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Middle Schools and Traditional Junior High Schools: A Comparison of Academic Achievement

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MIDDLE SCHOOLS AND TRADITIONAL JUNIOR HIGH SCHOOLS: A COMPARISON OF ACADEMIC ACHIEVEMENT

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ABSTRACT

The purpose of this quantitative study was to use existing data to compare academic achievement between middle schools and traditional junior high schools. The questions of this study derived from the debate on whether or not the middle school, with all of its components that are specifically geared towards young adolescents and their unique needs, had an impact on achievement.

This quantitative study used three types of variables to describe the schools in the sample. The control variables were the percentage of low-income students, total school enrollment, and the classification of the schools as rural, urban, or suburban. The independent variable was the grade configuration either as a middle school or junior high school. The dependant variables were PSSA scaled scores in math and Reading, as well as, the percentage of students scoring in each quartile on the exam. Academic achievement was measured by the changes from the 2005 fifth grade to the 2008 eighth grade PSSA math and reading

scores, the change in the percentage of students scoring in each quartile on the 2005 fifth grade as compared to the 2008 eighth grade PSSA math and reading exams. This measure of achievement was performed for all students in the sample, as well as, the special education and economically disadvantaged sub – groups.

Descriptive statistics were used to describe each of the variables in the study. T-tests were used to compare the dependent variables among the two types of schools structures. Multiple regression analysis was performed to determine statistical significance between the independent and control variables to the dependent variables.

Results indicated that no relationship was found between school structure and the change in PSSA scores for all students, special education students, and economically disadvantaged students. The use of middle school practices did have an association with students scoring in certain quartiles and overall scaled scores in math and reading. As schools and districts strive to increase student achievement, this study will help decision makers make choices that will affect students and the community for years to come.

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CHAPTER I

THE PROBLEM

Introduction to the Study

Since the 1960's, middle schools have been replacing traditional junior high schools. Bedard and Do (2005) define middle schools as those schools that exclude ninth grade students and include fifth and sixth grade students. The middle school as an institution spans grades five through eight or six through eight. Typically, successful middle schools have certain characteristics including interdisciplinary teams, advisory programs, varied instruction, exploratory programs, and transition programs (National Middle School Association, 1996). Junior high schools are those institutions that encompass grades seven through nine. These junior high schools can be self – contained, sometimes called intermediate schools, or they can be part of a six – grade secondary school (Cuban, 1992). Another type of school, a school within a school, is a small, autonomous program housed within a larger school building. These schools have their own culture, programs, personnel, budget, bell schedule, and school space (Northwestern Regional Educational Laboratory, 2002;& McAndrews & Anderson, 2002). Relating to the middle school concept, many secondary schools that were formerly seven through twelve junior/senior high schools have segregated

their seventh and eighth grade students in order to create smaller learning communities and to implement middle school ideals.

However, many communities are questioning the purpose and benefits of the middle school. Cities such as New York, Pittsburgh, and Philadelphia are closing their middle schools in support of kindergarten through eighth grade schools. The growing number of opponents to the middle school movement states that sixth grade students in an elementary setting perform better on tests than do sixth graders in middle schools (Steinbach, 2005). A study by Johnston and Williamson (1998) revealed seven major concerns regarding middle schools. These concerns included anonymity, curriculum, rigor and challenge, safety, sociability and civility, responsiveness, instruction, and parent concerns regarding school to home communication. Parents of middle school students are unsure as to whom to contact in the event of a question or concern. This confusion lies in the fact that middle school students interact with many adults throughout their day. Also, middle school students are known for not communicating effectively between home and school. Therefore, schools that do not have procedures for effective public relations are seen as unapproachable and unresponsive.

Since the 1960’s, the increase in middle school construction has been one of the more recent reform movements in

education. Districts across the Commonwealth of Pennsylvania have spent millions of dollars building facilities to accommodate and facilitate the various components of the middle school. Other districts have spent countless hours and taxpayer dollars debating whether or not to move toward a middle school design. With all of the debate and money spent, has the middle school design and concept with all of its components and specific facility requirements truly made an impact when it comes to academic achievement? Does a traditional junior high school compete on the same plane as a middle school when it comes to standardized test scores? This dissertation will explore and compare student achievement between middle schools and traditional junior high schools.

Purpose of the Study

The purpose of this study was to use existing data to compare academic achievement between middle schools and traditional junior high schools. The questions of this study derived from the debate on whether or not the middle school, with all of its components that are specifically geared towards young adolescents and their unique needs, had an impact on achievement. There have been many research studies on the individual components of the middle school design and their success on student achievement but few have been found that compare the educational results between the various school

structures that serve young adolescents in Pennsylvania. For this study, academic achievement was measured using the Pennsylvania System of State Assessments (PSSA). The Pennsylvania System of State Assessments (PSSA) is a series of criterion-referenced tests in the areas of mathematics, reading, writing, and science. These tests are based on academic standards that describe what each student in a specific grade level should know and be able to do. These tests are given to students in grades three through eight and eleven. The exception is in science where the test is given to grades eight and eleven.

Research Questions

Question 1. Based on the PSSA scores, what is the difference in academic achievement for students (all students, special education students, and economically disadvantaged students) in junior high schools as opposed to middle schools?

Sub-question 1: What was the difference in the changes between the 2005 fifth grade and 2008 eighth grade PSSA math and reading scaled scores (all students)in junior high scores as opposed to middle schools?

Sub-question 2: What was the difference in the percentage of the schools' students (all students, special education students, and economically disadvantaged students)who scored in the advanced quartile on the 2005

fifth grade PSSA math and reading tests as compared to the number of students (all students, special education students, and economically disadvantaged students) who scored in the advanced quartile on the 2008 eighth grade PSSA math and reading tests between middle schools and junior high schools?

Sub-question 3: What was the difference in the percentage of the schools' students (all students, special education students, and economically disadvantaged students)who scored in the proficient quartile in the 2005 fifth grade PSSA math and reading tests as compared to the number of students (all students, special education students, and economically disadvantaged students)who scored in the proficient quartile on the 2008 eighth grade PSSA math and reading tests between middle schools and junior high schools?

Sub-question 4: What was the difference in the percentage of the schools' students (all students, special education students, and economically disadvantaged students) who scored in the basic quartile in the 2005 fifth grade PSSA math and reading tests as compared to the number of students (all students, special education students, and economically disadvantaged students)who scored in the basic quartile on the 2008 eighth grade PSSA

math and reading tests between middle schools and junior high schools?

Sub-question 5: What was the difference in the percentage of the schools' students (all students, special education students, and economically disadvantaged students) who scored in the below basic quartile in the 2005 fifth grade PSSA math and reading tests as compared to the number of students (all students, special education students, and economically disadvantaged students)who scored in the below basic quartile on the 2008 eighth grade PSSA math and reading tests between middle schools and junior high schools?

Method of the Study

To address the lack of research regarding academic achievement between traditional junior high schools and middle schools, this study compared scaled scores and quartile percentages between all students, economically disadvantaged students and the special education sub-population. The population for this study included all public schools within the Commonwealth of Pennsylvania that contained grade seven in their configuration and met the definition of middle school and junior high school as defined for this dissertation. These schools were grouped according to their grade configurations that made them either a junior high school or a middle school. This

determination was made based on the grade configuration listed on the SchoolDataDirect website. Schools that included grade seven either in a five through eight or six through eight configuration and also included five of the six middle school components as defined for this dissertation were classified as a middle school while those schools with a seven through nine or seven through twelve configuration with no more than two components of the middle school design were used as a junior high school. These configurations were based on the definitions for middle schools and junior high schools established for this dissertation. In order to properly group these schools as middle schools or junior high schools, the principal or designee of each school was contacted via e-mail and asked how many of the six middle school components were currently being utilized in their program (see page 10 for a listing of these components). These schools were secondarily stratified according to certain demographic characteristics. Classification for the secondary stratification included rural, urban, suburban, percentage of low income students and total school enrollment. The information for these demographical characteristics came from the Pennsylvania School Profile web site and the SchoolDataDirect website. To answer this study's research questions, comparisons were made between demographically similar middle schools and junior high schools using PSSA data from

Pennsylvania Department of Education academic achievement reports and from the PDE website.

Conceptual Framework

The conceptual framework that guided this study was built on three bodies of literature: adolescent development, the middle school concept, and student achievement. Student achievement was measured by using PSSA scaled scores and quartile percentages in math and reading for the years 2005 and 2008.

Limitations of This Study

Schools that have reconfigured their grades and implemented various middle school concepts have often initiated other reform measures. It may be possible that other reform efforts have influenced academic achievement. There are also multiple ways of measuring academic achievement; PSSA scores may not reflect actual learning. Many schools also experience a transient population which could affect the outcome of this study. There could be student scores that are calculated into the 2008 scaled scores and quartile percentages that did not take the test for a particular school in 2005. Schools could also have students who have taken the 2005 PSSA math and reading exams who then moved to a different school or district before 2008.

The researcher has worked as a teacher and an administrator in both types of schools mentioned in this study. His

perceptions suggest that the middle school configuration and implementation of middle school concepts do not significantly improve academic achievement. These perceptions may have an effect on data interpretation.

Definition of Terms

Middle School: Operationally defined as a school with a grade configuration of five through eight or six through eight that includes five of the six components of the middle school concept that includes; interdisciplinary teaming, exploratory classes, advisory programs, varied instruction, transition programs and specific infrastructure that accommodates the middle school design (houses, team areas).

Junior High School: Operationally defined as a school with the grade configuration of seven through nine or grades seven through nine contained within a seven through twelve building that has no more than two components of the middle school design.

Academic Achievement: The indicators of academic achievement include the change between fifth grade and eighth grade scores on the mathematics and reading portions of the Pennsylvania System of Student Assessment (PSSA), the change in the number of students (all students, special education and economically disadvantaged) scoring in each quartile on the 2005 PSSA mathematics and reading tests compared to the number of students

(all students, special education and economically disadvantaged) scoring in each quartile on the 2008 PSSA mathematics and reading tests.

Economically Disadvantaged: Operationally defined as the percentage of students participating in the free and reduced lunch program.

Special Education: Operationally defined as those students who have an Individualized Education Plan (IEP).

Conclusion

The education of young adolescents proves to be a challenge due to the unique physical, cognitive, and psycho-social changes these young people are experiencing. The development of the junior high school was meant to meet these unique needs, however, this infrastructure proved ineffective because it turned into a situation that mirrored the high school program. What we now consider to be a “middle school” was developed in the mid twentieth-century as an answer to this problem. Middle schools use a variety of programs and strategies such as interdisciplinary teaming, advisory programs, exploratory classes, and varied instruction to increase the academic achievement of young adolescents. It is particularly important to focus efforts on academic achievement due to the recent standards and accountability movement. This recent movement has roots in several past reform efforts such as the New Math, A

Nation at Risk, Outcomes Based Education and Goals 2000. Now, the effectiveness of schools is based on a standardized test called the PSSA. As schools and districts strive to implement programs and infrastructure changes to meet the achievement goals set by the Pennsylvania Department of Education, research must be conducted on these changes to determine the impact on student achievement. As the percentages that schools and districts need in math and reading continue to increase in order to meet adequate yearly progress (AYP), data from current programming and curriculum need to be collected and analyzed for effectiveness. The programs and curriculum that are not performing need to be changed or eliminated. Programs and curriculum that are being considered for implementation need also to be scientifically based and studied for the desired outcomes. This study looked at the middle school model to see if its implementation had an effect on student achievement. The results may help schools and districts in their decision making process whether or not to continue with the current design or seek out more productive avenues to educate young adolescents.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

The purpose of this study was to use existing data to compare academic achievement between middle schools and junior high schools. The questions of this study derived from the debate on whether or not the middle school, with all of its components that are specifically geared towards young adolescents and their unique needs, had an impact on student achievement.

It has always been the goal of our educational institutions to develop our young people into free, healthy, and productive citizens. Thomas Jefferson understood this concept keenly when he stated, “It is highly interesting to our country, and it is the duty of its functionaries, to provide that every citizen in it should receive an education proportioned to the condition and pursuits of his life.” - Thomas Jefferson to Peter Carr, 1814.

Throughout the centuries since Jefferson spoke these words, it has been the charge of educational leaders to develop the very institutions that best prescribe these words. The twentieth century has seen vast social and economic transformations. According to the Carnegie Council on Adolescent Development (1989), in order for our children, especially our young

adolescents, to meet the challenges of the new century and become successful adults, they must:

- Find a valued place in a constructive group
- Feel a sense of worth as a person
- Achieve a reliable basis for making informed choices
- Know how to use the support systems available to them
- Express constructive curiosity and exploratory behavior
- Believe in a promising future with real opportunities
- Find ways of being useful to others
- Master social skills, including the ability to manage conflict peacefully
- Cultivate the inquiring and problem-solving habits of mind for lifelong learning
- Acquire the technical and analytical capabilities to participate in a world – class economy
- Become ethical persons
- Learn the requirements of responsible citizenship
- Respect diversity in our pluralistic society

It is crucial that our young people master these skills in our technologically advanced society. Now, more than ever, our educational system must not only prepare these students for the next century but provide the interventions necessary to prevent

these young adolescents from establishing any patterns of self-destructive behavior.

The purpose of the middle school design is to meet the needs of these young adolescents and develop them into the citizens of tomorrow who will carry on the liberty and traditions of those before them. According to Jackson & Davis (2002), states and schools should provide the authority and resources to transform middle schools and junior high schools into learning environments that are safe, intellectually stimulating, and build on their desire to explore. The Turning Points 2000 report made several recommendations for middle grades which include:

- Teach a curriculum grounded in rigorous, public academic standards for what students should know and be able to do, relevant to the concerns of adolescents and based on how students learn best.
- Use instructional methods designed to prepare all students to achieve higher standards and become lifelong learners.
- Staff middle grades schools with teachers who are expert at teaching young adolescents, and engage teachers in ongoing, targeted professional development opportunities.
- Organize relationships for learning to create a climate of intellectual development and a caring community of shared educational purpose.

- Govern democratically, through direct or representative participation by all school staff members, the adults who know the students best.
- Provide a safe and healthy school environment as part of improving academic performance and developing caring and ethical citizens.

This review of literature focused on four main topics. The first topic is a historical look at American education and the birth of the middle school movement. The second topic explored the discussion of adolescent development in regards to brain research, cognitive development, and psycho-social development. The third topic explained the middle school grade configuration and the various components that make up the middle school program. There were also sections devoted to academic achievement and the measures used in determining such.

Historical Perspective

To completely understand the recent movement from traditional junior high schools to middle schools requires a brief look at the history of American education.

In the early years of the United States, agriculture dominated the economics and daily lives of our citizenry. The basic requirements to function in these early years were reading, writing, and arithmetic. Children usually attended school until grade seven or eight. The one room school house

served this purpose. During the late 1800's and into the early twentieth century, the United States was transitioning from a primarily agricultural society to an industrialized society. The junior high school originated out of the concerns from educators about inefficiencies of the school organization which, at that time, were primarily eight years of elementary school and four years of secondary school. Other concerns centered on large numbers of out of school youth and the needs of the new industrial firms for semi – skilled workers (Cuban, 1992).

In 1918, the Commission on the Reorganization of Secondary Education recommended that the second six years of secondary education be designed to meet the needs of students twelve to eighteen years of age. The commission went on to recommend that the last six years of education be divided into junior and senior periods (U.S. Bureau of Education, 1918). This reform effort was centered on reshaping the curriculum for young children in order to fit their development. This new focus on the nature of the child, which came from the new field of psychology, replaced the focus from entirely subject matter and basic skills (Cuban, 1992). This was the first time education began to discuss providing an appropriate educational program for early adolescents (National Middle School Association & Pennsylvania Middle School Association, 1998).

From these early years of the junior high school movement until the 1960's, none of the above fundamental reform efforts came to fruition. The junior high schools of the 1960's drew many parallels to the senior high schools of the day. These schools, which attempted to provide a bridge between elementary and senior high school, became, in many instances, a prep school for the senior high schools. Departmentalization, class schedules, social events, athletics, and curriculum pushed down from the grades above it (Pennsylvania Middle School Association, 1995). Once again, educators began to discuss building schools where ten to fourteen year old students can learn in ways that were specifically tailored to the unique social, psychological, moral, and intellectual needs of the transescent (Cuban, 1992; Pennsylvania Middle School Association, 1995; & National Middle School Association, 1998).

Adolescent Development

The study of adolescent development came from the field of psychology as early as the 1870's when educators began to focus on the nature of the child rather than subject matter and basic skills (Cuban, 1992). The schools, as they were currently organized, were incompatible with these developmental changes. This new study on how young adolescents change and how they require a different approach when it comes to their education is the beginnings of the junior high schools and ultimately the

development of middle schools. The MedlinePlus Medical Encyclopedia (2006) defines adolescent development as, “the development of children ages 12 to 18 years old is expected to include predictable physical and mental milestones”. The period of early adolescence is one where each individual experiences many changes including biological, changes in relations with family and peers, and social and educational changes when transitioning from elementary school to middle school (Wigfield & Eccles, 2002). Huebner (2000) describes the changes that occur in young adolescents in three respects; physical development, cognitive development, and psycho – social development.

Physical change. Physically, teens experience rapid height and weight gains. They also develop their secondary sex characteristics which include pubic hair, menarche (females), penis growth (males), voice changes, and an increased production of oil and sweat gland activity. During this time of outward physical changes, there is also continued physical development of the brain. Inside the adolescent brain there are incomplete connections between the neurons that affect emotional, mental and physical abilities. These physical changes are the reasons why teens are characterized as needing longer periods of sleep, are clumsy, oversensitive, and feel awkward about their own bodies.

