comparisons of Repeated Measures ANOVA for English Language Arts MAP Index Scores

Cohort (I) Transition Year	Cohort (J)	Mean Difference (I – J)	*SE*	*p*
Fifth Grade	Sixth Grade	-2.79	3.98	.763
Fifth Grade	Seventh Grade	-13.60	4.79	.013
Sixth Grade	Seventh Grade	-10.82	3.67	.010

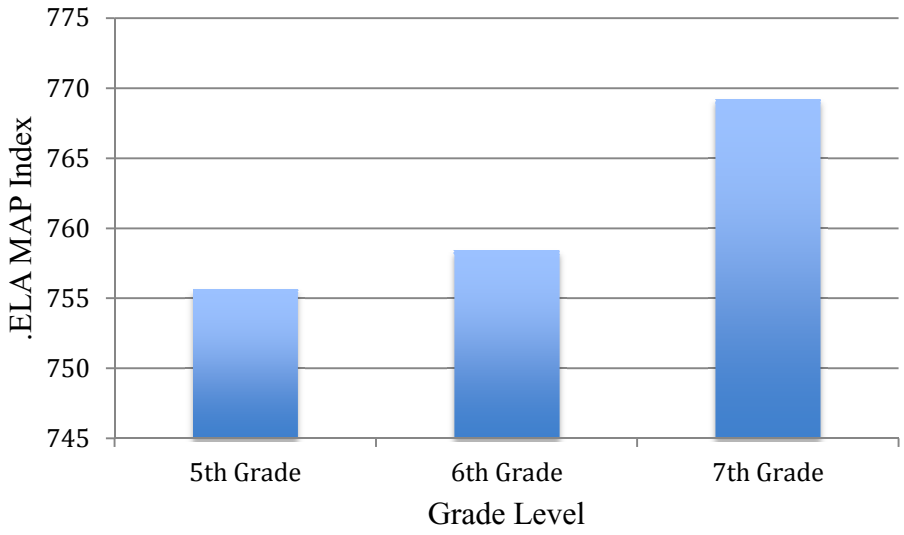

Figure 27. Bar graph comparing mean fifth, sixth, and seventh grade English Language Arts MAP index scores for the 2011-2012 school year.

The second one-way between groups ANOVA was conducted to explore the impact of grade-year transition on the mathematics MAP index score variable. The grade levels were divided into three cohorts (Cohort 1: fifth-grade transition year; Cohort 2:

sixth-grade transition year; Cohort 3: seventh-grade transition year). The effect size of the mean score differences among the cohort groups was small ($\eta^2 = .04$). Results were significant for the model, indicating there was a statistically significant mean difference in the mathematics MAP index score between the three cohorts, $F(2,297) = 6.74$, $p = .001$. Post-hoc comparisons using Tukey's HSD test indicated that the mean score for Cohort 1 ($M = 752.89$, $SD = 24.71$) was significantly lower than Cohort 3 ($M = 773.33$, $SD = 27.27$). Significant findings were not found between any of the other cohorts. Results are presented in Tables 16 and 17 and in Figure 28.

Table 16

Repeated Measures Analysis of Variance for Mathematics MAP Index Scores by Transitional Grade Level

	Mathematics MAP Index Scores				
Transition Year	*M*	*SD*	*F*(2, 297)	*p*	η^2
Fifth Grade	752.89	24.71	6.74	.001	.04
Sixth Grade	763.55	29.96			
Seventh Grade	773.33	27.27			

Table 17

Post Hoc Comparisons of Repeated Measures ANOVA for Mathematics MAP Index Scores

Cohort (I) Transition Year	Cohort (J)	Mean Difference (I – J)	*SE*	*p*
Fifth Grade	Sixth Grade	-10.66	4.63	.057
Fifth Grade	Seventh Grade	-20.44	5.57	.001
Sixth Grade	Seventh Grade	-9.78	4.27	.058

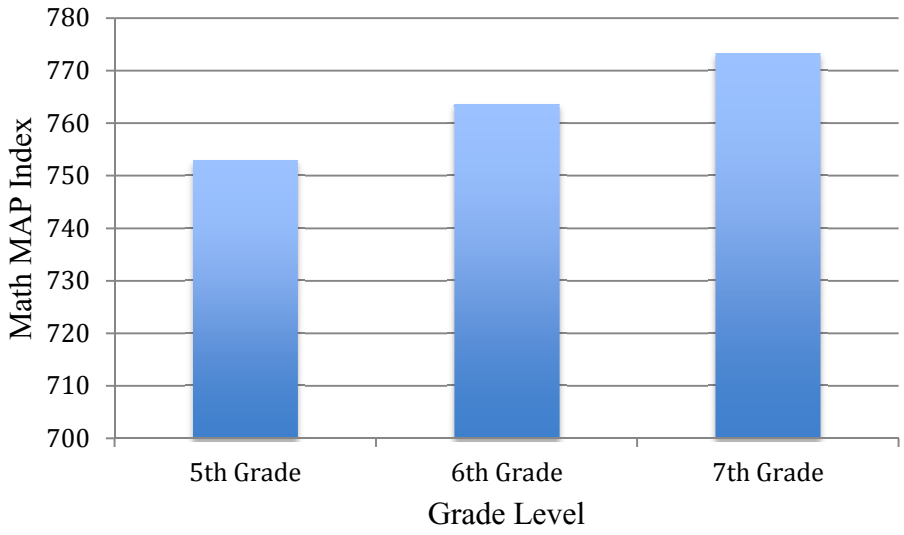

Figure 28. Bar graph comparing fifth, sixth, and seventh grade mean Mathematics MAP index scores for the 2011-2012 school year.

Conclusion as it relates to Research Question 2. The ANOVA tests indicated significant differences in mean scores among the three cohort groups. The mean English Language Arts MAP index score for the seventh-grade transitional year was significantly

higher than the scores for fifth-grade transitional year and the sixth-grade transitional year cohorts. The mean mathematics MAP index score for the seventh-grade transitional year was also significantly greater than the mean scores for the fifth-grade transitional year cohort; therefore, null hypothesis 2 was rejected. There was sufficient evidence to indicate differences in student achievement among varying transition years.