Cognitive change. The second major change that young adolescents experience is cognitive development. Adolescents increase in their ability to think abstractly, consider the hypothetical, engage in more elaborate information – processing strategies, and engage in meta – cognition (Huebner, 2000; & Wigfield, Lutz & Wagner, 2005). Meta – cognition, in its broadest sense, is thinking about thinking. These cognitive changes affect teens in many ways. These changes may be displayed as a heightened sense of self – consciousness, being overdramatic; it can't happen to me syndrome, being cause – oriented, and having a difficult time seeing shades of gray when it comes to situations were a perceived injustice has occurred (Huebner, 2000).

Psycho-social change. The third developmental change is psycho – social. According to Huebner, (2000), there are five recognized psychosocial issues that pertain to young adolescents. These issues are: 1. establishing an identity, 2. establishing autonomy, 3. establishing intimacy, 4. becoming comfortable with one's sexuality, and 5. achievement. These five issues correspond with teens spending more time with peers, having questions about sexuality, spending private time in their bedrooms, being elusive about where they are going or who they will be with, and becoming more argumentative. These adolescent changes were and still are the basis for educators to support

separating young adolescents and providing a unique learning environment.

Adolescent Brain Research

As adults, we have all experienced the “quirky” behavior of young adolescents. Research into the adolescent brain has revealed that this behavior may not be the full responsibility of hormones. According to Hall and Brier (2007), the duality of adolescent behavior from inattention to intense focus can be attributed to the neural restructuring of the adolescent brain.

Frontal lobes. During the teen years, there are prominent structures of the brain that are affected. The prefrontal cortex, also referred to as the frontal lobes, undergoes neural transformation and controls higher cognitive functions such as alertness, reasoning, motivation, judgment, planning, working memory, and appropriate social behaviors. This area of the brain is the largest and the slowest to develop during the period of young adolescence (Caskey and Ruben, 2003). According to Strauch (2003), this late development of the prefrontal cortex may be attributed to the late exuberance of synapses (which are the structures in the brain that allow cells to communicate with one another). Exuberance refers to the overproduction of brain cells or the “thickening” of the brain’s outer, gray matter layer. This process allows the brain to be more receptive to new information and new skill development. The affects of the

prefrontal cortex explains the difficulty for adolescents to keep track of their homework, plan for future assignments, make decisions, and organize their material. Another important function of the frontal lobe is impulse control. According to Strauch (2003), the brain's working memory found in the dorsolateral prefrontal cortex is related to impulse control. Young adolescents, because the frontal lobe area has not yet matured, have a difficult time withholding reflexive responses to irrelevant stimuli. This may explain why seventh grade students forget to take their notebook to class when confronted with several peers who wish to discuss the events of the past weekend.

Cerebellum. A second structure of the brain found at the top of the neck that undergoes transformation is the cerebellum. This structure (which is the last structure of the brain to mature (Strauch, 2003)), mediates balance and coordination and also assists in recognizing social cues.

Myelin. As adolescents mature, there is a fatty cell type called myelin (part of the white matter of the brain) that increases in production. Myelin production has been found to increase by 100% in the teenage years (Strauch, 2003). This myelin allows neuronal communication to become more efficient especially around important structures such as the prefrontal cortex and the limbic system. The increase in communication

between these two areas of the brain allows the adolescents to better control their emotions and attention as it relates to organization and appropriate social behaviors. There are two crucial areas of the brain that myelin growth acts as a connector, the hippocampus and cingulated gyrus. The hippocampus is that part of the middle brain which sorts out new memories while the cingulate involves emotions. Because these areas of the brain are found to be myelating during adolescence, there are disconnects between contextual thought and reactions to stimuli. Perhaps this explains the emotional outburst one may experience when asking 13 year olds to clean their rooms. Myelination occurs earlier in girls than in boys which may be one reason why adolescent boys are perceived to have poorer judgment (Caskey and Ruben, 2003).

Implications of Adolescent Brain Research

With this knowledge of the adolescent mind, there are strategies that teachers can employ to address issues of planning, organization, impulse control, and emotional distress. For students in the middle grades, teachers who are knowledgeable in neuroscience research can help them through this rapid change in brain development.

Studies indicate that, during early adolescence, connections in the brain are stabilized into functioning circuits by repetition while those not used are “pruned” and

removed from service (Caskey and Ruben, 2003). This pruning effect is necessary in order for a young teen to emerge from the fog of adolescence (Strauch, 2003). This scaling back of synapses also allows the brain to become calmer and specialize in important brain functions such as inhibition control, working memory, and the ability to focus when faced with multiple information sources. The use of interdisciplinary units is useful when teaching young adolescents. The connections made between subject areas help stimulate those areas of the brain still developing and provides a framework of meaning for these students. Project – based learning and infusing the arts across the curriculum are strategies that assist students in making connections between content and real life (Caskey and Ruben, 2003).

The Middle School Movement

The first middle school was formed in Bay City, Michigan, in 1950 (Manning, 2000). The middle school movement began to increase in numbers in the early 1960's as discontent began to grow about the effectiveness of the junior high schools. The original intent of the junior high school was replaced by its mirror image of the senior high schools. Educators revisited the purpose of a school designed specifically for the unique social, psychological, moral, and intellectual needs of young adolescents (Cuban, 1992). School reorganization occurred as a

result of this new movement. Schools were built or redesigned to house grades five to eight or grades six to eight. Ninth grade was designated to the senior high schools. Over the next twenty–seven years, the number of middle schools jumped from less than eleven to five thousand and sixty-six (Cuban, 1992).

Middle school principles. The middle school concept or design has also evolved since its conception. Don Eichhorn, who is considered by many in the middle school world to be the father of the middle school movement, gave a speech to the General Membership Meeting of the Pittsburgh Council on Public Education, July 15, 1970 on the middle school concept. In this speech, Mr. Eichhorn spoke of certain basic principles that are a part of successful middle school initiatives. The first organizational principle was non - grading. This grading structure would allow teachers to work with students at their own learning level. The second organizational principle was individualization. Instead of teaching to the average, teachers were to use techniques and programs to personalize the education presented to all levels of ability. Another organizational principle was flexible scheduling. The use of block or modular time would better use the talents of the teachers and give students who were struggling in a particular subject more time to practice and grasp the content or skills. The next set of principles centered on curriculum. The curriculum of a middle

school must be designed as to teach students at their own level of learning. Another curricular principle was concerned with helping young adolescents understand what was happening to them physically and socially. The last area of curriculum that was essential to successful middle school programs dealt with the notion of self – expression. Courses such as art, music, home economics, and industrial arts gave students an opportunity to express their individuality and acquire life skills. Other key principles in this speech included using a wide variety of teaching materials, in – servicing teachers regarding middle level education, and planning carefully any middle level program (Pennsylvania Middle School Association, 1995).

Cornerstone middle school strategies. Today, the National Association of Secondary School Principals (2006) has established nine cornerstone strategies that, when implemented properly, will form a foundation for success in a middle school environment. These strategies are as follows: 1. establish rigorous academic standards that will prepare students for senior high school and align the curriculum and use best practice teaching strategies to obtain that goal, 2. create teacher teams with common planning time, 3. provide structured planning time for teachers to align curriculum across grade levels, and address the academic, developmental, social, and personal needs of the students, 4. implement an advisory

program, 5. ensure that teachers are assessing individual learning needs and implementing strategies accordingly, 6. provide flexible instructional time to accommodate the ways that students learn most effectively, 7. structure shared decision making by students, teachers, family members, and the community, 8. provide programs and structure to ensure that all social, ethnic, and economic groups have equal access to challenging activities and learning opportunities, and 9. provide professional development programs to aid teachers in the implementation of the middle school concept.

Many of the principles that were part of the middle school design three decades ago are still an integral part of what successful middle schools do today.

Selected Middle School Practices

According to a National Middle School Association Research Study on Exemplary Middle Schools(1996),the characteristics of successful middle schools include; interdisciplinary teaming, advisory programs, varied instruction, exploratory programs, and transition programs.

Interdisciplinary teaming. Interdisciplinary teams consist of two or more teachers from different subject areas along with an assigned group of students whom they are charged with delivering curriculum and educational experiences that are developmentally appropriate for young adolescents (National

Middle School Association, 2004, National Middle School Association, 1996)). According to Valentine and Whitaker(1997),more than 50% of the middle schools in the United States have incorporated interdisciplinary teaming as part of their middle level program. Teaming can consist of multiage groups, looping, and schools-within-a-school. Multiage teams assign students from two or more grades together on a team. Looping consists of students remaining with the same core teachers as they move through middle school. Schools-within-a-school are used frequently as a means of separating middle grade students from the rest of the school population to give these students a sense of autonomy and community (George & Lounsbury, 2000). Teams typically range in size from 40 to 60 students with two teachers, to 150 – 190 students with six teachers. According to *Turning Points 2000*, teams should be no larger than 125 students with five teachers. The goal of interdisciplinary teaming is to coordinate instruction that is delivered in the classroom to improve student achievement. Classroom practices that impact instruction, which in turn impacts academic success, are curriculum coordination, coordination of student assignments, and assessments (Flowers, 2000). In order to have a successful team, members must have common planning time (National Middle school Association, 2004). This common planning time creates an opportunity for teachers to plan

collaboratively. During this time, in which the National Middle School Association (2003) recommends to be at least four times per week for thirty minutes per session, teachers can solve team problems, plan units, share reflections, coordinate team activities (tests, homework, projects), and integrate curriculum and instruction (Mills & Pollak, 1993, National Middle School Association, 2004).

There have been several studies relating the effectiveness of interdisciplinary teaming to student achievement and attendance. Aycock (2005) studied the difference in academic achievement, attendance and behavior between Mississippi middle schools where interdisciplinary teaming was implemented and middle schools were a junior high approach was used. Forty-nine middle schools with a grade configuration of six through eight were used for this study. The results of this study concluded that there was no significant difference in student achievement, attendance and behavior in grades six and seven between the middle schools that implemented interdisciplinary teaming and middle schools that did not. There was a significant difference in academic achievement in grade eight. Gray (2004) interviewed students from three urban middle schools to assess their opinions on the effectiveness of interdisciplinary teaming. The results of this study showed that the use of interdisciplinary teaming was a highly effective way to prepare middle school

students for high school and improve their attitudes about learning. Russell (1994) studied the implementation of middle level programs on student achievement. Professional staffs from ten urban school districts were surveyed and results of eighth grade students on the California Achievement Test served as the dependent variable. Results of this studies showed that five of the six middle level program concepts were relayed to enhanced student achievement. Sharts (1998) evaluated the effects of interdisciplinary teaming on Illinois eighth grade achievement on students that attended large (N=600+) middle schools. Achievement was measured from the state standardized test for grade configurations between grade five and nine. Results indicated that interdisciplinary teaming was a statistically significant predictor of math achievement but not for writing and reading. Washington (2000) researched the effects of interdisciplinary teaming on middle school climate and student achievement. Teachers in five suburban middle schools were surveyed to determine the perceived implementation of interdisciplinary teaming as a result of professional development. Results of the study showed a positive association among interdisciplinary teaming and student achievement scores. Results also indicated a more positive school climate among teachers who participated in the professional development. Weber (1994) compared school culture before and after the

implementation of middle school components that included interdisciplinary teaming. The schools used for comparison were suburban and formerly junior high schools. Two intact eighth grade classes were used as a comparison in the areas of achievement and affect. Results of the study showed significant difference in student achievement and attendance after integrating these middle school components.

Advisory programs. According to Wilson (1998), advisory programs are based on the concept that each child in the middle school should be known by at least one caring adult. These programs offer support to young adolescents as they make their way through a critical stage of their lives. Some of the specific purposes of advisory programs include;

1. Promoting opportunities for social development
2. Assisting students with academic problems
3. Facilitating positive involvement among teachers, administrators, and students
4. Providing an adult advocate for each student
5. Promoting positive school climate (Clark & Clark, 1994, pp. 135-136)

Beane and Lipka (1987) described advisory programs in the following manner:

> Advisory programs are designed to deal directly with the affective needs of transescents. Activities may range from

> non-formal interactions to the use of systematically developed units whose organizing centers are drawn from the common problems, needs, interests, or concerns of transescents, such as “getting along with peers,” “living in the school,” or “developing self-concept.” In the best of these programs, transescents have an opportunity to get to know one adult really well, to find a point of security in the institution, and to learn about what it means to be a healthy human being. (p. 40)

There have been many studies conducted regarding the implementation of advisory programs and student outcomes such as achievement, attendance, and self-efficacy. Caswell (2003) surveyed administrators, teachers and students in over two-hundred schools in sixteen states to analyze how advisory programs affect student grades and classroom behaviors. Results of this study indicated that frequency and duration of advisory programs have a significant impact on student achievement and student adjustment. Dooly (2005) studied the effectiveness of advisory programs in Arkansas secondary schools. Dooly concluded that no significant or consistent relationship existed between schools with advisory programs to academic or attendance measures. Moeller (2001) looked at the relationship between advisory programs implemented in a junior high school and student attendance, grades and student perceptions of school

climate. Results of this study indicated a relationship between advisory programs, student attendance and grades does not exist. Petritz (2004) interviewed fourteen teacher advisors in a large Montana school district on their perceptions of effective middle school teacher advisors. The subjects believed that they were effective and that being involved with advisees was critical in positive student outcomes. The subjects also stated that they developed positive relationships with their advisees. Spurgeon (2003) conducted a quantitative study using 600 middle school students in a Midwestern city to see if a relationship exists between implementation of certain middle school practices and student performance. Advisory programs were a part of these middle school practices. Spurgeon concluded that there was no statistical significance for grade seven for attendance and achievement but statistical significance found for eighth grade attendance and achievement.

Exploratory classes. In *This We Believe: Successful Schools for Young Adolescents* (National Middle School Association, 2003), curriculum for middle level students needs to be relevant, challenging, integrative, and exploratory. Middle schools have traditionally offered core and exploratory classes. Typically, core classes include math, language arts, social studies, and science. Classes that offer students the opportunity to explore new subjects and interests usually

include drama, foreign language, music, art, health, family & consumer science, and technology. According to Brazee (2000), the goal of these exploratory classes is to provide hands – on, participatory, engaging, and meaningful experiences that these students may never again be able to explore. These classes, whether they are called exploratory, block, or specials, allows students to learn new skills and engage in new ways of thinking. There are three models of exploratory programs found in the middle level grades. One is the traditional model where students participate in art, music, and a foreign language. Two, these courses may be in the form of mini-courses such as folktales and endangered species. The last model is an integration of these ideas within the core subject areas (Warren, 1998).

There are many studies that explore the correlation between schools that employ exploratory programs and student success. Baker (2001) surveyed principals in 278 schools that housed grade eight within K-8, 7-8, 7-12 and 6-8 schools. The purpose of this study was to determine the impact of middle level practices (including exploratory classes) on eighth grade Indiana state standardized exams. Baker concluded that success depended on configuration. A 7-8 grade configuration had a significantly higher eighth grade ISTEP score. Results also indicated that as the level of middle level practices increased so do the scores on the state standardized exam. Carothers

(1997) evaluated a specific middle school exploratory program by interviewing administrators, teachers and students. The study looked at perceptions from these stakeholders on the effectiveness of the program in regards to curricular and extracurricular decisions at the high school level. Results of the study concluded that the program was successful. There were student intellectual, social and emotional gains. Half of the seniors stated that they had an enriching experience in the exploratory programs in middle school. Marten (1998) studied the effects of middle school practices (including exploratory programs) at four middle schools in Kansas. Marten collected data through observations, interviews and focus groups. Results indicated that the strategies implemented were believed to be the reason for success. Pamperien (1997) studied academic achievement between junior high schools and middle schools in Missouri. Middle schools were defined as those schools that incorporated essential middle school components such as exploratory classes. Results indicated no statistically significant difference in language arts, reading, math and social studies. There was a statistically significant difference in science. Raymond (2005) looked at the effects of exploratory classes and other factors on student achievement in Colorado middle schools. The population for this study consisted of all middle schools in Colorado. Results of this descriptive study

indicated that schools with more exploratory classes were found to have more stable populations, smaller free and reduced lunch percentages and better scores on the Colorado standardized exam.

Academic Achievement

The last part of the conceptual framework upon which this study was based is academic achievement. Ever since the days of the one room school house, academic achievement has been dictated by outside influences such as; economics, science and politics. The change in the economic system of the late nineteenth century from agriculture to industry brought to an end the one room school house and ushered in the system of education that has dominated our schools until today. In the past seventy years, there have been several scientific, educational and political efforts to increase academic achievement among American students. These events have included; the launch of Sputnik, A Nation at Risk, Outcome-based Education, Goals 2000 and No Child Left Behind.

The effects of Sputnik. The launch of the Soviet satellite, Sputnik, created urgency in the United States to increase the math and science achievement of students. Initiatives such as NASA and the “New Math” came about in the late 1950’s and early 1960’s to help keep pace with the Soviet Union in regards to scientific achievement and mathematical skill (Kilpatrick,2009). This new math focused on abstract concepts such as set theory

and using number bases other than 10. This change away from traditional topics, such as arithmetic, was met by much opposition by teachers and parents primarily because neither party understood the new concepts. This new math slowly faded away by the end of the 1960's.

A Nation at Risk. In the early 1980's, President Reagan commissioned eighteen individuals to study the quality of teaching and learning in all spheres of private and public education (United States Government, 2009). The report entitled "A Nation at Risk" (published in 1983) noted several area of academic underachievement. The findings included; a drop in SAT scores between 1963 and 1980, a significant drop in students who could draw inferences from written material, only twenty percent of students could write a persuasive essay and two thirds of students could not solve multi-step math problems. President Reagan's Commission on Excellence in Education provided five major categories of improvements to be made to the American education system. These five categories involved recommendations in content, standards/expectations, length of day and school year, teaching and leadership/fiscal support (United States Government, 2009). The commission recommended an increase in the number of years students took math, science, social studies and computer science. The commission began recommending standardized tests of achievement during transition points throughout a

student’s school career. The commission also began the discussion of meeting the needs of certain subpopulation such as the gifted, economically disadvantaged, handicapped, minority and ESL students (United States Government, 2009). These points would later be the basis of the No Child Left Behind Act.