Research Question 3

What is the difference in eighth-grade achievement among varying grade configurations?

$H3_0$: There is not a significant difference in eighth-grade achievement across varying grade configurations.

$H3_a$: There is a significant difference in eighth-grade achievement across varying grade configurations.

Two analysis of variance tests (ANOVA) were performed, one for each of the dependent variables of English Language Arts MAP index eighth grade scores and mathematics MAP index eighth grade scores.

Both of the ANOVA analyses included the independent variable of middle school grade configurations with three categories: (a) fifth through eighth grade, (b) sixth through eighth grade, and (c) seventh through eighth grade. Post hoc analyses were not performed because the overall model fits of the ANOVA analyses were not statistically significant, indicating no mean differences between the cohort groups.

The first one-way between groups ANOVA was conducted to explore the impact of grade configurations on the eighth grade English Language Arts MAP index score. The grade configurations were divided into three cohorts (Cohort 1: fifth through eighth

grade; Cohort 2: sixth-eighth grade; Cohort 3: seventh-eighth grade). The means of all three cohorts were within a range of 1.9 MAP index points (fifth through eighth grades M = 771.45, SD = 22.26; sixth through eighth grades M = 769.59, SD = 27.32; seventh through eighth grades M = 770.49, SD = 24.72). There was not a statistically significant mean difference in the eighth grade English Language Arts MAP index score among the three cohorts, $F(2, 277) = 0.09$, $p = .910$. Results are presented in Table 18 and in Figures 29 to 32.

Table 18

Analysis of Variance for Eighth Grade English Language Arts MAP Index Scores by Middle School Grade Configuration

Middle School Grade Configuration	Eighth Grade English Language Arts MAP Index Scores				
	M	*SD*	*F*(2, 277)	*p*	η^2
Grades 5-8	771.45	22.26	0.09	.910	.01
Grades 6-8	769.59	27.32			
Grades 7-8	770.49	24.72			

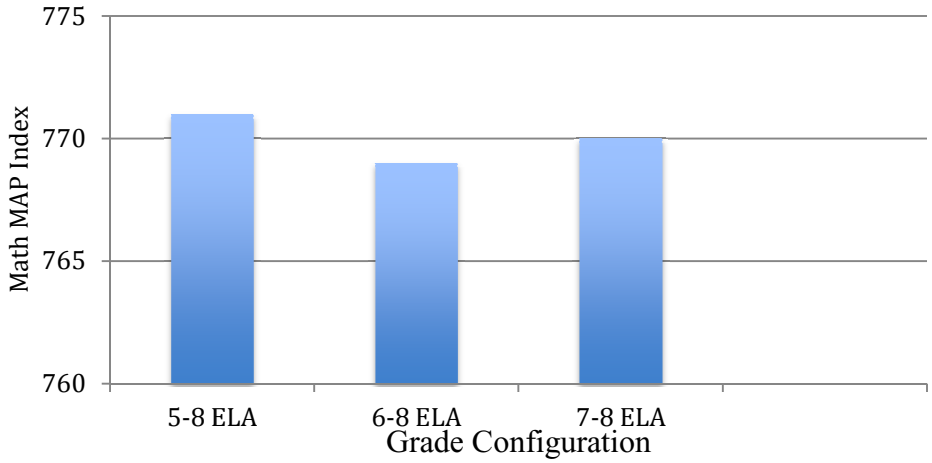

Figure 29. Bar graph showing mean eighth grade English Language Arts MAP index scores of Grades 5-8, Grades 6-8, and Grades 7-8 configurations during the 2011-2012 school year.

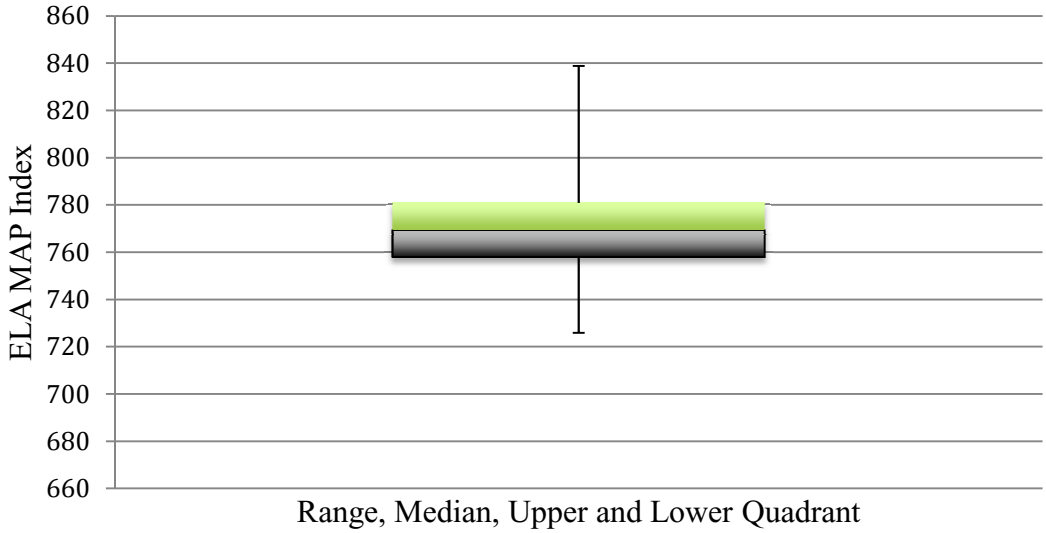

Figure 30. Box and whisker plot showing range, median, upper quadrant, and lower quadrant of eighth grade English Language Arts MAP index scores for Grades 5-8 configuration during the 2011-2012 school year.