Outcome - based education. During the 1980’s and 1990’s, a standards approach to education became popular. This reform model called Outcome-based education was a student centered model that focused on the empirical measurement of student performance based on constructivist methods. Many progressive ideas were incorporated into this model including; block scheduling, project based learning, whole language reading and reform mathematics (McNeir, 1993). Those who favored outcomes believed that all students could achieve high standards regardless of race, gender or social status. Proponents also liked the idea that students actually demonstrated learning, no social promotion was accepted and that expectations could be measured against a fixed benchmark. Critics of Outcome-based education argued that standardized tests did not measure mastery of objectives and that these objectives could be set too low or too high. Other criticisms of this reform model include; an increase in teacher workload and additional resources being allocated towards struggling students. In Pennsylvania, the

outcomes movement was ultimately defeated by the incorporation of values and character education into the curriculum.

Goals 2000. In March of 1994, President Bill Clinton signed "The Goals 2000: Educate America Act" into law (United States Government, 2009). The goals of this legislation, which was based on principles from the outcomes movement, were to provide a framework for increasing student achievement by incorporating standards to measure student progress. Specific goals included; increasing graduation rates to 90%, students leaving grades 4, 8 and 12 must demonstrate competency in math, English, science, foreign language, civics and government, every adult in America would be literate, every school would be drug, violence and alcohol free and teachers would have access to professional development opportunities to instruct students for the next century (United States Government, 2009).

No Child Left Behind. In January of 2002, President George W. Bush signed into law the "No Child Left Behind Act of 2001". This legislation required states to develop high standards that could be measured by specific assessments in the various content areas. For Pennsylvania, the Pennsylvania System of School Assessment was developed (PSSA). The intent of this legislation was to increase accountability for states, school districts and school for academic achievement. This act also increased the

focus on reading and reauthorized the “Elementary and Secondary Education Act of 1965”.

For the basis of this study, academic achievement was determined by results from the Pennsylvania System of School Assessment (PSSA). In 1999, Pennsylvania adopted academic standards for Reading, Writing, and Mathematics. These standards identified what students should know and be able to do. School districts have the flexibility to create curriculum and instruction to ensure that these standards are met. The Pennsylvania System of School Assessment (PSSA) is a standards based criterion – referenced test used to measure a student’s attainment of the academic standards (Pennsylvania Department of Education, 2006).

Economically disadvantaged. It is uncertain exactly how many students are considered economically disadvantaged within a particular school or district. This uncertainty lays in the way that schools and districts measure this student subgroup. Schools and districts report a percentage of students in this category by the number of students receiving free and reduced lunches. According to Picucci, Brownson, Kahlert and Sobel (2004), incorporating elements of the middle school concept can improve student achievement in schools with a high number of economically disadvantaged students. These authors looked at seven high performing middle schools with typical middle grade

configurations. At least 50% of the student populations were on free and reduced lunch. All schools in the study held fundamental beliefs from the *Turning Points* model. These schools focused on excellence and equity, smaller learning communities and employed staff that had an understanding of young adolescents. The following middle school components were found across the seven schools:

- Student teams
- Common planning time for teachers
- Block scheduling
- Extended school day for struggling students
- Structured academic support programs
- After-school programs
- Expanded academic opportunities
- Transition programs

Along with their beliefs and the incorporation of middle school components, these schools relied on student data to make decisions regarding curriculum and instruction and provided on-going professional development for teachers. A study by Rangel (2002) looked at the relationship of middle school practices on the academic achievement of economically disadvantaged students. These students were of Hispanic descent and also in the sixth grade. General demographic information was obtained through a

survey while academic achievement was analyzed using data from the Texas Assessment of Academic Skills (TAAS). The population for this study was 80 middle schools with a student population between 200 and 1000. The schools were further arranged into high and low academic groups in reading and math. This study found a statistically significant difference between the two groups in math and reading in relation to the middle school practices examined. The middle school components that demonstrated a significant difference were advisory programs, interdisciplinary teaming and varied instruction. The components that did not show significant differences in achievement between the two groups were exploratory programs and transition programs.

Special education. Special education refers to those students who are educated under an Individualized Education Plan (IEP) or a Gifted Individualized Education Plan (GIEP). For the purpose of this study, only IEP students will be considered under special education. This researcher found no studies that looked at the affects of the middle school concept on special education students. This lack of research is a topic that needs to be studied further but is beyond the scope of this particular project.

Factors Affecting Academic Achievement

Student academic achievement can be influenced either positively or negatively from a variety of internal and external factors. These factors include; the quality of leadership demonstrated in a school, parental involvement, the learning style of students, and the level of teacher professional development.

Quality of leadership. According to Clark and Clark (2007), besides schools that deliver quality curriculum and instruction, strong leadership can improve student academic performance. Academic performance improves when principals demonstrate the following:

- Learning as a top priority
- High expectations and developmentally appropriate programs ensure success for all students
- Full implementation of the middle school concept
- Knowledge of middle school programs
- Collaboration and shared decision making
- Transformational leadership style

Schools that have a high level of success are led by principals that focus on student learning.

Parental involvement. According to Fan and Chen (2001), parental involvement is associated with enhanced student

achievement. The measures of parent involvement that Fan and Chen examined were communication, supervision, parental expectations and parenting style. Of the measures, parents with high expectations and an authoritarian parenting style was found to have the most impact on student performance. Authoritarian parents practice inductive, non-punitive punishment, demonstrate consistency in child rearing and communicate a clear interest in the day to day lives of their children. An increase in parent involvement leads to improved student performance, fosters better classroom behavior, improves attendance and improves student emotional well-being (Pate & Andrews, 2006).

Learning styles. According to Dunn, Honigsfeld, Doolan, Bostrom, Russo, Schiering, et al. (2009), students who had their learning styles accommodated were expected to achieve 75% of a standard deviation higher than students who did not have any learning style accommodations. These authors indicated a positive impact in student achievement when students' learning styles were incorporated into curriculum delivery.

Professional development. According to the National Middle School Association (2004), the goal of professional development, whether it is formal (attending classes, workshops, conferences) or informal (joint lesson planning, peer coaching, peer collaboration), is to improve student learning outcomes. The greatest impact on student achievement is to have well trained

teachers. Effective professional development has the following characteristics:

- It is based on best available research
- Standards-based
- Relevant and focused
- On-going and continuous
- Aligned with school-wide improvement goals
- Collaborative and collegial

One of seven recommendations from *Turning Points 2000* is to employ on-going, targeted professional development for staff in middle schools.

Conclusion

Thomas Jefferson spoke of our liberty and the insurance of peace in 1787 when he spoke these words to James Madison,

> And say, finally, whether peace is best preserved by giving energy to the government or information to the people. This last is the most certain and the most legitimate engine of government. Enable them to see that it is their interest to preserve peace and order, and they will preserve them. And it requires no very high degree of education to convince them of this. They are the only sure reliance for the preservation of our liberty.

Ever since the founding of our nation, it has been the goal of its citizens and those in authority to carry on this grand experiment we call democracy through the passing on of knowledge from one generation to the next.

The education of young adolescents proves to be a challenge due to the unique physical, cognitive, and psycho-social changes these young people are experiencing. The development of the junior high school was meant to meet these unique needs, however, this infrastructure proved ineffective because it turned into a situation that mirrored the high school program. What we now consider to be a “middle school” was developed in the mid twentieth-century as an answer to this problem. Middle schools use a variety of programs and strategies such as interdisciplinary teaming, advisory programs, exploratory classes, and varied instruction to increase the academic achievement of transescents. It is particularly important to focus efforts on academic achievement due to the recent standards and accountability movement. This recent movement has roots in several past reform efforts such as the New Math, A Nation at Risk, Outcomes Based Education and Goals 2000. Now, the effectiveness of schools is based on a standardized test called the PSSA.

As schools and districts strive to implement programs and infrastructure changes to meet the achievement goals set by the

Pennsylvania Department of Education, research must be conducted on these changes to determine the impact on student achievement. It is important to note that the middle school concept may have an indirect influence on the academic achievement of students. By its very nature, the middle school concept strives to meet the needs of young adolescents socially and emotionally, as well as, academically. This attempt at creating a nurturing, safe environment for adolescents may also lead to improved academic success. As the percentages that schools and districts need in math and reading continue to increase in order to meet adequate yearly progress (AYP), data from current programming and curriculum need to be collected and analyzed for effectiveness. The programs and curriculum that are not performing need to be changed or eliminated. Programs and curriculum that are being considered for implementation need also to be scientifically based and studied for the desired outcomes. This study looked at the middle school model to see if its implementation had an effect on student achievement. The results may help schools and districts in their decision making process whether or not to continue with the current design or seek out more productive avenues to educate young adolescents.

CHAPTER III

METHODOLOGY

Introduction

Educators have spent the previous one hundred years attempting to meet the distinctive needs of young adolescents. These students, between the ages of 10 and 15, have unique academic, cognitive, and psycho-social needs that require specific strategies and infrastructure in order to prepare them for high school. Early Twentieth Century educators developed the junior high school which focused on these middle level students. Unfortunately, these junior high schools morphed into schools that reflected a mini-high school. The original intent to meet the inimitable needs of young adolescents was lost. By the mid-Twentieth Century, educators began to re-examine the education they were offering to middle level students. Out of this discussion and self-evaluation, came the concept of the middle school. Today, middle schools are developed around core ideals that are specifically geared towards young adolescents. The education of young adolescents has evolved to include specialized programs, specially trained teachers, and infrastructure that accommodate the social and cognitive needs of these students. Chapter three described the methodology of the study, the selection of the sample, and the methods used to

analyze the data. This study analyzed existing school level data on academic achievement and compared traditional junior high schools with modern middle schools. All of the data were available from the Pennsylvania Department of Education, SchoolDataDirect and the Pennsylvania School Profiles website.

Statement of the Problem

The purpose of this quantitative study was to use existing data to compare academic achievement between middle schools and traditional junior high schools. The questions of this study derived from the debate on whether or not the middle school, with all of its components that are specifically geared towards young adolescents and their unique needs, had an impact on achievement. There have been many research studies on the individual components of the middle school design and their success on student achievement but few have been found that compare the educational results between the various school structures that serve young adolescents in Pennsylvania.

Research Questions

Question 1. Based on the PSSA scores, what was the difference in academic achievement for students (all students, special education students, and economically disadvantaged students) in junior high schools as opposed to middle schools?

Sub-question 1: What was the difference in the changes between the 2005 fifth grade and 2008 eighth grade

PSSA math and reading scaled scores (all students)in junior high scores as opposed to middle schools?

Sub-question 2: What was the difference in the percentage of the schools' students (all students, special education students, and economically disadvantaged students)who scored in the advanced quartile on the 2005 fifth grade PSSA math and reading tests as compared to the number of students (all students, special education students, and economically disadvantaged students)who scored in the advanced quartile on the 2008 eighth grade PSSA math and reading tests between middle schools and junior high schools?

Sub-question 3: What was the difference in the percentage of the schools' students (all students, special education students, and economically disadvantaged students)who scored in the proficient quartile in the 2005 fifth grade PSSA math and reading tests as compared to the number of students (all students, special education students, and economically disadvantaged students)who scored in the proficient quartile on the 2008 eighth grade PSSA math and reading tests between middle schools and junior high schools?

Sub-question 4: What was the difference in the percentage of the schools' students (all students, special

education students, and economically disadvantaged students) who scored in the basic quartile in the 2005 fifth grade PSSA math and reading tests as compared to the number of students (all students, special education students, and economically disadvantaged students)who scored in the basic quartile on the 2008 eighth grade PSSA math and reading tests between middle schools and junior high schools?

Sub-question 5: What was the difference in the percentage of the schools' students (all students, special education students, and economically disadvantaged students) who scored in the below basic quartile in the 2005 fifth grade PSSA math and reading tests as compared to the number of students (all students, special education students, and economically disadvantaged students)who scored in the below basic quartile on the 2008 eighth grade PSSA math and reading tests between middle schools and junior high schools?

Sample Selection

All public schools in Pennsylvania that contained grade seven in their configuration and also met the definition of a middle school and junior high school as defined in this dissertation were included. To determine school configuration type, the SchoolDataDirect website was utilized. This website

provided grade levels for individual schools throughout Pennsylvania, as well as, percentage of low income students and total school enrollment. Schools that met the definition for middle level schools and junior high schools were used for this study. To place these schools into the proper category as either a middle school or junior high school, the principal or their designee of all of the schools was contacted via e-mail and asked how many of the six middle school components were evident in their program (see page ten for a listing of these components). Those middle schools that reported using at least five of the six components were used. The junior high schools that were a part of this study reported using no more than two of the six middle level components. The deficiency in establishing school configuration type is that there was no middle level certification or recognition. Using PDE classification, these schools were further separated into rural, suburban, and urban institutions. Within these categories, each middle school was randomly paired with a junior high school of similar enrollment and percentage of economically disadvantaged students. The variables of enrollment and percent of low-income students were based on data from the SchoolDataDirect website. By using this method, the overall demographics of middle schools and junior high schools were similar.

Data Sources

This study utilized data from three sources. The SchoolDataDirect website provided school grade level configuration, percentage of low income students and total school enrollment. The PDE website provided the percentage of students scoring in each quartile on the math and reading PSSA. Data pertaining to school classification of rural, suburban or urban was taken from the PA School Profiles website. PSSA scaled score data were provided by individuals from the Pennsylvania Department of Education. The data used from the Department of Education and SchoolDataDirect was school level data and no information from individual students was released. This study used achievement data from the 2005 and 2008 school years.

PSSA Tests

The Pennsylvania System of State Assessments (PSSA) are a series of criterion-referenced tests in the areas of mathematics, reading, writing, and science. These tests are based on academic standards that describe what each student in a specific grade level should know and be able to do. These tests are given to students in grades three through eight and eleven. The exception is in science where the test is given to grades eight and eleven. A comparative analysis in Science was not be made, at this time, due to the recent inclusion of this test into the PSSA series. There are no Science scores for the year

2005. The Pennsylvania Department of Education's website provides school level scores for these various tests. The PSSA exams are aligned with the federal No Child Left Behind Act and based on content standards set by the Pennsylvania Department of Education. Schools are measured by Adequate Yearly Progress. This measure represents a percentage of students demonstrating proficiency or advanced standing on the math and reading PSSA exams. As of this date, the writing and science PSSA exams are not calculated for AYP. For the school year 2005 to 2007, the percentages for meeting AYP were 54% for reading and 45% in math. For the school years 2008 to 2010, the percentages for meeting AYP are 63% for reading and 56% in math. The percentages for making AYP will increase to 72% for reading and 67% for math for the school year 2011. By the year 2014, all schools need to demonstrate 100% proficiency in math and reading for all students. Besides demonstrating AYP for math and reading, schools need to meet 95% participation on both exams and meet minimum levels in attendance, graduation rate and growth for sub-populations such as economically disadvantaged and special education.

School Control Variables

Academic achievement is influenced by many factors. This study considered factors such as percentage of low-income students, total school enrollment and school classification such

as rural, suburban, or urban. This demographic information can be found on the School Profile page of PDE and the SchoolDataDirect website.

Academic Achievement Data

The Pennsylvania System of School Assessment (PSSA) exam was taken by nearly all Pennsylvania students in math and reading in grades three through eight and eleven. The changes between each schools' 2005 fifth grade and 2008 eighth grade PSSA math and reading scores, the percentage change of students scoring in each quartile i.e. advanced, proficient, basic, below basic, on the 2005 fifth grade, as compared to the 2008 eighth grade PSSA math and reading tests was used to determine the level of academic achievement. Comparisons were made using PSSA data from 2005 and 2008 for all students in the sample, as well as, the economically disadvantaged and special education sub-population.

Data Analysis Procedures

This quantitative study used four types of variables to describe the schools in the sample. The control variables were the percentage of low-income students, total school enrollment, and the classification of the schools as rural, urban, or suburban. The independent variable were the grade configuration either as a middle school or junior high school. The dependant variables were categorized into two groups. Academic achievement

was measured by the changes from the 2005 fifth grade to the 2008 eighth grade PSSA math and reading scores, the change in the percentage of students scoring in each quartile on the 2005 fifth grade, as compared to the 2008 eighth grade, PSSA math and reading exams.

A frequency, range, means, standard deviation, minimum, and maximum was calculated for each of the variables in the study. Multiple analysis of covariance was used to determine the effect of school configuration on the change from the 2005 fifth grade to the 2008 eighth grade PSSA math scores, the change in the percentage of students scoring in each quartile on the 2005 fifth grade PSSA math exam as compared to the 2008 eighth grade math exam, the change from the 2005 fifth grade to the 2008 eighth grade PSSA reading scores and the change in the percentage of students scoring in each quartile on the 2005 fifth grade PSSA reading exam as compared to the 2008 eighth grade reading exam. Multiple analysis of covariance showed if variations in the dependant variables between middle schools and junior high schools were statistically significant.

Null Hypothesis

Null hypothesis 1. The change in a schools' scaled math and reading scores (all students)from the 2005 fifth grade PSSA exam to the 2008 eighth grade PSSA exam was not related to school configuration.

Null hypothesis 2. The change in the percentage of students (all students, special education students, and economically disadvantaged students) who scored in the advanced quartile on the 2005 fifth grade PSSA math and reading exams as compared to the percentage of students (all students, special education students, and economically disadvantaged students) who scored in the advanced quartile on the 2008 eighth grade PSSA math and reading exams was not related to school configuration.