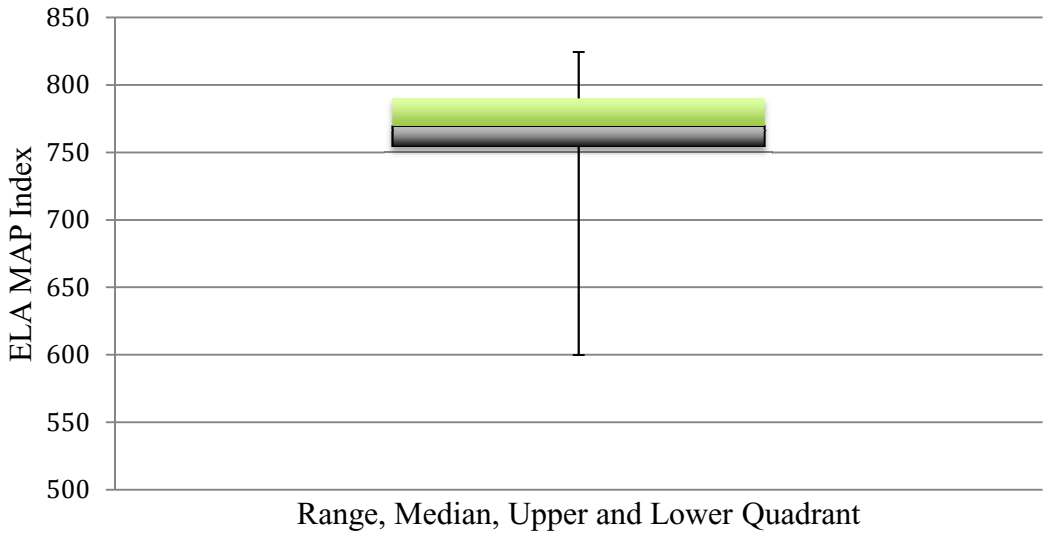

Figure 31. Box and whisker plot showing range, median, upper quadrant, and lower quadrant of eighth grade English Language Arts MAP index scores for Grades 6-8 configuration during the 2011-2012 school year.

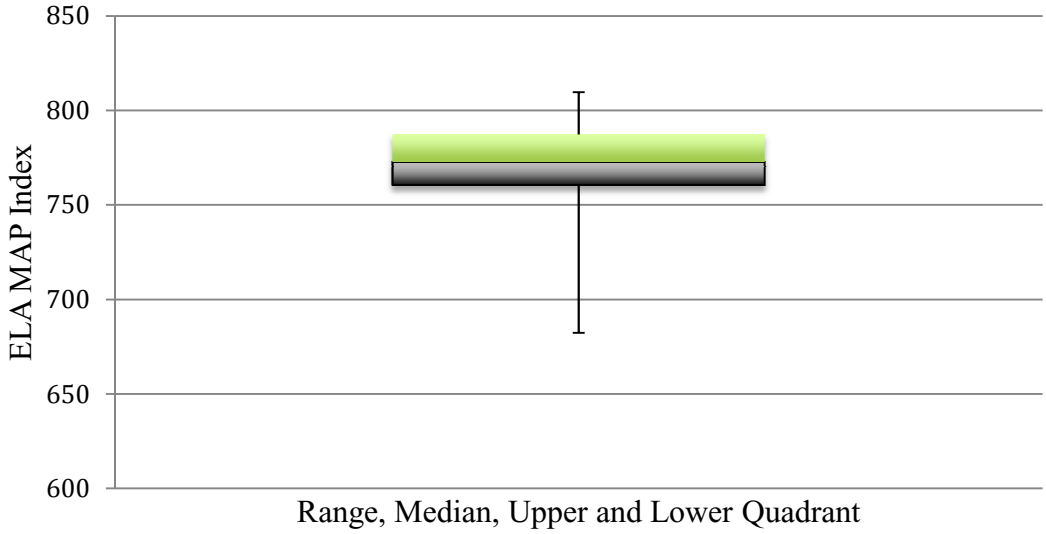

Figure 32. Box and whisker plot showing range, median, upper quadrant, and lower quadrant of eighth grade English Language Arts MAP index scores for Grades 7-8 configuration during the 2011-2012 school year.

The second one-way between groups ANOVA was conducted to explore the impact of grade configurations on the eighth grade mathematics MAP index score. The grade configurations were divided into three cohorts (Cohort 1: fifth-grade transition year; Cohort 2: sixth-grade transition year; Cohort 3: seventh-grade transition year). All three cohorts were within 1.02 MAP index points (fifth through eighth grades M = 762.11, SD = 27.64; sixth through eighth grades M = 761.09, SD = 33.75; seventh through eighth grades M = 761.11, SD = 28.56). There was not a statistically significant mean difference in the eighth grade mathematics MAP index score among the three cohorts, $F(2, 277) = 0.02$, $p = .983$. Results are presented in Table 19 and Figures 33, 34, 35, and 36.

Table 19

Analysis of Variance for Eighth Grade Mathematics MAP Index Scores by Middle School Grade Configuration

	Eighth Grade Mathematics MAP Index Scores				
Middle School Grade Configuration	*M*	*SD*	*F*(2, 277)	*p*	η^2
Grades 5-8	762.11	27.64	0.02	.983	.00
Grades 6-8	761.09	33.75			
Grades 7-8	761.11	28.56			

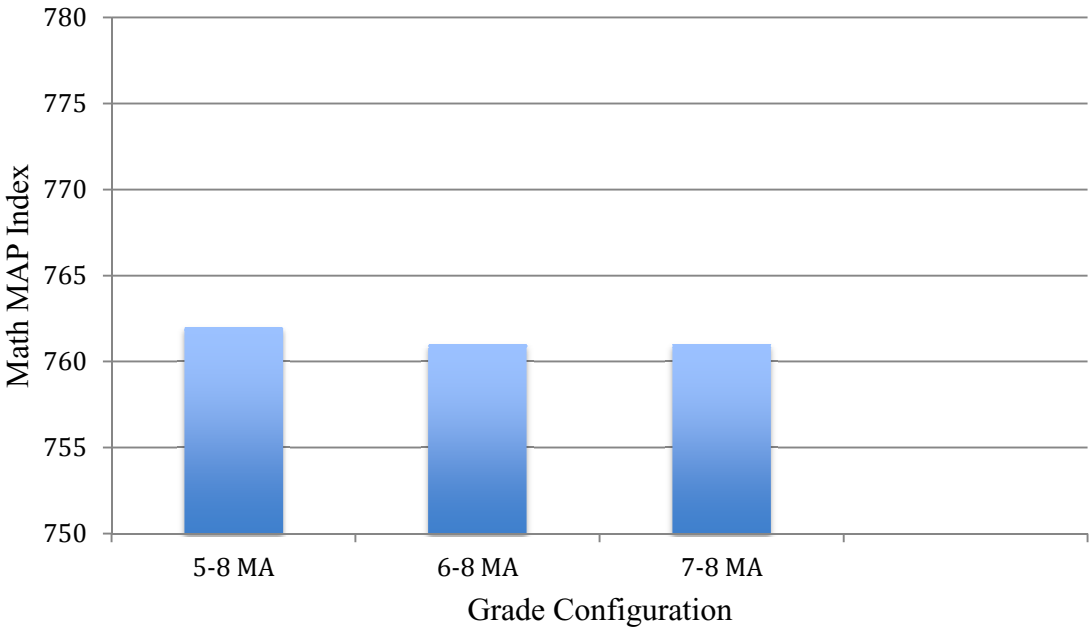

Figure 33. Bar graph showing mean eighth grade mathematics MAP index scores of Grades 5-8, Grades 6-8, and Grades 7-8 configurations during the 2011-2012 school year.

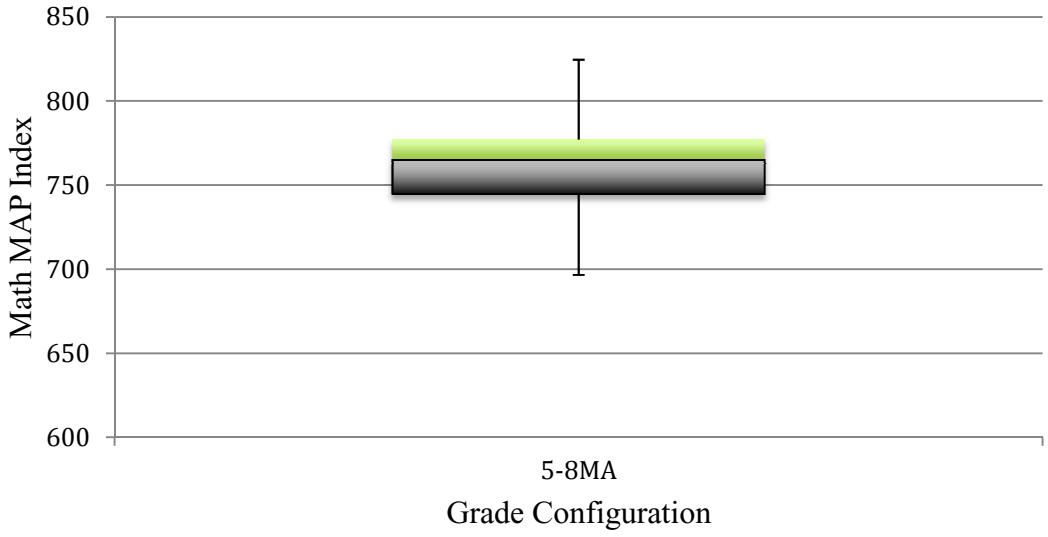

Figure 34. Box and whisker plot showing range, median, upper quadrant, and lower quadrant of eighth grade mathematics MAP index scores for Grades 5-8 configuration during the 2011-2012 school year.

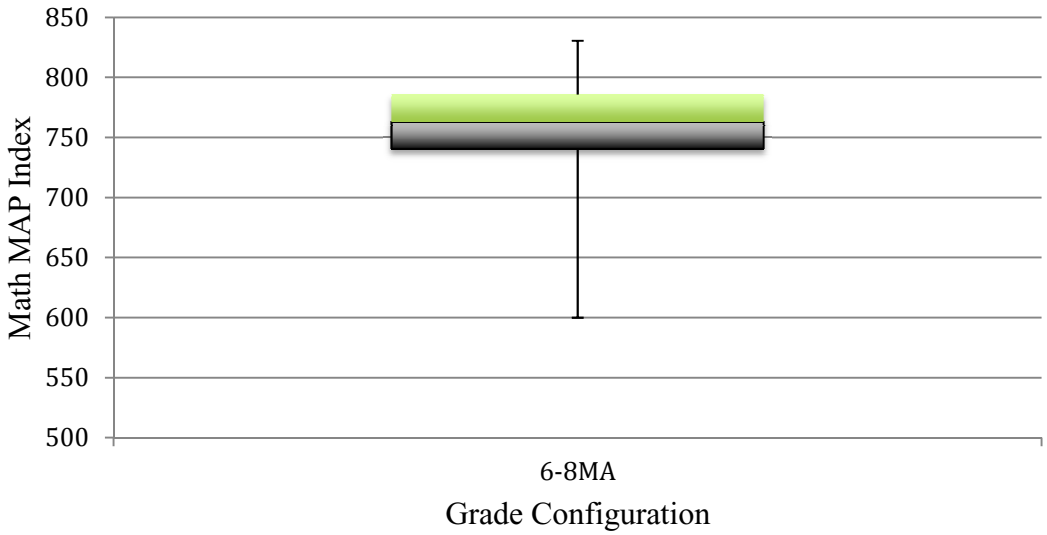

Figure 35. Box and whisker plot showing range, median, upper quadrant, and lower quadrant of eighth grade mathematics MAP index scores for Grades 6-8 configuration during the 2011-2012 school year.