Null hypothesis 3. The change in the percentage of students (all students, special education students, and economically disadvantaged students) who scored in the proficient quartile on the 2005 fifth grade PSSA math and reading exams as compared to the percentage of students (all students, special education students, and economically disadvantaged students) who scored in the proficient quartile on the 2008 eighth grade PSSA math and reading exams was not related to school configuration.

Null hypothesis 4. The change in the percentage of students (all students, special education students, and economically disadvantaged students) who scored in the basic quartile on the fifth grade PSSA math and reading exams as compared to the percentage of students (all students, special education students, and economically disadvantaged students) who scored in the basic quartile on the eighth grade PSSA math and reading exams was not related to school configuration.

Null hypothesis 5. The change in the percentage of students (all students, special education students, and economically disadvantaged students) who scored in the below basic quartile on the fifth grade PSSA math and reading exams as compared to the percentage of students (all students, special education students, and economically disadvantaged students) who scored in the below basic quartile on the eighth grade PSSA math and reading exams was not related to school configuration.

Summary

This study was designed to determine the effects school configuration had on academic achievement. Academic achievement was measured by standardized test scores. Because many variables can affect academic achievement, total school enrollment, percentage of low-income students, and the PA School Profile's classification of rural, suburban, and urban were included to insure that this study was not compromised by unrelated demographics. By controlling the demographical differences between middle schools and junior high schools in this study, it minimized the effect they had on the analysis and conclusion. The middle school concept may indirectly affect student achievement by creating an environment (based on the special programming) that is safe and nurturing.

Multiple analysis of covariance of school configuration made it possible to determine variations in academic achievement

due to the structure of grade levels. This data should assist districts in determining the most effective grade configuration due to any type of new construction or renovation projects.

CHAPTER IV

DATA AND ANALYSIS

Introduction

The purpose of this quantitative study was to use existing data to compare academic achievement between middle schools and traditional junior high schools. The questions of this study derived from the debate on whether or not the middle school, with all of its components that are specifically geared towards young adolescents and their unique needs, had an impact on achievement. There have been many research studies on the individual components of the middle school design and their success on student achievement but few have been found that compare the educational results between the various school structures that serve young adolescents in Pennsylvania.

Research Questions

Question 1. Based on the PSSA scores, what was the difference in academic achievement for students (all students, special education students, and economically disadvantaged students) in junior high schools as opposed to middle schools?

Sub-question 1: What was the difference in the changes between the 2005 fifth grade and 2008 eighth grade PSSA math and reading scaled scores (all students)in junior high scores as opposed to middle schools?

Sub-question 2: What was the difference in the percentage of the schools' students (all students, special education students, and economically disadvantaged students)who scored in the advanced quartile on the 2005 fifth grade PSSA math and reading tests as compared to the number of students (all students, special education students, and economically disadvantaged students)who scored in the advanced quartile on the 2008 eighth grade PSSA math and reading tests between middle schools and junior high schools?

Sub-question 3: What was the difference in the percentage of the schools' students (all students, special education students, and economically disadvantaged students)who scored in the proficient quartile in the 2005 fifth grade PSSA math and reading tests as compared to the number of students (all students, special education students, and economically disadvantaged students)who scored in the proficient quartile on the 2008 eighth grade PSSA math and reading tests between middle schools and junior high schools?

Sub-question 4: What was the difference in the percentage of the schools' students (all students, special education students, and economically disadvantaged students) who scored in the basic quartile in the 2005

fifth grade PSSA math and reading tests as compared to the number of students (all students, special education students, and economically disadvantaged students)who scored in the basic quartile on the 2008 eighth grade PSSA math and reading tests between middle schools and junior high schools?

Sub-question 5: What was the difference in the percentage of the schools' students (all students, special education students, and economically disadvantaged students) who scored in the below basic quartile in the 2005 fifth grade PSSA math and reading tests as compared to the number of students (all students, special education students, and economically disadvantaged students)who scored in the below basic quartile on the 2008 eighth grade PSSA math and reading tests between middle schools and junior high schools?

This chapter represents the procedures and results of the data analysis used in this study. Data concerning academic achievement was analyzed using descriptive statistics when discussing the schools comprising the sample. T-tests were used to analyze academic achievement between school structures. Multiple regression analysis was used to determine a relationship between school structure, percentage of low – income students, and total school enrollment to any variable of

academic achievement. To finish, the relationship between the control variables and the measure of academic achievement or the related variables were analyzed using multiple regression. The data were analyzed for all students in the sample, as well as, the special education and economically disadvantaged sub-populations.

The Sample Population

Two hundred and twenty – six middle schools and ninety – four junior high schools were contacted via e-mail to inquire as to the number of middle level components that were evident in their school. The contact person for these schools was the building principal. These schools were selected based on the grade configuration for middle schools and junior high schools outlined in this dissertation. Of the one hundred and forty – two schools that responded, the final population consisted of eighty – six middle schools and twenty – six junior high schools. These schools met the appropriate definition of middle/junior high schools outlined in this dissertation. Those middle schools that reported using at least five of the six middle level components were used. The junior high schools that were a part of this study reported using no more than two of the six middle level components (see page ten for a listing of these components). Each school was categorized as urban, suburban, or rural as determined by the PA School Profiles website. The

SchoolDataDirect website provided data regarding total school enrollment and the percentage of economically disadvantaged students. The total sample contained twenty middle schools and twenty junior high schools that were similar in regards to classification, total school enrollment, and percentage of economically disadvantaged students.

Independent and Control Variables

The independent variable was the school structure used by an individual school; either middle school or junior high school. No school was included in the sample that did not meet the grade configuration and definition of said school outlined in this study. The control variables were the percentage of low – income students, total school enrollment, and the classification of rural, suburban, and urban. The school structure was determined via e-mail to specific school principals and the control variables were obtained from PA School Profiles and SchoolDataDirect.

Descriptive Statistics of Academic Achievement

Descriptive statistics were used to describe the schools in the sample. The number of schools, the range, minimum, maximum, mean, and standard deviation were used to describe the academic achievement variables for all students, special education students, and economically disadvantaged students in the school sample.

The academic achievement variables are as follows; the 2008 eighth grade PSSA math and reading scaled scores, the 2005 eighth grade math and reading scaled scores, the change from the 2005 eighth grade PSSA math and reading scaled scores to the 2008 PSSA eighth grade math and reading scaled scores, the percentage of student scoring in each quartile on the 2005 and 2008 PSSA math and reading exams (all students, special education students, and economically disadvantaged students), the change in the percentage of students in each quartile on the 2005 and 2008 PSSA math and reading exams.

The schools in the sample had a broad variation in all of the factors associated with academic achievement (Tables 1, 2, and 3). The ranges of the variables, minimums, maximums, means, and standard deviation are also shown in tables 1, 2, and 3. A review of the tables shows that the change from the 2008 eighth grade PSSA math score to the 2005 eighth grade PSSA math score ranged from a minimum of -121.1 points to a maximum of 134.2 points, with an average of -8.3 points. The changes in the PSSA reading scores ranged from a minimum of 33.3 points to a maximum of 286.6 points with an average of 151.4 points. The percentage of students (all students, special education students, and economically disadvantaged students) scoring in each quartile on the 2005 fifth grade PSSA math and reading exams and the 2008 eighth grade PSSA math and reading exams had a very wide

variation in all of the descriptive measurements. The changes in the percentage of all students scoring in each quartile in 2008 as compared to 2005 in math ranged from -32.8 to 36.1. The changes in the percentage of special education students scoring in each quartile in 2008 as compared to 2005 in math ranged from -9 to 60. The changes in the percentage of economically disadvantaged students scoring in each quartile in 2008 as compared to 2005 in math ranged from -9 to 47. The changes in each quartile in reading had a wider range for all students and economically disadvantaged students with a minimum of -39.2 to 63.5 and -8 to 60 respectively.

Table 1.

Summary of Descriptive Statistics of Academic Achievement (All Schools, All Students)

	Number	Range	Min.	Max.	Mean	Std.Dev.
2008 8th Grade PSSA Math	40	265.1	1309.7	1574.8	1422.6	60.6
2008 8th Grade PSSA Math (Percent Advanced)	40	52.3	24.2	76.5	45.4	12.1
2008 8th Grade PSSA Math (Percent Proficient)	40	31.2	16.1	47.3	29.0	6.4
2008 8th Grade PSSA Math (Percent Basic)	40	21.2	5.2	26.4	13.2	5.2
2008 8th Grade PSSA Math (Percent Below Basic)	40	31.1	2.2	33.3	12.3	5.7
2005 5th Grade PSSA Math	40	273.5	1297.1	1570.6	1430.9	61.6
2005 5th Grade PSSA Math (Percent Advanced)	40	52.0	11.4	63.4	38.3	12.7
2005 5th Grade PSSA Math (Percent Proficient)	40	21.6	22.6	44.3	33.0	4.5
2005 5th Grade PSSA Math (Percent Basic)	40	32.4	5.7	38.1	19.5	8.4
2005 5th Grade PSSA Math (Percent Below Basic)	40	21.6	.7	22.4	9.1	4.9
Change in PSSA Math	40	255.3	-121.1	134.2	-8.2	62.9
Change in PSSA Math (Percent Advanced)	40	55.7	-19.6	36.1	7.0	14.6
Change in PSSA Math (Percent Proficient)	40	40.2	-26.5	13.7	-3.9	7.5
Change in PSSA Math (Percent Basic)	40	41.1	-32.8	8.3	-6.3	8.9

Table 1 (cont.).

Summary of Descriptive Statistics of Academic Achievement (All Schools)

	Number	Range	Min.	Max.	Mean	Std.Dev.
Change in PSSA Math (Percent Below Basic)	40	35.9	-8.2	27.7	3.1	6.1
2008 8th Grade PSSA Read.	40	381.8	1362.6	1744.4	1508.3	75.6
2008 8th Grade PSSA Read. (Percent Advanced)	40	59.4	31.9	91.3	58.7	12.1
2008 8th Grade PSSA Read. (Percent Proficient)	40	28.4	7.0	35.4	24.3	6.5
2008 8th Grade PSSA Read. (Percent Basic)	40	21.3	.9	22.2	8.6	4.2
2008 8th Grade PSSA Read. (Percent Below Basic)	40	19.8	.0	19.8	8.1	4.4
2005 5th Grade PSSA Read.	40	290.9	1219.3	1510.2	1356.3	56.7
2005 5th Grade PSSA Read. (Percent Advanced)	40	37.1	12.1	49.2	24.7	8.7
2005 5th Grade PSSA Read. (Percent Proficient)	40	32.1	33.0	65.1	45.3	6.6
2005 5th Grade PSSA Read. (Proficient Basic)	40	22.8	6.8	29.6	16.2	4.7
2005 5th Grade PSSA Read. (Percent Below Basic)	40	25.4	1.9	27.3	13.6	6.3
Change in PSSA Reading	40	255.3	33.3	286.6	151.3	55.2
Change in PSSA Reading (Percent Advanced)	40	51.6	11.9	63.5	34.0	9.1
Change in PSSA Reading (Percent Proficient)	40	38.9	-39.2	-.3	-20.9	8.7

Table 1 (cont.).

Summary of Descriptive Statistics of Academic Achievement (All Schools)

	Number	Range	Min.	Max.	Mean	Std.Dev.
Change in PSSA Reading (Percent Basic)	40	27.0	-20.5	6.5	-7.5	5.7
Change in PSSA Reading (Percent Below Basic)	40	21.4	-17.7	3.7	-5.4	5.6

Table 2.

Summary of Descriptive Statistics of Academic Achievement (All Schools, IEP Students)

	Number	Range	Min.	Max.	Mean	Std.Dev.
2008 8th Grade PSSA Math (Percent Advanced)	33	38.5	.0	38.5	8.0	10.1
2008 8th Grade PSSA Math (Percent Proficient)	33	37.5	.0	37.5	21.1	10.3
2008 8th Grade PSSA Math (Percent Basic)	33	36.9	4.3	41.2	19.3	7.9
2008 8th Grade PSSA Math (Percent Below Basic)	33	80.9	10	90.9	51.6	17.4
2005 5th Grade PSSA Math (Percent Advanced)	28	26	0	26	11.8	8.6
2005 5th Grade PSSA Math (Percent Proficient)	28	40	0	40	15.9	9.8
2005 5th Grade PSSA Math (Percent Basic)	28	57	6	63	27.3	12.9
2005 5th Grade PSSA Math (Percent Below Basic)	28	72	0	72	43	18.6
Change in PSSA Math (Percent Advanced)	25	39	-9	30	1.2	9.4
Change in PSSA Math (Percent Proficient)	25	38	-8	30	5.7	10.0
Change in PSSA Math (Percent Basic)	25	36	-5	31	1.9	8.0

Table 2 (cont.).

Summary of Descriptive Statistics of Academic Achievement (All Schools, IEP Students)

	Number	Range	Min.	Max.	Mean	Std.Dev.
Change in PSSA Math (Percent Below Basic)	25	66	-6	60	12.6	15.1
2008 8th Grade PSSA Read.33 (Percent Advanced)		61.5	.0	61.5	16.7	14.1
2008 8th Grade PSSA Read.33 (Percent Proficient)		52.9	.0	52.9	24.8	12.4
2008 8th Grade PSSA Read.33 (Percent Basic)		40.5	5	45.5	23.3	10.5
2008 8th Grade PSSA Read.33 (Percent Below Basic)		80	.0	80	35.2	17.8
2005 5th Grade PSSA Read.40 (Percent Advanced)		129	-99	30	-24.5	49.8
2005 5th Grade PSSA Read.40 (Percent Proficient)		146	-99	47	-16.9	55.0
2005 5th Grade PSSA Read.28 (Percent Basic)		50	0	50	20.0	11.5
2005 5th Grade PSSA Read.28 (Percent Below Basic)		72	20	92	52.8	16.9
Change in PSSA Reading (Percent Advanced)	26	43	-3	40	9.4	10.5
Change in PSSA Reading (Percent Proficient)	26	56	-6	50	9.6	14.8
Change in PSSA Reading (Percent Basic)	24	38	-8	30	7.6	10.0
Change in PSSA Reading (Percent Below Basic)	26	20	-8	12	-1.6	3.8

Table 3.

Summary of Descriptive Statistics of Academic Achievement (All Schools, ED Students)

	Number	Range	Min.	Max.	Mean	Std.Dev.
2008 8th Grade PSSA Math (Percent Advanced)	38	65	0	65	29.8	13.1
2008 8th Grade PSSA Math (Percent Proficient)	38	37	13	50	31.3	8.8
2008 8th Grade PSSA Math (Percent Basic)	38	33	0	33	16.9	7.6
2008 8th Grade PSSA Math (Percent Below Basic)	38	54	2	56	20.7	11.0
2005 5th Grade PSSA Math (Percent Advanced)	34	75	6	81	26.3	16.2
2005 5th Grade PSSA Math (Percent Proficient)	34	45	8	53	32.8	9.4
2005 5th Grade PSSA Math (Percent Basic)	34	45	5	50	25.8	12.1
2005 5th Grade PSSA Math (Percent Below Basic)	34	37	0	37	16.2	8.5
Change in PSSA Math (Percent Advanced)	34	43	-7	36	7.9	12.5
Change in PSSA Math (Percent Proficient)	34	25	-8	17	.7	5.9
Change in PSSA Math (Percent Basic)	34	25	-9	16	-.03	5.7

Table 3 (cont.).

Summary of Descriptive Statistics of Academic Achievement (All Schools, ED Students)

	Number	Range	Min.	Max.	Mean	Std.Dev.
Change in PSSA Math (Percent Below Basic)	34	56	-9	47	6.4	10.7
2008 8th Grade PSSA Read. (Percent Advanced)	38	60	18	78	41.1	11.9
2008 8th Grade PSSA Read. (Percent Proficient)	38	36	9	45	29.4	8.9
2008 8th Grade PSSA Read. (Percent Basic)	38	28	3	31	13.8	6.5
2008 8th Grade PSSA Read. (Percent Below Basic)	38	29	0	29	13.9	7.9
2005 5th Grade PSSA Read. (Percent Advanced)	34	27	0	27	12.5	6.4
2005 5th Grade PSSA Read. (Percent Proficient)	34	38	26	64	40.9	10.1
2005 5th Grade PSSA Read. (Percent Basic)	34	20	11	31	21.4	6.2
2005 5th Grade PSSA Read. (Percent Below Basic)	34	40	5	45	23.6	9.5
Change in PSSA Reading (Percent Advanced)	34	53	7	60	27.7	10.8
Change in PSSA Reading (Percent Proficient)	34	22	-8	14	-.9	4.5
Change in PSSA Reading (Percent Basic)	31	27	-8	19	.1	5.2
Change in PSSA Reading (Percent Below Basic)	33	17	-8	9	-1.4	3.8

These variables are higher than the state averages for the scaled scores used in this study. In 2008, the Pennsylvania average on the eighth grade PSSA exams were 1404.1 in math and 1355.3 in reading. This compares to the sample average of 1422.7 in math and 1508.4 in reading. The state averages on the 2005 fifth grade PSSA exams were 1369.9 in math and 1327.3 in reading. This compares to the sample average of 1430.9 in math and 1356.4 in reading. The percentage of students (all students, special education students, and economically disadvantaged students) scoring in the advanced quartile increased for both math and reading by a minimum of 1.8 to a maximum of 6.9. The state averages are summarized in tables 4, 5, and 6.

Table 4.