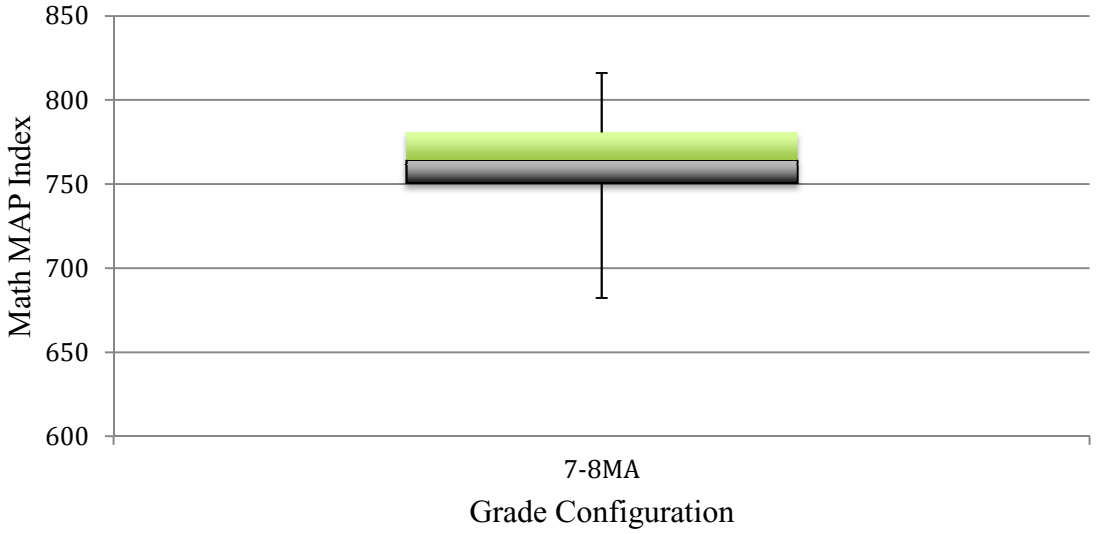

Figure 36. Box and whisker plot showing range, median, upper quadrant, and lower quadrant of eighth grade mathematics MAP index scores for Grades 7-8 configuration during the 2011-2012 school year.

Conclusion as it relates to research question 3. The ANOVA tests did not indicate statistically significant differences among the cohort groups on the eighth grade English Language Arts or mathematics MAP index scores; therefore, null hypothesis 3 was not rejected. There was not sufficient evidence to indicate a difference in eighth-grade achievement across varying grade configurations.

Summary

Chapter Four began with a presentation of the results of the required assumptions for the inferential analyses of ANOVA and *t*-tests. The results of the hypotheses tests of the three research questions were presented next. Significant results were found for Research Questions 1 and 2. Findings for Research Question 3 were not statistically significant. The summary of the study, findings, conclusions, implications, and recommendations are presented in Chapter Five.

Chapter Five: Conclusions and Recommendations

Middle school is a pivotal time during a student's educational career and occurs at one on the most turbulent periods in human development (Wormeli, 2011). The grade-level configuration of most school districts has a transition year during this time of development (U.S. Department of Education, 2013). School configurations for early adolescent and adolescent children are varied due to strong opinions, fiduciary constraints, and logistical reasoning's (Wyant & Mathis, 2007).

Trends in grade-level configurations, such as the decrease in junior high schools in the 1960s, the rise of grades 6-8 middle schools in the 1970s, and a current increase in the number of kindergarten through eighth grade schools cause administrators to continue to search for the best middle level grade configuration (Hough, 2009). Researchers cite several reasons by school districts for switching back to K-8 configurations. The reasons include student performance, dissatisfaction with traditional middle schools, a desire for smaller schools and class sizes, improved dropout rates, better behavior, and increased attendance (Hough, 2009). Current and past research has not created a consensus on the best school configuration to meet the intellectual needs of young adolescents (Wyant & Mathis, 2007).

This study examined Missouri achievement scores on the state assessment examinations before, during, and after the transition year to middle school. Although students in Missouri were assessed in science, the research revolved around fifth through eighth grade achievement in mathematics and English Language Arts. Cohort groups were organized based on timing of the transition, grade configurations, and the presence of a transition during the 2011-2012 school year. Significant differences in student

achievement were found in certain aspects of the study. A summary of the study, responses to research questions, conclusions, implications for practice, and recommendations for further research are contained in this chapter.

Summary of the Study

The purpose of this study was to investigate the difference in student achievement related to the transition year and to provide information to school administration regarding transition years and students achievement. To address the purpose, a quantitative study was designed to investigate the difference, if any, exists in student achievement during the transition years of middle school. Mean MAP index scores of cohort groups were compared to determine if the difference in scores between the groups.

Three questions involving middle school transitions were addressed in this study. The first question was: What is the difference in student achievement between the transition year and non-transition year? The dependent variables for this question were (a) English Language Arts MAP index scores and (b) mathematics MAP index scores. The investigation of this question used two different sets of data. The first set of data included cohorts in fifth, sixth, and seventh grade. Cohorts were compared to each other based on the existence of a transition year in the grade level. The second test of this question utilized randomly selected school districts. Cohorts were disaggregated into three groups regardless of grade level. Cohorts were assigned to (a) pre-transition year, (b) transition year, and (c) post-transition year. A series of *t*-tests and an ANOVA were applied to investigate the mean differences for each of the dependent variables.

Investigation of the difference in student achievement between varying transition years was addressed in the second question of the study. Two one-way between groups

ANOVAs were performed, one for each of the dependent variables of (a) English Language Arts MAP index scores and (b) mathematics MAP index scores. The two ANOVAs included the independent variable of transitional grade level with three categories of (a) fifth grade, (b) sixth grade, and (c) seventh grade. The two dependent variables were (a) English Language Arts MAP index scores and (b) mathematics MAP index scores.

Investigation of the difference in eighth-grade student achievement between varying grade configurations was addressed in question three. Three grade configurations served as the independent variable. Cohorts were assigned to one of three categories based on their grade configuration: (a) fifth through eighth grades, (b) sixth through eighth grades, and (c) seventh through eighth grades. Eighth grade English Language Arts MAP index scores and eighth grade mathematics MAP index scores served as the dependent variables. Two ANOVAs were performed; one for each of the dependent variables.