Summary of Descriptive Statistics of State Averages of Academic Achievement (All Schools, All Students)

	State Average
2008 8th Grade PSSA Math	1404.1
2008 8th Grade PSSA Math (Percent Advanced)	42.2
2008 8th Grade PSSA Math (Percent Proficient)	30.3
2008 8th Grade PSSA Math (Percent Basic)	14
2008 8th Grade PSSA Math (Percent Below Basic)	13.5
2005 5th Grade Math	1369.9
2005 5th Grade Math (Percent Advanced)	38.6
2005 5th Grade Math (Percent Proficient)	31.0
2005 5th Grade Math (Percent Basic)	19.1
2005 5th Grade Math (Percent Below Basic)	11.3
Change in PSSA Math	+34.1
Change in PSSA Math (Percent Advanced)	+3.6
Change in PSSA Math (Percent Proficient)	-.7
Change in PSSA Math (Percent Basic)	-5.1
Change in PSSA Math (Percent Below Basic)	+2.2
2008 8th Grade PSSA Reading	1355.2
2008 8th Grade PSSA Reading (Percent Advanced)	29.5
2008 8th Grade PSSA Reading (Percent Proficient)	39.3
2008 8th Grade PSSA Reading (Percent Basic)	15.8
2008 8th Grade PSSA Reading (Percent Below Basic)	15.4

Table 4 (cont.).

Summary of the Descriptive Statistics of State Averages of Academic Achievement (All Schools, All Students)

	State Average
2005 5th Grade PSSA Reading	1327.2
2005 5th Grade PSSA Reading (Percent Advanced)	22.6
2005 5th Grade PSSA Reading (Percent Proficient)	41.4
2005 5th Grade PSSA Reading (Percent Basic)	17.2
2005 5th Grade PSSA Reading (Percent Below Basic)	18.8
Change in PSSA Reading	+27.9
Change in PSSA Reading (Percent Advanced)	+6.9
Change in PSSA Reading (Percent Proficient)	-2.1
Change in PSSA Reading (Percent Basic)	-1.4
Change in PSSA Reading (Percent Below Basic)	-3.4

Table 5.

Summary of Descriptive Statistics of State Averages of Academic Achievement (All Schools, IEP Students)

	State Average
2008 8th Grade PSSA Math	1221.0
2008 8th Grade PSSA Math (Percent Advanced)	15.3
2008 8th Grade PSSA Math (Percent Proficient)	23.3
2008 8th Grade PSSA Math (Percent Basic)	20
2008 8th Grade PSSA Math (Percent Below Basic)	41.5
2005 5th Grade Math	1178.4
2005 5th Grade Math (Percent Advanced)	13.5
2005 5th Grade Math (Percent Proficient)	23.1
2005 5th Grade Math (Percent Basic)	27.9
2005 5th Grade Math (Percent Below Basic)	35.6
Change in PSSA Math	+42.6
Change in PSSA Math (Percent Advanced)	+1.8
Change in PSSA Math (Percent Proficient)	+.2
Change in PSSA Math (Percent Basic)	-7.9
Change in PSSA Math (Percent Below Basic)	+5.9
2008 8th Grade PSSA Reading	1164.2
2008 8th Grade PSSA Reading (Percent Advanced)	8.3
2008 8th Grade PSSA Reading (Percent Proficient)	23.2
2008 8th Grade PSSA Reading (Percent Basic)	21.2
2008 8th Grade PSSA Reading (Percent Below Basic)	47.3

Table 5 (cont.).

Summary of the Descriptive Statistics of State Averages of Academic Achievement (All Schools, IEP Students)

	State Average
2005 5th Grade PSSA Reading	1090.9
2005 5th Grade PSSA Reading (Percent Advanced)	6.2
2005 5th Grade PSSA Reading (Percent Proficient)	22.2
2005 5th Grade PSSA Reading (Percent Basic)	27.9
2005 5th Grade PSSA Reading (Percent Below Basic)	35.6
Change in PSSA Reading	+73.26
Change in PSSA Reading (Percent Advanced)	+2.1
Change in PSSA Reading (Percent Proficient)	+1
Change in PSSA Reading (Percent Basic)	+.8
Change in PSSA Reading (Percent Below Basic)	-4

Table 6.

Summary of Descriptive Statistics of State Averages of Academic Achievement (All Schools, ED Students)

	State Average
2008 8th Grade PSSA Math	1331.6
2008 8th Grade PSSA Math (Percent Advanced)	28.7
2008 8th Grade PSSA Math (Percent Proficient)	32.6
2008 8th Grade PSSA Math (Percent Basic)	18.7
2008 8th Grade PSSA Math (Percent Below Basic)	20
2005 5th Grade Math	1018.3
2005 5th Grade Math (Percent Advanced)	24.3
2005 5th Grade Math (Percent Proficient)	31.7
2005 5th Grade Math (Percent Basic)	26.1
2005 5th Grade Math (Percent Below Basic)	17.9
Change in PSSA Math	+313.3
Change in PSSA Math (Percent Advanced)	+4.4
Change in PSSA Math (Percent Proficient)	+.9
Change in PSSA Math (Percent Basic)	-7.4
Change in PSSA Math (Percent Below Basic)	+2.1
2008 8th Grade PSSA Reading	1285.3
2008 8th Grade PSSA Reading (Percent Advanced)	18
2008 8th Grade PSSA Reading (Percent Proficient)	38.4
2008 8th Grade PSSA Reading (Percent Basic)	20.7
2008 8th Grade PSSA Reading (Percent Below Basic)	22.9

Table 6 (cont.).

Summary of the Descriptive Statistics of State Averages of Academic Achievement (All Schools, ED Students)

	State Average
2005 5th Grade PSSA Reading	1236.6
2005 5th Grade PSSA Reading (Percent Advanced)	11.5
2005 5th Grade PSSA Reading (Percent Proficient)	36.9
2005 5th Grade PSSA Reading (Percent Basic)	22.3
2005 5th Grade PSSA Reading (Percent Below Basic)	29.3
Change in PSSA Reading	+48.7
Change in PSSA Reading (Percent Advanced)	+6.5
Change in PSSA Reading (Percent Proficient)	+1.5
Change in PSSA Reading (Percent Basic)	-1.6
Change in PSSA Reading (Percent Below Basic)	-6.4

The control variables are described in table 7. Total school enrollment varied from 296 students to 930 students with a mean of 577. The percentage of low – income students ranged from 2.7% to 48.8% with a mean of 31.1%.

Table 7.

Summary of the Control Variables (All Schools)

	Number	Range	Min.	Max.	Mean	Std. Dev.
Percentage of Low-Income Students	40	46.1	2.7	48.8	31.1	11.9
Total Student Enrollment	40	634	296	930	577	162.7

Summary of the Descriptive Results of the Academic Achievement of Middle Schools vs. Junior High Schools

There is much variation in the descriptive statistics of academic achievement between middle schools and junior high schools. This is true for all students, special education students, and economically disadvantaged students. Middle schools and junior high schools are compared in tables 8, 9, and 10. For all students, the middle schools have higher mean scaled scores in both math and reading. In regards to the quartile percentages for all students, the junior high schools have higher mean scores by a three to one ratio for math and reading. For all students, the middle schools have higher scores in math and reading in the changes between the years 2005 and 2008. For special education students, middle schools have higher scores in the changes between 2005 and 2008 for the advanced, proficient, and basic quartiles in math. Middle schools also have higher scores in the changes between 2005 and 2008 for the advanced,

basic, and below basic quartiles in reading. For the economically disadvantaged sub-group, the middle schools had higher scores in the changes between 2005 and 2008 for the advanced, proficient, and basic quartiles in both math and reading. The middle schools and junior high schools can both be compared to the sample by comparing tables 8, 9, and 10 to tables 1, 2, and 3.

Summary of the Results of the T-Tests of Academic Achievement in Middle Schools vs. Junior High Schools

For this study, significant difference was defined as $p < .05$. The T-Tests showed that there were statistically significant variations of the measures of academic achievement when comparing middle schools and junior high schools. For all students, middle schools were associated with higher mean scaled scores on the 2008 eighth grade PSSA math exam, more students testing in the below basic range on the 2008 eighth grade PSSA math exam, higher mean scaled scores on the 2008 eighth grade PSSA reading exam, and more students testing in the advanced range on the 2005 fifth grade PSSA exam. For all students, junior high schools were associated with more students testing in the below basic range on the 2008 eighth grade PSSA exam (Table 8). For special education students, there were not significant variations in any of the measures of academic achievement when comparing middle schools and junior high

schools (Table 9). For economically disadvantaged students, junior high schools were associated with more students scoring in the below basic range on the 2008 eighth grade PSSA math exam and more students scoring in the basic range on the 2008 eighth grade PSSA reading exam (Table 10).

Table 8.

Summary of the Descriptive Statistics of Academic Achievement (All Students)

	Middle Schools			Traditional Junior High Schools			
	Number	Mean	SD	Number	Mean	SD	Sig.
2008 8th Grade PSSA Math	20	1441.9	48.2	20	1403.4	66.7	.043
2008 8th Grade PSSA Math (Percent Advanced)	20	49.1	9.9	20	41.7	13.2	.055
2008 8th Grade PSSA Math (Percent Proficient)	20	28.4	6.2	20	29.7	6.8	.532
2008 8th Grade PSSA Math (Percent Basic)	20	12.6	5.4	20	13.9	5.2	.435
2008 8th Grade PSSA Math (Percent Below Basic)	20	9.9	3.5	20	14.7	6.6	.008
2005 5th Grade PSSA Math	20	1445.7	62.5	20	1416.2	58.6	.133
2005 5th Grade PSSA Math (Percent Advanced)	20	40.3	13.6	20	36.4	11.9	.342
2005 5th Grade PSSA Math (Percent Proficient)	20	32.4	4.5	20	33.7	4.7	.381
2005 5th Grade PSSA Math (Percent Basic)	20	19.0	8.5	20	20.1	8.5	.700
2005 5th Grade PSSA Math (Percent Below Basic)	20	8.3	4.5	20	9.9	5.4	.321

Table 8 (cont.).

Summary of the Descriptive Statistics of Academic Achievement (All Students)

	Middle Schools			Traditional Junior High Schools			
	Number	Mean	SD	Number	Mean	SD	Sig.
Change in PSSA Math	20	3.75	58.6	20	-12.8	68.2	.656
Change in PSSA Math (Percent Advanced)	20	8.81	14.7	20	5.38	14.8	.467
Change in PSSA Math (Percent Proficient)	20	3.9	8.4	20	-3.9	6.7	.994
Change in PSSA Math (Percent Basic)	20	6.5	9.5	20	-6.2	8.6	.913
Change in PSSA Math (Percent Below Basic)	20	1.6	3.7	20	4.8	7.7	.111
2008 8th Grade PSSA Reading	20	1533.1	77.1	20	1483.6	67.3	.037
2008 8th Grade PSSA Reading (Percent Advanced)	20	62.4	11.7	20	55.1	11.7	.056
2008 8th Grade PSSA Reading (Percent Proficient)	20	23.5	7.5	20	25.2	5.5	.418
2008 8th Grade PSSA Reading (Percent Basic)	20	7.6	3.6	20	9.8	4.6	.115
2008 8th Grade PSSA Reading (Percent Below Basic)	20	6.5	3.3	20	9.9	4.8	.012

Table 8 (cont.).

Summary of the Descriptive Statistics of Academic Achievement (All Students)

	Middle Schools			Traditional Junior High Schools			
	Number	Mean	SD	Number	Mean	SD	Sig.
2005 5th Grade PSSA Reading	20	1373.2	66.3	20	1339.6	40.1	.060
2005 5th Grade PSSA Reading (Percent Advanced)	20	28.1	9.6	20	21.4	6.3	.013
2005 5th Grade PSSA Reading (Percent Proficient)	20	43.5	5.3	20	47.2	7.4	.075
2005 5th Grade PSSA Reading (Percent Basic)	20	15.8	4.6	20	16.7	4.9	.581
2005 5th Grade PSSA Reading (Percent Below Basic)	20	12.6	6.8	20	14.7	5.8	.283
Change in PSSA Reading	20	159.9	51.2	20	142.8	58.9	.332
Change in PSSA Reading (Percent Advanced)	20	34.3	6.4	20	33.8	11.4	.854
Change in PSSA Reading (Percent Proficient)	20	19.9	9.2	20	-22.0	8.4	.468
Change in PSSA Reading (Percent Basic)	20	8.2	4.7	20	-6.9	6.7	.491
Change in PSSA Reading (Percent Below Basic)	20	6.1	5.1	20	-4.8	6.2	.477

Table 9.

Summary of the Descriptive Statistics of Academic Achievement (Special Education Students)

	Middle Schools			Traditional Junior High Schools			
	Number	Mean	SD	Number	Mean	SD	Sig.
2008 8th Grade PSSA Math (Percent Advanced)	19	10.1	10.7	14	5.2	8.9	.167
2008 8th Grade PSSA Math (Percent Proficient)	19	22.6	7.7	14	19.1	13.0	.333
2008 8th Grade PSSA Math (Percent Basic)	19	18.7	8.4	14	20.2	7.5	.582
2008 8th Grade PSSA Math (Percent Below Basic)	19	48.7	13.4	14	55.6	21.5	.263
2005 5th Grade PSSA Math (Percent Advanced)	16	13.2	8.8	12	9.9	8.4	.329
2005 5th Grade PSSA Math (Percent Proficient)	16	16.8	11.9	12	14.8	6.3	.617
2005 5th Grade PSSA Math (Percent Basic)	16	28.9	13.7	12	25.2	12.2	.458
2005 5th Grade PSSA Math (Percent Below Basic)	16	38.7	20.3	12	48.8	14.9	.157

Table 9 (cont.).

Summary of the Descriptive Statistics of Academic Achievement (Special Education Students)

	Middle Schools			Traditional Junior High Schools			
	Number	Mean	SD	Number	Mean	SD	Sig.
Change in PSSA Math (Percent Advanced)	14	1.8	8.6	11	.36	10.7	.702
Change in PSSA Math (Percent Proficient)	14	6	9.3	11	5.3	11.3	.862
Change in PSSA Math (Percent Basic)	14	1.1	9.2	11	2.9	6.8	.583
Change in PSSA Math (Percent Below Basic)	14	12.6	12.2	11	12.6	18.9	.992
2008 8th Grade PSSA Reading (Percent Advanced)	19	19.9	15.1	14	12.2	11.8	.124
2008 8th Grade PSSA Reading (Percent Proficient)	19	25.3	10.3	14	24.2	15.1	.820
2008 8th Grade PSSA Reading (Percent Basic)	19	22.3	10.7	14	24.7	10.4	.519
2008 8th Grade PSSA Reading (Percent Below Basic)	19	32.5	15.4	14	38.8	20.1	.326

Table 9 (cont.).

Summary of the Descriptive Statistics of Academic Achievement (Special Education Students)

	Middle Schools			Traditional Junior High Schools			
	Number	Mean	SD	Number	Mean	SD	Sig.
2005 5th Grade PSSA Reading (Percent Advanced)	20	-13.1	44.6	20	-35.9	53.2	.151
2005 5th Grade PSSA Reading (Percent Proficient)	20	-3.3	50.0	20	-30.5	57.8	.120
2005 5th Grade PSSA Reading (Percent Basic)	16	20.1	10.8	12	19.9	12.8	.963
2005 5th Grade PSSA Reading (Percent Below Basic)	16	49.4	18.5	12	57.3	14.4	.236
Change in PSSA Reading (Percent Advanced)	15	10.9	8.5	11	7.4	12.9	.412
Change in PSSA Reading (Percent Proficient)	15	6.3	12.8	11	14	16.8	.199
Change in PSSA Reading (Percent Basic)	14	7.9	9.9	10	7.1	10.8	.847
Change in PSSA Reading (Percent Below Basic)	15	-1.6	2.0	11	-1.6	5.5	.972

Table 10.

Summary of the Descriptive Statistics of Academic Achievement(Econ. Disadv. Students)

	Middle Schools			Traditional Junior High Schools			
	Number	Mean	SD	Number	Mean	SD	Sig.
2008 8th Grade PSSA Math (Percent Advanced)	18	31.5	8.1	20	28.3	16.5	.461
2008 8th Grade PSSA Math (Percent Proficient)	18	33.3	7.7	20	29.5	9.5	.184
2008 8th Grade PSSA Math (Percent Basic)	18	17.3	7.8	20	16.5	7.6	.726
2008 8th Grade PSSA Math (Percent Below Basic)	18	16.4	7.7	20	24.5	12.3	.023
2005 5th Grade PSSA Math (Percent Advanced)	17	29.8	18.6	17	22.8	12.9	.213
2005 5th Grade PSSA Math (Percent Proficient)	17	33.1	8.4	17	32.5	10.5	.844
2005 5th Grade PSSA Math (Percent Basic)	17	24.6	12.2	17	26.9	12.4	.590
2005 5th Grade PSSA Math (Percent Below Basic)	17	16.2	8.9	17	16.2	8.3	1.00

Table 10 (cont.).

Summary of the Descriptive Statistics of Academic Achievement (Econ. Disadv. Students)

	Middle Schools			Traditional Junior High Schools			
	Number	Mean	SD	Number	Mean	SD	Sig.
Change in PSSA Math (Percent Advanced)	17	8.5	11.9	17	7.5	13.4	.820
Change in PSSA Math (Percent Proficient)	17	.9	6.3	17	.41	5.7	.799
Change in PSSA Math (Percent Basic)	17	.7	5.9	17	-.71	5.4	.494
Change in PSSA Math (Percent Below Basic)	17	3.2	7.6	17	9.5	12.5	.089
2008 8th Grade PSSA Reading (Percent Advanced)	18	44.3	9.1	20	38.3	13.6	.121
2008 8th Grade PSSA Reading (Percent Proficient)	18	30.5	7.9	20	28.4	9.8	.467
2008 8th Grade PSSA Reading (Percent Basic)	18	11.4	5.1	20	15.9	7.0	.031
2008 8th Grade PSSA Reading (Percent Below Basic)	18	11.8	6.9	20	15.7	8.5	.135

Table 10 (cont.).

Summary of the Descriptive Statistics of Academic Achievement (Econ. Disadv. Students)

	Middle Schools			Traditional Junior High Schools			
	Number	Mean	SD	Number	Mean	SD	Sig.
2005 5th Grade PSSA Reading (Percent Advanced)	17	13.7	5.5	17	11.3	7.1	.278
2005 5th Grade PSSA Reading (Percent Proficient)	17	40.9	12.1	17	40.9	8.1	.987
2005 5th Grade PSSA Reading (Percent Basic)	17	21.1	6.2	17	21.7	6.2	.806
2005 5th Grade PSSA Reading (Percent Below Basic)	17	22.5	10.9	17	24.6	8.1	.537
Change in PSSA Reading (Percent Advanced)	17	29.3	8.1	17	26	12.9	.380
Change in PSSA Reading (Percent Proficient)	17	-.06	5.8	17	-1.9	2.6	.249
Change in PSSA Reading (Percent Basic)	16	1.3	6.6	15	-1.1	3.0	.211
Change in PSSA Reading (Percent Below Basic)	17	-1.7	3.4	16	-1.1	4.2	.663

Summary of the Descriptive Statistics of the Control Variables

Table 11 shows that the control variables of the middle schools and junior high schools are very similar. A comparison of Table 11 to Table 7 also shows that both the middle schools and junior high schools are very similar to the sample as a whole. T-tests indicated that there were no statistically significant differences in either the percentage of low – income students or the total school enrollment when comparing middle schools and junior high schools.

Table 11.

Summary of the Descriptive Statistics of the Control Variables

	Middle Schools			Traditional Junior High Schools			
	Number	Mean	SD	Number	Mean	SD	Sig.
Percentage of Low-Income Students	20	31.4	13.8	20	30.1	10.3	.902
Total Student Enrollment	20	574.8	170.3	20	579.1	159.2	.935

Multiple Regression Analysis – Academic Achievement

Multiple regression analysis was used to indicate if there was a relationship between program type and any measures of academic achievement for all students, special education students, and economically disadvantaged students. Tables 12 – 26 showed how each of the academic achievement variables were related to school structure, percentage of low – income students, and total student enrollment for all students on the PSSA math exam. Tables 27 – 38 showed how each of the academic achievement variables were related to school structure, percentage of low – income students, and total student enrollment for economically disadvantaged students on the PSSA math exam. Tables 39 – 50 showed how each of the academic achievement variables were related to school structure, percentage of low – income students, and total student enrollment for special education students on the PSSA math exam. Tables 51 – 65 showed how each of the academic achievement variables were related to school structure, percentage of low – income students, and total student enrollment for all students on the PSSA reading exam. Tables 66 – 77 showed how each of the academic achievement variables were related to school structure, percentage of low – income students, and total student enrollment for special education students on the PSSA reading exam. Tables 78 – 89 showed how each of the academic achievement

variables were related to school structure, percentage of low – income students, and total student enrollment for economically disadvantaged students on the PSSA reading exam. Academic achievement was determined by a combination of the following variables; the 2008 eighth grade PSSA math and reading scaled scores, the 2005 eighth grade math and reading scaled scores, the change from the 2005 eighth grade PSSA math and reading scaled scores to the 2008 PSSA eighth grade math and reading scaled scores, the percentage of student scoring in each quartile on the 2005 and 2008 PSSA math and reading exams (all students, special education students, and economically disadvantaged students), the change in the percentage of students in each quartile on the 2005 and 2008 PSSA math and reading exams.

Multiple regression analysis showed that school structure and the percentage of low – income students were related to the 2008 eighth grade PSSA math exam. Middle schools were associated with higher scores on the exam. Lower percentages of low – income students were related to higher scores on the 2008 eighth grade PSSA math exam. Therefore, this study showed that the characteristics favorable for more students scoring well on the eighth grade PSSA math exam were the use of the middle school structure and having fewer low – income students. The scores on

the exam were not related to total student enrollment (Table 12).

Table 12.

Multiple Regression Analysis of 2008 8th Grade PSSA Mathematics

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-39.4	16.9	-.33	-2.32	.026
Percentage of Low-Income Students	-2.4	.821	-.47	-2.88	.007
Total Student Enrollment	-.05	.061	-.12	-.738	.465

As seen in Table 13, school structure and percentage of low – income students were related to the number of students scoring advanced on the 2008 eighth grade PSSA math exam. More low – income students were associated with fewer students scoring advanced on the exam. Middle schools were associated with more students scoring advanced on the exam. As a result, this study showed that the characteristics favorable to more students scoring in the advanced quartile on the eighth grade PSSA math exam were fewer low – income students and the use of the middle school structure. There was no relationship between total school enrollment and students scoring advanced on the exam.

Table 13.

Multiple Regression Analysis of 2008 8th Grade PSSA Mathematics (Advanced)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-7.5	3.5	-.31	-2.16	.038
Percentage of Low-Income Students	-.45	.168	-.45	-2.68	.011
Total Student Enrollment	-.01	.012	-.19	-1.11	.273

As seen in Table 14, there was a relationship between the percentage of low – income students and the number of students scoring proficient on the 2008 eighth grade PSSA math exam. More low – income students was associated with an increase in the number of students scoring proficient on the exam. Therefore, this study showed that (for all students) schools with a greater number of low – income students tended to have a greater number of students score in the proficient quartile on the eighth grade PSSA math exam. There was no relationship between school structure and total school enrollment to the number of students scoring proficient.

Table 14.

Multiple Regression Analysis of 2008 8th Grade PSSA Mathematics (Proficient)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	1.36	1.99	.106	.682	.500
Percentage of Low-Income Students	.212	.096	.392	2.20	.034
Total Student Enrollment	.012	.007	.291	1.63	.111

For Table 15, none of the variables were associated with the number of students scoring basic on the 2008 eighth grade PSSA math exam.

Table 15.

Multiple Regression Analysis of 2008 8th Grade PSSA Mathematics (Basic)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	1.37	1.67	.132	.826	.414
Percentage of Low-Income Students	.085	.081	.193	1.05	.300
Total Student Enrollment	-.003	.006	-.096	-.523	.604

Table 16 shows that middle schools have fewer students scoring below basic on the 2008 eighth grade PSSA math exam. There was no relationship between the percentage of low – income students and total school enrollment to the number of students scoring below basic. This study showed that schools that employ the middle level concept had fewer students scoring below basic on the eighth grade PSSA math exam.

Table 16.

Multiple Regression Analysis of 2008 8^{th} Grade PSSA Mathematics (Below Basic)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	4.74	1.63	.419	2.90	.006
Percentage of Low-Income Students	.154	.079	.321	1.94	.061
Total Student Enrollment	.005	.006	.151	.913	.367

Table 17 shows a relationship between the percentage of low – income students and total school enrollment to scores on the 2005 fifth grade PSSA math exam. A lower percentage of low – income students was related to higher scores on the exam. Smaller schools were related to higher scores on the exam. No relationship exists between school structure and the scores on the exam. Therefore, this study showed that the characteristics

associated with higher scores on the fifth grade PSSA math exam were fewer low – income students and a smaller school.

Table 17.

Multiple Regression Analysis of 2005 5th Grade PSSA Mathematics

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-30.11	17.42	-.247	-1.73	.093
Percentage of Low-Income Students	-2.60	.845	-.506	-3.08	.004
Total Student Enrollment	-.133	.062	-.35	-2.13	.040

There was a relationship between the percentage of low – income students and the number of students scoring advanced on the 2005 fifth grade PSSA exam (Table 18). There was no relationship between school structure and total school enrollment to the number of students scoring advanced on the exam. A lower percentage of low – income students was related to an increase in the number of students scoring advanced on the exam. As a result, schools with fewer low – income students tend to have a greater percentage of students scoring advanced on the fifth grade PSSA math exam.

Table 18.

Multiple Regression Analysis of 2005 5th Grade PSSA Mathematics (Advanced)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-4.12	3.87	-.159	-1.04	.306
Percentage of Low-Income Students	-.438	.188	-.411	-2.34	.025
Total Student Enrollment	-.021	.014	-.263	-1.49	.144

Tables 19 and 20 show no relationship between school structure, the percentage of low – income students and total school enrollment to the number of students scoring proficient or basic on the 2005 fifth grade PSSA math exam.

Table 19.

Multiple Regression Analysis of 2005 5th Grade PSSA Mathematics (Proficient)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	1.30	1.49	.144	.877	.386
Percentage of Low-Income Students	.021	.072	.054	.288	.775
Total Student Enrollment	-.001	.005	-.051	-.269	.789

Table 20.

Multiple Regression Analysis of 2005 5th Grade PSSA Mathematics (Basic)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	1.11	2.66	.067	.418	.678
Percentage of Low-Income Students	.222	.129	.316	1.72	.094
Total Student Enrollment	.009	.010	.176	.959	.344

As seen in Table 21, there was a relationship between the percentage of low – income students and total school enrollment to the number of students scoring below basic on the 2005 fifth grade PSSA math exam. A greater number of low – income students was related to an increase in the number of students scoring below basic on the exam. Also, larger schools were related to an increase of students scoring below basic on the exam. Subsequently, this study showed that smaller schools and schools with fewer low – income students is beneficial in decreasing the number of students scoring in the below basic quartile on the fifth grade PSSA math exam. No relationship was shown relating school structure and the number of students scoring below basic on the exam.

Table 21.

Multiple Regression Analysis of 2005 5th Grade PSSA Mathematics (Below Basic)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	1.61	1.43	.165	1.13	.266
Percentage of Low-Income Students	.196	.069	.476	2.84	.007
Total Student Enrollment	.013	.005	.427	2.55	.015

No relationship exists between school structure, the percentage of low – income students, and total school enrollment to the change in PSSA math scaled scores between 2005 and 2008 (Table 22).

Table 22.

Multiple Regression Analysis of the Change in PSSA Mathematics

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-9.28	20.21	-.075	-.459	.649
Percentage of Low-Income Students	.239	.980	.046	.244	.808
Total Student Enrollment	.088	.072	.228	1.22	.231

For tables 23, 24, 25, and 26, no relationship exists between school structure, the percentage of low – income students, and total school enrollment to the changes in the percentages of students scoring in the advanced, proficient, basic, and below basic quartiles between 2005 and 2008 on the PSSA math exam.

Table 23.

Multiple Regression Analysis of the Change in PSSA Mathematics (Advanced)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-3.46	4.77	-.12	-.725	.473
Percentage of Low-Income Students	-.011	.231	-.009	-.048	.962
Total Student Enrollment	.007	.017	.076	.403	.689

Table 24.

Multiple Regression Analysis of the Change in PSSA Mathematics (Proficient)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	.055	2.37	.004	.023	.982
Percentage of Low-Income Students	.192	.115	.305	1.67	.104
Total Student Enrollment	.013	.008	.282	1.54	.132

Table 25.

Multiple Regression Analysis of the Change in PSSA Mathematics (Basic)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	.301	2.89	.017	.104	.918
Percentage of Low-Income Students	-.14	.140	-.188	-1.00	.323
Total Student Enrollment	-.012	.010	-.226	-1.21	.236

Table 26.

Multiple Regression Analysis of the Change in PSSA Mathematics (Below Basic)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	3.14	1.94	.257	1.62	.114
Percentage of Low-Income Students	-.043	.094	-.083	-.459	.649
Total Student Enrollment	-.008	.007	-.202	-1.11	.275

As seen in Table 27, there was no relationship between school structures, percentage of low – income students, and total school enrollment with the number of economically disadvantaged students scoring in the advanced quartile on the 2008 eighth grade PSSA math exam.

Table 27.

Multiple Regression Analysis of 2008 8th Grade PSSA Mathematics (Advanced) (Economically Disadvantaged)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-2.98	4.38	-.115	-.680	.501
Percentage of Low-Income Students	.015	.249	.012	.060	.952
Total Student Enrollment	-.017	.016	-.210	-1.06	.294

As seen in Table 28, there was no relationship between school structures, percentage of low – income students, and total school enrollment with the number of economically disadvantaged students scoring in the proficient quartile on the 2008 eighth grade PSSA math exam.

Table 28.

Multiple Regression Analysis of 2008 8th Grade PSSA Mathematics (Proficient) (Economically Disadvantaged)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-4.06	2.91	-.234	-1.39	.172
Percentage of Low-Income Students	-.048	.166	-.058	-.291	.772
Total Student Enrollment	.007	.010	.124	.636	.529

As seen in Table 29, there was no relationship between school structures, percentage of low – income students, and total school enrollment with the number of economically disadvantaged students scoring in the basic quartile on the 2008 eighth grade PSSA math exam.

Table 29.

Multiple Regression Analysis of 2008 8th Grade PSSA Mathematics (Basic) (Economically Disadvantaged)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-.799	2.59	-.053	-.308	.760
Percentage of Low-Income Students	.006	.147	.008	.040	.968
Total Student Enrollment	-.006	.009	-.141	-.703	.487

There was a relationship between school structure and the number of students scoring below basic on the 2008 eighth grade PSSA exam. The number of students scoring in the basic quartile on the exam was greater in the junior high schools. Therefore, this study showed that economically disadvantaged students tend to score more frequently in the basic quartile in junior high schools as compared to middle schools. No relationship existed between the percentage of low – income students and total school enrollment with the exam (Table 30).

Table 30.

Multiple Regression Analysis of 2008 8th Grade PSSA Mathematics (Below Basic) (Economically Disadvantaged)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	7.84	3.43	.360	2.29	.028
Percentage of Low-Income Students	.000	.195	.000	-.005	.996
Total Student Enrollment	.016	.012	.235	1.28	.208

Tables 31, 32,and 33 show no relationship between school structures, percentage of low – income students, and total school enrollment for economically disadvantaged students with students scoring in the advanced, proficient, and basic quartiles on the 2005 fifth grade PSSA math exam.

Table 31.

Multiple Regression Analysis of 2005 5th Grade PSSA Mathematics (Advanced) (Economically Disadvantaged)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-4.24	5.22	-.133	-.811	.424
Percentage of Low-Income Students	.618	.346	.348	1.78	.085
Total Student Enrollment	-.014	.018	-.148	-.774	.445

Table 32.

Multiple Regression Analysis of 2005 5th Grade PSSA Mathematics (Proficient) (Economically Disadvantaged)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-.951	3.28	-.052	-.29	.774
Percentage of Low-Income Students	-.198	.217	-.193	-.912	.369
Total Student Enrollment	-.021	.011	-.378	-1.82	.078

Table 33.

Multiple Regression Analysis of 2005 5th Grade PSSA Mathematics (Basic) (Economically Disadvantaged)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	2.11	4.33	.088	.487	.630
Percentage of Low-Income Students	.066	.287	.049	.229	.820
Total Student Enrollment	.019	.015	.271	1.288	.208

Table 34 shows a relationship between total school enrollment and the number of students scoring in the below basic quartile on the 2005 fifth grade PSSA exam. Larger schools have more students scoring in the below basic quartile on this exam. This study showed that economically disadvantaged students in

larger schools tend to score in the below basic quartile on the fifth grade PSSA math exam. The variables of school structure and percentage of low – income students exhibit no relationship with the number of students scoring in the below basic quartile on the exam.

Table 34.

Multiple Regression Analysis of 2005 5th Grade PSSA Mathematics (Below Basic) (Economically Disadvantaged)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-.840	2.43	-.050	-.354	.733
Percentage of Low-Income Students	-.034	.161	-.037	-.211	.834
Total Student Enrollment	.031	.008	.612	3.61	.001

No relationship is shown between school structures, the percentage of low – income students, and total student enrollment for economically disadvantaged students in the advanced, proficient, basic, and below basic quartiles on the change from the 2005 to the 2008 math exam (Tables 35, 36, 37, 38).

Table 35.

Multiple Regression Analysis of the Change in PSSA Mathematics (Advanced) (Economically Disadvantaged)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-1.22	4.61	-.049	-.265	.793
Percentage of Low-Income Students	-.090	.306	-.066	-.296	.769
Total Student Enrollment	-.006	.016	-.081	-.371	.714

Table 36.

Multiple Regression Analysis of the Change in PSSA Mathematics (Proficient) (Economically Disadvantaged)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-.33	2.11	-.028	-.156	.877
Percentage of Low-Income Students	.114	.140	.175	.813	.422
Total Student Enrollment	.011	.007	.312	1.48	.149

Table 37.

Multiple Regression Analysis of the Change in PSSA Mathematics (Basic) (Economically Disadvantaged)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-1.66	2.00	-.149	-.831	.413
Percentage of Low-Income Students	-.137	.133	-.221	-1.03	.311
Total Student Enrollment	-.010	.007	-.301	-1.44	.161

Table 38.

Multiple Regression Analysis of the Change in PSSA Mathematics (Below Basic) (Economically Disadvantaged)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	6.09	3.74	.290	1.63	.114
Percentage of Low-Income Students	-.088	.248	-.075	-.354	.726
Total Student Enrollment	-.009	.013	-.144	-.695	.492

Table 39 shows a relationship between the percentages of low – income students and students scoring advanced on the 2008 eighth grade PSSA math exam for special education. As the percentage of low – income, special education students decrease, the number of students scoring in the advanced quartile on this

exam increases. Therefore, schools with fewer special education students in the low – income sub – category performed better on the eighth grade PSSA math exam. This table shows no relationship between school structure and total student enrollment to the number of students scoring in the advanced quartile on the exam.

Table 39.