Findings

Research question 1. A significant difference in student achievement was found between the two independent fifth-grade groups in English Language Arts. Index scores for each group indicated that cohorts score higher on the MAP when districts do not transition students to middle school in the fifth grade when compared to districts that do transition in the fifth grade. The mean score for fifth-grade cohorts not in a transition year was 761.60 (SD = 34.79), while mean cohort scores during the transition year was 755.61 (SD = 17.26).

Mathematics assessment scores mirrored English Language Arts scores with a significant difference in student achievement found between the two independent fifth-grade groups. Index scores for each group indicated that cohort groups scored higher when districts did not transition students to middle school in the fifth grade when compared to districts that do transition in the fifth grade. The mean score for cohorts without a transition year was 764.11 (*SD* = 35.91), while mean cohort scores during the transition year was 752.89 (*SD* = 24.71).

Cohort groups in the sixth grade did not show a statistically significant difference in student achievement. Although not significant, cohort groups achieved higher mean scores while in a transition year in both English Language Arts and mathematics during the sixth-grade year. The mean score during the transition year in English Language Arts was 758.39 (*SD* = 26.32), while the non-transition year mean score was 754.90 (*SD* = 21.18). The mean score during the sixth-grade transition year in mathematics was 763.55 (*SD* = 29.96), while the non-transition year mean score was 759.49 (*SD* = 24.68).

Seventh-grade transition year achievement results aligned with the results of sixth-grade achievement. Significant differences between transition year and non-transition year scores were not attained. The English Language Arts mean score during the transition year was 769.21 (*SD* = 24.09), and the non-transition year mean score during the seventh grade was 766.59 (*SD* = 27.23).

Significant differences in English Language Arts MAP index scores were found between the transition year and pre-transition year. The mean score for cohorts in a pre-transition year was 4.10 MAP index points higher than cohorts in a transition year. A significant decrease in student achievement was found between the pre-transition year

and post-transition year. The results of the comparison between the transition year and post-transition year were reflective of the results of the comparison of the pre-transition year and post transition year. Cohorts in a post-transition year had a significantly higher mean MAP index score. Post-transition year scores were 7.8 MAP index scores higher than transition year scores. Significant differences in student achievement were not found when comparing pre-transition year achievement to post-transition year achievement.

In both scenarios, the null hypothesis was rejected for Question 1. There was sufficient evidence to indicate a difference in student achievement during the transitional year when compared to non-transitional years. Students in fifth grade scored significantly higher when they were not involved in a transition year to middle school in both English Language Arts and mathematics. A significant decrease in scores was found on the English Language Arts assessment between the transition year and the pre-transition year, and a significant increase was found on the English Language Arts MAP index scores between the post-transition year and the transition year. Significant differences on the mathematics assessment were found between the post-transition year and the transition year but not between the pre-transition year and transition year.

Research question 2. What is the difference in student achievement among varying transition years? A significant difference in achievement scores were found when comparing transition year achievement among fifth, sixth, and seventh grades in English Language Arts. Cohort groups transitioning in the seventh grade scored significantly higher than cohorts transitioning in fifth or sixth grade. There was not a statistically significant difference between fifth- and sixth-grade cohort groups.

A significant difference in mathematics achievement was found between fifth and seventh grade. There was not a significant difference found among any of the other cohorts. Seventh-grade cohorts did have a higher mean score than fifth- and sixth-grade cohorts, but the difference was significant between the fifth and seventh grade scores. Sixth grade attained a mean score of 763.55 (*SD* = 29.96), which was higher than the fifth grade mean score of 752.89 (*SD* = 24.71). The null hypothesis was rejected on Question 2 because there was sufficient evidence to indicate differences in student achievement among varying transition years.

Research question 3. What is the difference in eighth-grade achievement among varying grade configurations? MAP scores were analyzed to determine if grade configuration and timing of the transition year had an impact on eighth-grade student achievement. The difference in the mean English Language Arts MAP index scores among all three cohorts was minimal. Districts with eighth graders in a fifth through eighth grade configuration averaged 771.45 (*SD* = 22.26), districts with a sixth through eighth grade configuration averaged 769.58 (*SD* = 27.32), and districts with a seventh through eighth grade configuration averaged 770.49 (*SD* = 24.72).

Likewise, the differences in the mathematics mean scores were also minimal. Districts with a fifth through eighth grade configuration scored 762.11 (*SD* = 27.64), sixth through eighth grade configuration 761.09 (*SD* = 33.75), and seventh through eighth grade configuration 761.11 (*SD* = 28.56). Therefore, the null hypothesis was not rejected in Question 3. There was not sufficient evidence to indicate a difference in eighth-grade achievement across varying grade configurations.

Conclusions

The over-arching theme of the research was to provide information regarding the optimal year to transition students to middle school. The three research questions focused on student achievement as a determining factor for finding the optimal transition year. Student achievement, as defined in Chapter One, was performance on the MAP and was summarized by the index calculation of individual school buildings. Results were mixed with significant differences in student achievement found in Research Question 1 and Research Question 2. Investigation of the research questions indicated significant differences in the early years of the transition to middle school, but by the eighth grade, achievement differences were minimal. This evidence supports the conclusion that the timing of the transition year does not have an effect on eight-grade scores, and districts should focus on improving achievement within the current grade configurations as opposed to re-configuring the middle years.

In reference to Research Question 1, there was a significant difference in student achievement during the transition year to middle school when the transition occurred during the fifth grade year. A large portion of the cohort groups that did not transition in the fifth grade were housed in a kindergarten to fifth grade elementary school configuration. Students in kindergarten to fifth grade elementary schools scored significantly higher than fifth-grade students who transitioned to a new school.