Multiple Regression Analysis of 2008 8th Grade PSSA Mathematics (Advanced) (Special Education)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-5.2	3.30	-.257	-1.58	.126
Percentage of Low-Income Students	-.384	.147	-.483	-2.61	.014
Total Student Enrollment	-.014	.012	-.209	-1.12	.271

For tables 40 and 41, no relationship was shown between the variables of school structure, percentage of low – income students, and total student enrollment to the number of students scoring in the proficient and basic quartiles on the 2008 eighth grade PSSA math exam for special education students.

Table 40.

Multiple Regression Analysis of 2008 8th Grade PSSA Mathematics (Proficient) (Special Education)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-3.84	3.58	-.188	-1.07	.292
Percentage of Low-Income Students	-.282	.159	-.351	-1.77	.087
Total Student Enrollment	-.007	.013	-.106	-.532	.599

Table 41.

Multiple Regression Analysis of 2008 8th Grade PSSA Mathematics (Basic) (Special Education)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	1.75	2.93	.111	.598	.555
Percentage of Low-Income Students	.060	.131	.097	.462	.648
Total Student Enrollment	-.001	.011	-.028	-.135	.894

Table 42 shows a relationship between the percentages of low – income students and the number of special education students scoring in the below basic quartile on the 2008 eighth grade PSSA math exam for special education. More low – income students is associated with a greater number of students scoring

below basic on the exam. As a result, this study showed that schools performed better on the 2008 eighth grade Math PSSA exam (less scoring below basic) when there were less students from the low – income sub - category. No relationship was shown between school structure and total student enrollment to the number of student scoring below basic on the exam for special education.

Table 42.

Multiple Regression Analysis of 2008 8^{th} Grade PSSA Mathematics (Below Basic) (Special Education)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	7.28	5.83	.210	1.25	.222
Percentage of Low-Income Students	.605	.260	.444	2.33	.027
Total Student Enrollment	.022	.021	.197	1.03	.314

No relationship is shown between any of the independent variables and the number of students scoring in the advanced, proficient, basic, and below basic quartiles on the 2005 fifth grade PSSA math exam for special education (Tables 43, 44, 45, 46).

Table 43.

Multiple Regression Analysis of 2005 5th Grade PSSA Mathematics (Advanced) (Special Education)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-2.93	3.41	-.171	-.861	.398
Percentage of Low-Income Students	-.078	.169	-.103	-.460	.650
Total Student Enrollment	-.010	.012	-.188	-.831	.414

Table 44.

Multiple Regression Analysis of 2005 5th Grade PSSA Mathematics (Proficient) (Special Education)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-2.16	3.89	-.111	-.554	.585
Percentage of Low-Income Students	-.153	.194	-.179	-.788	.439
Total Student Enrollment	.002	.014	.033	.144	.886

Table 45.

Multiple Regression Analysis of 2005 5th Grade PSSA Mathematics (Basic) (Special Education)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-3.72	4.97	-.144	-.748	.462
Percentage of Low-Income Students	-.408	.247	-.359	-1.65	.112
Total Student Enrollment	-.011	.018	-.141	-.643	.526

Table 46.

Multiple Regression Analysis of 2005 5th Grade PSSA Mathematics (Below Basic) (Special Education)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	10.21	7.03	.277	1.45	.159
Percentage of Low-Income Students	.475	.349	.292	1.36	.187
Total Student Enrollment	.010	.025	.088	.406	.689

For the changes in the PSSA math scores between 2005 and 2008 for the advanced, proficient, basic, and below basic quartiles for special education, no relationship was shown between the independent variables and the independent variable (Tables 47, 48, 49, 50).

Table 47.

Multiple Regression Analysis of the Change in PSSA Mathematics (Advanced) (Special Education)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-1.11	3.88	-.060	-.286	.778
Percentage of Low-Income Students	-.139	.185	-.178	-.751	.461
Total Student Enrollment	-.020	.014	-.323	-1.36	.188

Table 48.

Multiple Regression Analysis of the Change in PSSA Mathematics (Proficient) (Special Education)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-.808	4.33	-.041	-.187	.854
Percentage of Low-Income Students	.006	.206	.007	.029	.977
Total Student Enrollment	.003	.016	.049	.199	.844

Table 49.

Multiple Regression Analysis of the Change in PSSA Mathematics (Basic) (Special Education)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	2.35	3.24	.147	.723	.478
Percentage of Low-Income Students	.025	.154	.037	.159	.875
Total Student Enrollment	-.018	.012	-.337	-1.46	.159

Table 50.

Multiple Regression Analysis of the Change in PSSA Mathematics (Below Basic) (Special Education)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	.119	6.53	.004	.018	.986
Percentage of Low-Income Students	-.073	.311	-.058	-.236	.815
Total Student Enrollment	-.005	.024	-.050	-.203	.841

Table 51 shows a relationship between school structures, percentage of low – income students and total school enrollment to the scaled scores on the 2008 eighth grade PSSA reading exam for all students. Middle schools have significantly higher scaled scores on the 2008 PSSA reading exam. A greater

percentage of low – income students was associated with lower scaled scores on the exam. Also, smaller schools were associated with increased scores on the exam. As a result, this study showed that small schools with fewer low – income students and used at least five middle level components performed better on the 2008 eighth grade Reading exam. Schools that did not perform as well included those that were large, had a larger number of low – income students, and was structured as a traditional junior high school.

Table 51.

Multiple Regression Analysis of 2008 8^{th} Grade PSSA Reading

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-51.1	17.53	-.342	-2.91	.006
Percentage of Low-Income Students	-4.53	.850	-.719	-5.33	.000
Total Student Enrollment	-.134	.063	-.289	-2.14	.039

Table 52 shows a relationship between the three independent variables to the number of students scoring in the advanced quartile on the 2008 eighth grade PSSA reading exam for all students. Middle schools have a significantly higher percentage of students scoring in the advanced quartile on the exam. As the percentage of low – income students decreases, the amount of

students scoring in the advanced quartile increases. Also, smaller schools have a greater number of students scoring in the advanced quartile on the exam.

Table 52.

Multiple Regression Analysis of 2008 8th Grade PSSA Reading (Advanced)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-7.5	3.05	-.314	-2.46	.019
Percentage of Low-Income Students	-.657	.148	-.651	-4.44	.000
Total Student Enrollment	-.023	.011	-.305	-2.08	.045

Table 53 shows a relationship between the percentage of low – income students and the number of students scoring proficient on the 2008 eighth grade PSSA reading exam for all students. More students in the low – income category are related to a higher number of students scoring proficient on the exam. There is no relationship between school structure and total student enrollment to the number of students scoring proficient on the exam.

Table 53.

Multiple Regression Analysis of 2008 8th Grade PSSA Reading (Proficient)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	1.77	1.95	.137	.911	.368
Percentage of Low-Income Students	.254	.094	.465	2.69	.011
Total Student Enrollment	.011	.007	.272	1.57	.125

Multiple regression analysis showed that the percentage of low – income students was related to the number of students scoring in the basic quartile on the 2008 eighth grade PSSA reading exam for all students (Table 54). As the percentage of low – income students increased, the number of students scoring in the basic quartile also increased. The independent variables of school structure and total student enrollment were not related to the number of students scoring basic on the exam. As a result, this study showed that a school would have more students in the basic category if their number of students in the low – income sub – category increased.

Table 54.

Multiple Regression Analysis of 2008 8th Grade PSSA Reading (Basic)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	2.19	1.12	.263	1.96	.058
Percentage of Low-Income Students	.212	.054	.603	3.91	.000
Total Student Enrollment	.005	.004	.190	1.23	.226

Multiple regression analysis of the 2008 eighth grade PSSA reading exam for all students showed a relationship between school structure and percentage of low – income students to the exam (Table 55). More students in the low – income category was related to an increased number of students scoring in the below basic category. Also, junior high schools had a significantly higher number of students scoring in the below basic quartile on the exam. There was no relationship between total student enrollment and the number of students scoring below basic on the exam. Therefore, this study showed that junior high schools with a large number of low – income students had a large number of students scoring in the below basic quartile on the eighth grade PSSA Reading exam. Accordingly, middle schools and schools with

fewer low – income students performed better on the eighth grade PSSA Reading exam.

Table 55.

Multiple Regression Analysis of 2008 8th Grade PSSA Reading (Below Basic)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	3.52	1.18	.40	2.98	.005
Percentage of Low-Income Students	.191	.057	.514	3.34	.002
Total Student Enrollment	.007	.004	.248	1.61	.116

Table 56 showed a relationship between school structure and percentage of low – income students to the scaled scores on the 2005 fifth grade PSSA reading exam. Middle schools were associated with higher scaled scores on the exam. More low – income students were related to decreased scores on the exam. No relationship was found between total student enrollment and the scaled scores on the exam. Consequently, middle schools with fewer low – income students tended to perform better on the 2005 fifth grade PSSA Reading exam.

Table 56.

Multiple Regression Analysis of 2005 5th Grade PSSA Reading

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-34.76	14.36	-.31	-2.42	.021
Percentage of Low-Income Students	-2.96	.696	-.625	-4.25	.000
Total Student Enrollment	-.053	.051	-.153	-1.04	.304

Table 57 showed a relationship between school structure and percentage of low – income students to the number of students scoring advanced on the 2005 fifth grade PSSA reading exam for all students. Middle schools showed a greater percentage of students scoring in the advanced quartile. A lower percentage of low – income students was associated with a higher number of students scoring in the advanced quartile on the exam. Therefore, this study showed that middle schools with fewer low – income students performed better on the fifth grade PSSA Reading exam than a junior high or a school with a greater number of low – income students.

Table 57.

Multiple Regression Analysis of 2005 5th Grade PSSA Reading (Advanced)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-6.93	2.19	-.401	-3.15	.003
Percentage of Low-Income Students	-.375	.107	-.515	-3.52	.001
Total Student Enrollment	.000	.008	-.005	-.034	.973

Tables 58 and 59 showed no relationship of any of the independent variables to the number of students scoring in the proficient and basic quartiles on the 2005 fifth grade PSSA reading exam for all students.

Table 58.

Multiple Regression Analysis of 2005 5th Grade PSSA Reading (Proficient)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	3.73	2.05	.285	1.82	.077
Percentage of Low-Income Students	-.075	.099	-.135	-.752	.457
Total Student Enrollment	-.009	.007	-.228	-1.27	.212

Table 59.

Multiple Regression Analysis of 2005 5th Grade PSSA Reading (Basic)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	.909	1.45	.097	.629	.534
Percentage of Low-Income Students	.127	.070	.321	1.81	.079
Total Student Enrollment	-.002	.005	-.072	-.404	.689

In table 60, the percentage of low – income students was associated with the number of students scoring in the below basic quartile on the 2005 fifth grade PSSA exam for all students. As the percentage of low – income students increased, so did the number of students scoring in the below basic quartile on the exam. Therefore, this study showed that schools with a greater number of low – income students also had more students score in the below basic quartile on the fifth grade PSSA Reading exam.

Table 60.

Multiple Regression Analysis of 2005 5th Grade PSSA Reading (Below Basic)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	2.23	1.71	.182	1.33	.192
Percentage of Low-Income Students	.326	.083	.620	3.93	.000
Total Student Enrollment	.012	.006	.303	1.92	.063

Table 61 showed no relationship between the independent and dependent variables.

Table 61.

Multiple Regression Analysis of the Change in PSSA Reading

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-17.59	17.08	-.161	-1.03	.310
Percentage of Low-Income Students	-1.57	.828	-.342	-1.9	.065
Total Student Enrollment	-.077	.061	-.226	-1.25	.218

The percentage of low – income students and total school enrollment were associated with the change in the number of students scoring in the advanced quartile on the PSSA reading exam from 2005 to 2008 for all students (Table 62). As the

percentage of low – income students decreased, the change in the number of students scoring in the advanced quartile increased. Also, smaller schools were associated with a greater change of students scoring in the advanced quartile on the exam. Therefore, this study showed that students performed better from 2005 to 2008 on the PSSA Reading exam in smaller schools. Also, schools with fewer low – income students had more students score in the advanced quartile. There was no association between school structure and the change in the number of students scoring in the advanced quartile on the PSSA Reading exam.

Table 62.

Multiple Regression Analysis of the Change in PSSA Reading (Advanced)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-.583	2.78	-.032	-.21	.835
Percentage of Low-Income Students	-.282	.135	-.370	-2.09	.043
Total Student Enrollment	-.022	.010	-.398	-2.26	.030

Multiple regression analysis showed an association between the percentage of low – income students and total student enrollment to the change in the number of students scoring proficient on the PSSA reading exam between 2005 and 2008 for

all students (Table 63). As the percentage of low – income students increased, the greater the change in the number of students scoring proficient between 2005 and 2008 on the exam. Also, larger schools were associated with a greater change in students scoring proficient between 2005 and 2008 on the exam. Therefore, this study showed that larger schools with a greater number of low – income students showed more students scoring proficient on the PSSA Reading exam from 2005 to 2008. There was no relationship between school structure and the dependent variable.

Table 63.

Multiple Regression Analysis of the Change in PSSA Reading (Proficient)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-1.98	2.60	-.114	-.761	.452
Percentage of Low-Income Students	.330	.126	.451	2.62	.013
Total Student Enrollment	.020	.009	.375	2.18	.036

Tables 64 and 65 showed no relationship between the independent variables and the change in the percentage of students scoring in the basic and below basic quartiles between 2005 and 2008 on the PSSA reading exam for all students.

Table 64.

Multiple Regression Analysis of the Change in PSSA Reading (Basic)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	1.28	1.84	.113	.695	.492
Percentage of Low-Income Students	.085	.089	.178	.951	.348
Total Student Enrollment	.007	.007	.199	1.07	.294

Table 65.

Multiple Regression Analysis of the Change in PSSA Reading (Below Basic)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	1.25	1.78	.112	.698	.489
Percentage of Low-Income Students	-.135	.086	-.287	-1.56	.127
Total Student Enrollment	-.005	.006	-.143	-.777	.442

Table 66 shows a relationship between school structure and percentage of low – income students to the number of special education students scoring advanced on the 2008 eighth grade PSSA reading exam. As the percentage of low – income students decreased, the number of special education students scoring

advance on the exam increased. Therefore, this study showed that special education students performed better if there were fewer students also in the low – income sub – group. Middle schools were associated with a greater number of special education students scoring in the advanced quartile on the exam. Therefore, this study showed that special education students in the middle school structure performed better than students in a junior high on the eighth grade PSSA exam. There was no relationship between total school enrollment and the dependent variable.

Table 66.

Multiple Regression Analysis of 2008 8^{th} Grade PSSA Reading (Advanced) (Special Education)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-8.42	3.94	-.299	-2.14	.041
Percentage of Low-Income Students	-.748	.175	-.677	-4.27	.000
Total Student Enrollment	-.019	.015	-.206	-1.29	.208

Tables 67 and 68 showed no relationship between school structures, percentage of low – income students, and total student enrollment to the number of special education students

scoring in the proficient and basic quartiles on the 2008 eighth grade PSSA reading exam.

Table 67.

Multiple Regression Analysis of 2008 8th Grade PSSA Reading (Proficient) (Special Education)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-.89	4.49	-.036	-.198	.844
Percentage of Low-Income Students	-.238	.20	-.25	-1.19	.243
Total Student Enrollment	-.015	.017	-.187	-.903	.374

Table 68.

Multiple Regression Analysis of 2008 8th Grade PSSA Reading (Basic) (Special Education)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	2.92	3.77	.14	.774	.445
Percentage of Low-Income Students	.155	.168	.189	.922	.364
Total Student Enrollment	-.005	.014	-.069	-.335	.740

Multiple regression analysis showed a relationship between the percentage of low – income students and the number of special education students scoring in the below basic quartile on the 2008 eighth grade PSSA reading exam (Table 69). More low

– income students were associated with an increased number of special education students scoring in the below basic quartile on the exam. As the percentage of low – income students increased in a school, a greater number of special education students scored below basic on the eighth grade Reading PSSA exam. Therefore, this study showed that schools with a large population of low – income students also had a large number of special education students scoring below basic on the eighth grade Reading PSSA exam. No relationship was shown for school structure and total student enrollment to the number of special education students scoring in the below basic quartile on the exam.

Table 69.

Multiple Regression Analysis of 2008 8^{th} Grade PSSA Reading (Below Basic) (Special Education)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	6.4	5.56	.18	1.15	.259
Percentage of Low-Income Students	.83	.247	.594	3.36	.002
Total Student Enrollment	.038	.02	.331	1.86	.073

Table 70 showed an association between total school enrollment and the number of special education students scoring

advanced on the 2005 fifth grade PSSA reading exam. Larger schools were associated with more special education students scoring advanced on the exam. As the number of students increased in the schools, the number of students scoring in the advanced quartile on the fifth grade PSSA Reading exam also increased. Therefore, this study showed that special education students performed better in larger schools on the fifth grade PSSA Reading exam. No relationship was shown between school structure and percentage of low – income students to the exam.

Table 70.

Multiple Regression Analysis of 2005 5th Grade PSSA Reading (Advanced) (Special Education)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-22.92	14.72	-.23	-1.56	.128
Percentage of Low-Income Students	.827	.714	.199	1.16	.254
Total Student Enrollment	.132	.053	.431	2.51	.017

Table 71 showed a relationship between total student enrollment and the number of special education students scoring in the proficient quartile on the 2005 fifth grade PSSA reading exam. Larger schools were associated with more students scoring in the proficient quartile on the exam. As the number of

students in a school increased, the number of special education students who scored proficient on the fifth grade Reading PSSA also increased. Therefore, this study showed that special education students performed better in larger schools on the fifth grade PSSA Reading exam. No relationship was found between school structure and percentage of low – income students to the number of special education students scoring in the proficient quartile on the exam.

Table 71.