Although research was not conducted on the specific practices of the kindergarten to fifth grade elementary schools involved in the study, possible explanations for the significant difference in student achievement may lie in the fact that a transition year was present at an early age. These findings mirror studies performed in New York and

Florida by Rockoff and Lockwood (2010) and Schwerdt and West (2013). Achievement among students in the youngest cohort of the school was lower than students in the oldest cohort of the school. The difference in academic achievement of students who transitioned during the sixth and seventh grades was not consistent with fifth-grade. These students did not show a significant drop in achievement during the transition year to middle school.

The data revealed that a significant difference in student achievement during the transition year was present during the 2011-2012 school year. Transition year cohorts scored significantly lower than non-transition year cohorts in English Language Arts. Mathematics scores revealed that scores were not significantly different between the pre-transition and transition year but were significantly different between the transition year and post transition year. Possible explanations for these findings may be found in the effect that the transition year played on students who entered new schools with new norms, curriculum, social groups, and faculty members.

The fifth-, sixth-, and seventh-grade cohorts in a transition year were examined to determine if there was a difference in student achievement between three different transitional year cohorts. Achievement data indicated students transitioning in seventh grade outperformed fifth- and sixth-grade transitional year students in English Language Arts. Seventh graders also significantly scored higher in mathematics. All three groups were in a transition year indicating that older students showed less of a drop in academic achievement when they were transitioned to middle school.

The results from Research Question 2 provide evidence that directly points to the age of the transition. Drops in student achievement were minimized when students

transitioned to middle school at an older age. Data from Question 1 provide evidence to support this conclusion for the reason that sixth and seventh grade transitional students outperformed sixth- and seventh-grade non-transitional year students. Students in fifth grade showed a significant drop in academic achievement during the fifth grade year when compared to fifth graders not in a transition year.

Achievement in the eighth grade was not affected due to grade configuration attended during this study. All eighth grade mean MAP index scores were very similar. Any difference in student achievement during fifth, sixth, and seventh grades were not present in the eighth grade when students completed middle school. Cohorts attending varying grade configurations with varying transition years all scored within two MAP index points of each other. Eighth-grade cohort scores across the state of Missouri were similar despite attending a 5-8 grade configuration, 6-8 grade configuration, or a 7-8 middle school grade configuration. The research indicated that regardless of the grade configuration attended, or timing of the transition, student achievement was similar by the end of the eighth-grade year. Therefore, grade configuration in middle school did not play a significant role at the end of middle school during the 2011-2012 school year.

Implications for Practice

The review of literature revealed trends in middle school education, middle school practices, and the effects transition years have on academic achievement. This study was focused on student achievement, and the results mirrored studies conducted in New York and Florida. Previous studies indicated a drop in academic achievement during the transition year. This study affirmed previous results because fifth-grade students transitioning to middle school performed significantly lower than students in fifth grade

who did not transition. The results of the study contrasted with Schwerdt and West (2013) and Rockoff and Lockwood (2010) regarding the timing of the transition. Previous studies point toward transitioning students at a younger age to decrease a drop in student achievement. The older students in this study (seventh-grade) outperformed students in fifth- or sixth-grade transition years.

The review of literature indicated that the data from this study would indicate a drop in academic achievement during the transition year to middle school and this study supported the current research. Current research has also found that the earlier the transition year the less impact it has on student achievement. This study did not support current research so unanticipated results in student achievement were noticed in Question 2. Although not significant, cohorts transitioning in sixth and seventh grade outscored sixth- and seventh-grade cohorts that were not in a transition year.

The transition to middle school is highlighted by physical, mental, social, and academic changes that must be taken into consideration when districts make decisions surrounding transition years. Recommendations supported by this study are that educators re-configuring their district should (a) minimize the number of transitions students make during their educational career and (b) avoid transitioning students during their fifth-grade year. These recommendations are supported by a significant regression of student achievement during the transition year and fifth-grade transition year MAP performance index scores.

Recommendations

A longitudinal study of cohort groups transitioning to middle school would enhance this study. Data on three separate cohorts disaggregated by timing of the

transition to middle school need to be collected to provide further evidence as to the optimal year to transition students to middle school. Researchers would be able to compare trends in achievement through eighth grade based on timing of the transition to middle school. As well as using longitudinal data to compare multiple cohorts, the data could be used to compare achievement within a cohort across three years. This addition to the methods would provide an additional view in determining the optimal year to transition students.

Broadening the definition of student achievement to include grades, reading lexiles, and progress monitored math assessments would add a formative assessment view of student achievement. A limitation to this study was that data were collected on cohort groups based on one assessment given on one day. Utilizing formative assessment data throughout the school year would benefit the study by providing a more precise look into student achievement.

This study found a significant drop in student achievement in both math and English Language Arts when students transitioned during the fifth-grade year. Results of the study indicate the need for a deeper investigation into fifth-grade student achievement. Two additional studies are recommended to focus on the fifth-grade year. The first recommendation is to compare student achievement in kindergarten through fifth-grade elementary schools to student achievement in alternative elementary school configurations. The second recommendation is to compare instructional practices in kindergarten through fifth-grade elementary schools to instructional practices in alternative elementary school configurations. An element this research could provide would be an examination of the amount of instructional time spent on reading, writing,

and math within each elementary configuration. The amount of time may have a direct correlation to student achievement on state assessments.

Successful middle school practices are factors that play a role in student achievement. Two recommendations involving successful middle school practices and student achievement are suggested. Comparing transition year student achievement to the full implementation of research-based middle school strategies and practices could provide valuable information when searching for the optimal year to transition students to middle school. These data may also reveal reasoning as to why there is a drop in student achievement during the transition year to middle school.

The second recommendation based on practices is for a deeper investigation into the difference of middle school practices and philosophies between grade configurations (K-8, 6-8, and 7-8). Opposing grade configurations may have varying practices and philosophies regarding middle school education. These variances may have a direct correlation to achievement on state assessments by middle school students.

The state of Missouri is in the middle of a shift to the Common Core curriculum. Assessments will change during the 2014-2015 school year to reflect the Missouri Learning Standards. These new standards will take the place of current grade-level expectations that were assessed on the MAP. According to the Common Core State Standards website (2014), the new standards will have the following requirements:

1. Standards will be aligned with college and work expectations.
2. Standards will require the application of knowledge.
3. Standards will focus on higher order thinking skills.
4. Standards are clear and evidence based.

5. The standards will prepare students to compete in a global society. (p. 1)

The Missouri Learning Standards will place a larger emphasis on content reading and writing skills and their application to "real world" situations.

The implementation of new standards, expectations, and assessments may have an effect on student achievement at the middle school level. Further research is needed surrounding the difference in student achievement during the transition year after the implementation of the Missouri Learning Standards.

Summary

The results of this study add to the body of research on the effect of transitioning students to new schools during early adolescence. There are many factors other than the timing of the transition year that contributes to successful transitions for early adolescent children. Therefore, the focus should not be placed on grade configurations alone, due to the findings of this study that student scores in English Language Arts and mathematics at the end of the middle school years were similar regardless of the grade configuration attended.

The focus on improving middle school student achievement should be placed on the individual needs of the students. The results of this research suggest educational leaders should focus time, energy, and capital on improving the quality of education in the current grade configurations within the school system. Investments in transition programs, curriculum alignment, technology, assessment, and professional development may be more beneficial for transition year students than reorganizing the current grade configurations. Social, emotional, and physical needs must be met by caring educated

experts who are equipped with researched based strategies and a love of adolescent students.

Districts undergoing a high increase or decrease in student population requiring the elimination or addition of schools would benefit by taking a hard look into grade configurations. These districts are already faced with great change and should think outside of the box to design a school system that meets the needs of their students. Transition years may be unavoidable, but results from this study indicate district leaders should minimize the amount of transition years within a kindergarten through 8th grade program.

The country's students are showing growth in mathematics and reading, according to the National Assessment of Educational Progress (U.S. Department of Education, 2013). Students in fourth and eighth grades displayed an increase in both content areas in 2013. Students scored higher in 2013 than all previous assessment years. Compared to 1990, scores in 2013 increased 28 points in fourth grade and 22 points in eighth grade on the mathematics assessment. Scores in reading increased five points in fourth grade and eight points in eighth grade (U.S. Department of Education, 2013). Although there has been growth nationally, students must be able to excel on a worldwide stage.

Competition is global; therefore, students in the 21st century must be prepared for jobs that are not foreseeable. Education must mirror the current status of the world. Stagnant practices and the execution of education predicated on the way things have always been done are performing a disservice to students and country. A global society, in which information and communication is a click of the button away, demands that

teaching practices, facilities, and configurations must adapt. Students are yearning for connections and collaboration with adults and peers across the globe. Designing schools and learning environments based on logistics alone will not prepare future generations for the world in which they will be reinventing.

Appendix A

Instructions
This form is to be used when requesting special reports from the Department. First explore the Missouri Comprehensive Data System (MCDS) portal at http://mcds.dese.mo.gov/Pages/default.aspx, as a number of resources are available that might meet your needs. Allow at least three business days for notification regarding the status of your request. If you have any questions, contact the Office of Data System Management at dsm@dese.mo.gov or 573-522-3207.

* Denotes required fields

Contact Information

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* Last Name:

Title:

* Email:

* Daytime Phone:

Organization/Affiliation:

Request
* Indicate the data being requested. Be specific and thorough. (Text over 600 characters will not be saved.)

* What is the purpose of this request -- how are the data to be used? (Text over 250 characters will not be saved.)

* Indicate the date the requested data are needed. The Department does not guarantee the data will be available on the date indicated.

* Format of data to be provided:
If Other is selected, please explain: (Text over 250 characters will not be saved.)

If additional supporting information is needed to process this request, upload a document by clicking the Browse button and selecting the supporting document.

Upload file:

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Appendix B

DATE: July 23, 2013

TO: Brandon Eggleston

FROM: Lindenwood University Institutional Review Board

STUDY TITLE: [480932-1] An Investigation of the Difference in Student Achievement during the Middle School Transition Years

IRB REFERENCE #:
SUBMISSION TYPE: New Project

ACTION: APPROVED
APPROVAL DATE: July 23, 2013
EXPIRATION DATE: July 23, 2014
REVIEW TYPE: Expedited Review

Thank you for your submission of New Project materials for this research project. Lindenwood University. Institutional Review Board has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a study design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

This submission has received Expedited Review based on the applicable federal regulation.

Please remember that informed consent is a process beginning with a description of the study and insurance of participant understanding followed by a signed consent form. Informed consent must continue throughout the study via a dialogue between the researcher and research participant. Federal regulations require each participant receive a copy of the signed consent document.

Please note that any revision to previously approved materials must be approved by this office prior to initiation. Please use the appropriate revision forms for this procedure.

All SERIOUS and UNEXPECTED adverse events must be reported to this office. Please use the appropriate adverse event forms for this procedure. All FDA and sponsor reporting requirements should also be followed.

All NON-COMPLIANCE issues or COMPLAINTS regarding this project must be reported promptly to the IRB.

This project has been determined to be a Minimal Risk project. Based on the risks, this project requires continuing review by this committee on an annual basis. Please use the completion/amendment form for this procedure. Your documentation for continuing review must be received with sufficient time for review and continued approval before the expiration date of July 23, 2014.

Please note that all research records must be retained for a minimum of three years.

If you have any questions, please contact Tameka Moore at (618) 616-7027 or tmoore@lindenwood.edu.

Please include your study title and reference number in all correspondence with this office.

If you have any questions, please send them to IRB@lindenwood.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Lindenwood University Institutional Review Board's records.

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Vita

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Eggleston began his professional career teaching physical education and coaching at Joplin North Middle School, Joplin, Missouri, in 1999. After earning a Master of Science in Secondary administration from William Woods University in 2004, he was promoted to assistant principal at North Middle School in 2007. Eggleston earned a Specialist in Educational Administration from Missouri State University in 2010 and was promoted to principal at North Middle School in 2011.