Multiple Regression Analysis of 2005 5th Grade PSSA Reading (Proficient) (Special Education)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-27.36	15.49	-.252	-1.77	.086
Percentage of Low-Income Students	1.24	.751	.271	1.65	.107
Total Student Enrollment	.177	.055	.523	3.12	.003

Tables 72 and 73 showed no relationship between school structures, percentage of low – income students, and total student enrollment to the number of special education students scoring in the basic or below basic quartiles on the 2005 fifth grade PSSA reading exam.

Table 72.

Multiple Regression Analysis of 2005 5th Grade PSSA Reading (Basic) (Special Education)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-.235	4.55	-.01	-.052	.959
Percentage of Low-Income Students	-.268	.226	-.267	-1.19	.247
Total Student Enrollment	-.006	.016	-.085	-.372	.713

Table 73.

Multiple Regression Analysis of 2005 5th Grade PSSA Reading (Below Basic) (Special Education)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	8.53	6.48	.253	1.32	.200
Percentage of Low-Income Students	.340	.322	.229	1.06	.301
Total Student Enrollment	-.009	.023	-.082	-.377	.710

Tables 74, 75, 76, and 77 showed no association between the independent variables and the change in the number of special education students scoring in the advanced, proficient, basic, and below basic quartiles between 2005 and 2008 on the PSSA reading exam.

Table 74.

Multiple Regression Analysis of the Change in PSSA Reading (Advanced) (Special Education)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-3.39	4.09	-.163	-.830	.416
Percentage of Low-Income Students	-.337	.198	-.380	-1.7	.103
Total Student Enrollment	-.020	.015	-.30	-1.34	.193

Table 75.

Multiple Regression Analysis of the Change in PSSA Reading (Proficient) (Special Education)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	8.02	5.51	.272	1.45	.160
Percentage of Low-Income Students	-.472	.267	-.376	-1.77	.091
Total Student Enrollment	-.04	.02	-.412	-1.93	.066

Table 76.

Multiple Regression Analysis of the Change in PSSA Reading (Basic) (Special Education)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-.498	4.12	-.025	-.121	.905
Percentage of Low-Income Students	.348	.196	.420	1.77	.092
Total Student Enrollment	.006	.015	.100	.422	.677

Table 77.

Multiple Regression Analysis of the Change in PSSA Reading (Below Basic) (Special Education)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	.011	1.53	.002	.008	.994
Percentage of Low-Income Students	.111	.074	.344	1.50	.148
Total Student Enrollment	.007	.006	.290	1.26	.220

An association was shown between total student enrollment and the number of economically disadvantaged students scoring in the advanced quartile on the 2008 eighth grade PSSA reading exam (Table 78). Small schools were associated with more students scoring in the advanced quartile on the exam. As the number of

students in a school decreased, there was an increase in the number of economically disadvantaged students who scored in the advanced quartile on the eighth grade Reading PSSA. Therefore, this study showed that economically disadvantaged students performed better in smaller schools. No relationship was shown between school structure and percentage of low – income students to the number of economically disadvantaged students scoring in the advanced quartile on the exam.

Table 78.

Multiple Regression Analysis of 2008 8^{th} Grade PSSA Reading (Advanced) (Economically Disadvantaged)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-6.27	3.70	-.266	-1.69	.099
Percentage of Low-Income Students	-.151	.210	-.133	-.715	.479
Total Student Enrollment	-.029	.013	-.402	-2.19	.035

Table 79 showed no relationship between school structures, percentage of low – income students, and total student enrollment to the number of economically disadvantaged students scoring in the proficient quartile on the 2008 eighth grade PSSA exam.

Table 79.

Multiple Regression Analysis of 2008 8th Grade PSSA Reading (Proficient) (Economically Disadvantaged)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-2.48	2.98	-.140	-.831	.412
Percentage of Low-Income Students	-.069	.170	-.081	-.407	.686
Total Student Enrollment	.009	.011	.168	.853	.399

Table 80 showed a relationship between school structure and the number of economically disadvantaged students scoring in the basic quartile on the 2008 eighth grade PSSA exam. Junior high schools were associated with a greater number of economically disadvantaged students scoring in the basic quartile on the exam. Therefore, this study showed that middle schools that incorporated five or more of the middle level components had fewer students in the basic category which benefited the schools when it came to calculate Adequate Yearly Progress. No relationship was shown between percentage of low – income students and total student enrollment and the number of economically disadvantaged students scoring in the basic quartile on the exam.

Table 80.

Multiple Regression Analysis of 2008 8th Grade PSSA Reading (Basic) (Economically Disadvantaged)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	4.66	2.09	.363	2.23	.033
Percentage of Low-Income Students	.051	.119	.083	.429	.671
Total Student Enrollment	.002	.007	.048	.252	.802

No association was shown between school structure, percentage of low – income students, and total students enrollment to the number of economically disadvantaged students scoring in the below basic quartile on the 2008 eighth grade PSSA reading exam (Table 81).

Table 81.

Multiple Regression Analysis of 2008 8th Grade PSSA Reading (Below Basic) (Economically Disadvantaged)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	4.16	2.51	.266	1.66	.107
Percentage of Low-Income Students	.134	.143	.178	.939	.355
Total Student Enrollment	.017	.009	.363	1.94	.060

No relationship was shown between school structures, percentage of low – income students, and total student enrollment to the number of economically disadvantaged students scoring in the advanced, proficient, basic, and below basic quartiles on the 2005 fifth grade PSSA reading exam (Tables 82, 83, 84, and 85).

Table 82.

Multiple Regression Analysis of 2005 5th Grade PSSA Reading (Advanced) (Economically Disadvantaged)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-1.75	2.22	-.139	-.786	.438
Percentage of Low-Income Students	.226	.147	.322	1.53	.136
Total Student Enrollment	.010	.008	.262	1.27	.213

Table 83.

Multiple Regression Analysis of 2005 5th Grade PSSA Reading (Proficient) (Economically Disadvantaged)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	.126	3.68	.006	.034	.973
Percentage of Low-Income Students	-.012	.244	-.010	-.047	.962
Total Student Enrollment	-.010	.013	-.169	-.783	.440

Table 84.

Multiple Regression Analysis of 2005 5th Grade PSSA Reading (Basic) (Economically Disadvantaged)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	.012	2.13	.001	.006	.995
Percentage of Low-Income Students	-.214	.141	-.318	-1.52	.140
Total Student Enrollment	-.014	.007	-.396	-1.93	.063

Table 85.

Multiple Regression Analysis of 2005 5th Grade PSSA Reading (Below Basic) (Economically Disadvantaged)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	1.70	3.38	.091	.505	.617
Percentage of Low-Income Students	-.005	.224	-.004	-.020	.984
Total Student Enrollment	.015	.012	.260	1.24	.225

Table 86 showed a relationship between total student enrollment and the change in the number of economically disadvantaged students scoring in the advanced quartile from 2005 to 2008 on the PSSA reading exam. Small schools were associated with a greater change in the number of economically

disadvantaged students scoring in the advanced quartile on the exam. As the number of students in a school decreased, a greater number of students in the low economic sub – group scored advanced on the Reading PSSA from 2005 to 2008. Therefore, this study shows that economically disadvantaged students performed better on the Reading PSSA exam in smaller schools. No relationship was shown between middle schools and junior high schools and percentage of low – income students to the change in the number of economically disadvantaged students scoring in the advanced quartile on the exam.

Table 86.

Multiple Regression Analysis of the Change in PSSA Reading (Advanced) (Economically Disadvantaged)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-3.14	3.48	-.148	-.904	.373
Percentage of Low-Income Students	-.152	.230	-.129	-.660	.514
Total Student Enrollment	-.033	.012	-.517	-2.71	.011

Multiple regression analysis showed no relationship between school structures, percentage of low – income students, and total school enrollment to the change in the number of economically disadvantaged students scoring in the proficient,

basic, and below basic quartiles on the PSSA reading exam

(Tables 87, 88, and 89).

Table 87.

Multiple Regression Analysis of the Change in PSSA Reading (Proficient) (Economically Disadvantaged)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-1.96	1.64	-.218	-1.19	.242
Percentage of Low-Income Students	-.028	.109	-.056	-.257	.799
Total Student Enrollment	.001	.006	.040	.186	.854

Table 88.

Multiple Regression Analysis of the Change in PSSA Reading (Basic) (Economically Disadvantaged)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	-2.85	1.86	-.276	-1.54	.136
Percentage of Low-Income Students	-.113	.127	-.201	-.889	.382
Total Student Enrollment	.005	.007	.153	.684	.500

Table 89.

Multiple Regression Analysis of the Change in PSSA Reading (Below Basic) (Economically Disadvantaged)

Variable	B	Std. Error	Beta	t	Sig.
School Structure	.550	1.39	.074	.396	.695
Percentage of Low-Income Students	-.045	.091	-.111	-.50	.621
Total Student Enrollment	-.005	.005	-.238	-1.10	.278

Summary

The sample in this study contained twenty middle schools and twenty junior high schools that were similar in regards to classification (rural, suburban, and urban), total student enrollment, and percentage of economically disadvantaged students. There is much variation in the descriptive statistics of academic achievement between middle schools and junior high schools. The dependent variables in the sample are higher than the state averages for the scaled scores used in this study. In 2008, the Pennsylvania average on the eighth grade PSSA exams were 1404.1 in math and 1355.3 in reading. This compares to the sample average of 1422.7 in math and 1508.4 in reading. The state averages on the 2005 fifth grade PSSA exams were 1369.9 in math and 1327.3 in reading. This compares to the sample average

of 1430.9 in math and 1356.4 in reading. The percentage of students (all students, special education students, and economically disadvantaged students) scoring in the advanced quartile increased for both math and reading by a minimum of 1.8 to a maximum of 6.9. Comparing the control variables to the state averages showed that the schools in this sample are typical of the schools in Pennsylvania since there was little variation in these measures.

None of the independent variables were associated with academic achievement for all students, special education, and economically disadvantaged students. Of the 78 dependent variables assessed, 11 were associated with total student enrollment. For all students, 6 of the 30 dependent variables were associated with total student enrollment. For special education students, 2 of the 24 dependent variables were associated with total student enrollment. For economically disadvantaged students, 3 of the 24 dependent variables were associated with total student enrollment. The total student enrollment was consistently not related to the measures of academic achievement. Of the measures that were statistically significant, the smaller schools were generally associated with higher scores on the PSSA exam.

Of the 78 dependent variables assessed, 20 were associated with the percentage of low – income students. For all students,

16 of the 30 dependent variables were associated with the percentage of low – income students. For special education students, 4 of the 24 dependent variables were associated with the percentage of low – income students. For economically disadvantages students, 0 of the 24 dependent variables were associated with the percentage of low – income students. The percentage of low – income students was consistently not related to the measures of academic achievement. Of the measures that were statistically significant, a greater percentage of low – income students were generally associated with lower scores on the PSSA exam.

Of the 78 dependent variables assessed, 14 were associated with school structure. For all students, 11 of the 30 dependent variables were associated with school structure. For special education students, 1 of the 24 dependent variables was associated with school structure. For economically disadvantaged students, 2 of the 24 dependent variables were associated with school structure. The school structure as either middle school or junior high school was consistently not related to the measures of academic achievement. Of the measures that were statistically significant, middle schools were generally associated with higher scores on the PSSA exam.

CHAPTER V

SUMMARY AND CONCLUSIONS

The purpose of this study was to determine if there was a difference in academic achievement when comparing middle schools and junior high schools within the Commonwealth of Pennsylvania. Data were analyzed for all students in the sample, as well as, the economically disadvantaged and special education sub – groups. Various measures of academic achievement were used in this study. The intent was to determine if middle schools with all of its components that are specifically geared towards young adolescents and their unique needs were associated with improved academic performance within the Commonwealth of Pennsylvania.

Academic achievement is difficult to determine. There are many measures that can be used including classroom level data, local assessment data, and various standardized exams. All of these measures of academic achievement are extremely inconsistent due to variations in expectations, grading scales, and the many standardized exams available. Due to these issues, the standardized exam that measures academic achievement for students in Pennsylvania (PSSA) was chosen for this study. Studies in other states that look at academic achievement data have been inconsistent and report a wide variation of results. Some studies have shown increases in academic achievement when

implementing certain components of the middle school concept (Baker, 2001; Caswell, 2003; & Petritz, 2004) and others have reported no changes in academic achievement (Dooly, 2005; Moeller, 2001, & Pamperien, 1997). Baker (2001) surveyed principals in 278 schools that housed grade eight within K-8, 7-8, 7-12 and 6-8 schools. The purpose of the Baker study was to determine the impact of middle level practices (including exploratory classes) on eighth grade Indiana state standardized exams. Baker concluded that success depended on configuration. A 7-8 grade configuration had a significantly higher eighth grade ISTEP score. Results also indicated that as the level of middle level practices increased so do the scores on the state standardized exam. Caswell (2003) surveyed administrators, teachers and students in over two-hundred schools in sixteen states to analyze how advisory programs affect student grades and classroom behaviors. Results of the Caswell study indicated that frequency and duration of advisory programs have a significant impact on student achievement and student adjustment. Petritz (2004) interviewed fourteen teacher advisors in a large Montana school district on their perceptions of effective middle school teacher advisors. The subjects believed that they were effective and that being involved with advisees was critical in positive student outcomes. The subjects also stated that they developed positive relationships with their

advisees. Dooly (2005) studied the effectiveness of advisory programs in Arkansas secondary schools. Dooly concluded that no significant or consistent relationship existed between schools with advisory programs to academic or attendance measures. Moeller (2001) looked at the relationship between advisory programs implemented in a junior high school and student attendance, grades and student perceptions of school climate. Results of the Moeller study indicated a relationship between advisory programs, student attendance and grades does not exist. Pamperien (1997) studied academic achievement between junior high schools and middle schools in Missouri. Middle schools were defined as those schools that incorporated essential middle school components such as exploratory classes. Results indicated no statistically significant difference in language arts, reading, math and social studies. There was a statistically significant difference in science. This study demonstrated the same inconsistent findings as previous studies. There were individual cases where school structure, student enrollment, and the percentage of low – income students made a positive impact on student achievement and in other cases they did not. For the Pamperien study, middle schools were associated with the following; a higher percentage of special education students scoring advanced on eighth grade Reading, a higher percentage of all students scoring advanced on fifth grade Reading, higher

scaled scores on fifth grade Reading, a higher percentage of all students scoring advanced on eighth grade Reading, higher scaled scores on eighth grade Reading, a higher percentage of all students scoring advanced on eighth grade math, higher scaled scores for all students on eighth grade math, and fewer students scoring below basic on eighth grade math. Junior high schools were associated with a greater percentage of students scoring basic and below basic on eighth grade Reading (economically disadvantaged), eighth grade Reading (all), and eighth grade math (economically disadvantaged) respectively. Although school structure did have an impact in a few instances, the majority of the cases showed no statistically significant differences. The research questions related to this study were not focused on scores for a particular year but the change over time from 2005 to 2008. This view was taken as to determine which type of program, middle school or junior high school, produced higher scores on the math and Reading PSSA exams or a greater percentage of students scoring in particular quartiles.

Individual student academic achievement data is unattainable due to confidentiality issues. Therefore, school level data were used in this study. This data were available through the SchoolDataDirect website, the Pennsylvania Department of Education website, and from individuals from the PA Department of Education.

Academic Achievement Variables

The academic achievement variables were as follows; the 2008 eighth grade PSSA math and reading scaled scores, the 2005 eighth grade math and reading scaled scores, the change from the 2005 eighth grade PSSA math and reading scaled scores to the 2008 PSSA eighth grade math and reading scaled scores, the percentage of student scoring in each quartile on the 2005 and 2008 PSSA math and reading exams (all students, special education students, and economically disadvantaged students), and the change in the percentage of students in each quartile on the 2005 and 2008 PSSA math and reading exams.

Descriptive statistics were used to describe the schools in the sample. The number of schools, the range, minimum, maximum, mean, and standard deviation were used to describe the academic achievement variables for all students, special education students, and economically disadvantaged students in the school sample. Data concerning academic achievement was analyzed using descriptive statistics when discussing the schools comprising the sample. T-tests were used to analyze academic achievement between school structures. Multiple regression analysis was used to determine a relationship between school structure, percentage of low – income students, and total student enrollment to any variables of academic achievement. To finish, the relationship between the control variables and the measure of academic

achievement or the related variables were analyzed using multiple regression. The data were analyzed for all students in the sample, as well as, the special education and economically disadvantaged sub-populations. To eliminate any influence from total school enrollment and percentage of low – income students - the study included these variables.

Independent and Control Variables

The independent variable was the school structure used by an individual school; either middle school or junior high school. No school was included in the sample that did not meet the grade configuration and definition of said school outlined in this study. The control variables were the percentage of low – income students, total school enrollment, and the classification of rural, suburban, and urban. The school structure was determined via e-mail to specific school principals and the control variables were obtained from PA School Profiles and SchoolDataDirect.

Summary of the Design of the Study

All public schools in Pennsylvania that contained grade seven in their configuration and also met the definition of a middle school and junior high school as defined in this dissertation were included. To determine school configuration type, the SchoolDataDirect website was utilized. This website provided grade levels for individual schools throughout

Pennsylvania, as well as, percentage of low income students and total school enrollment. Schools that met the definition for middle level schools and junior high schools were used for this study. To place these schools into the proper category as either a middle school or junior high school, the principals or their designees of all of the schools were contacted via e-mail and asked how many of the six middle school components were evident in their program (see page ten for a listing of these components). Those middle schools that reported using at least five of the six components were used. The junior high schools that were a part of this study reported using no more than two of the six middle level components. The deficiency in establishing school configuration type was that there is no middle level certification or recognition. Using PDE classification, these schools were further separated into rural, suburban, and urban institutions. Within these categories, each middle school was randomly paired with a junior high school of similar enrollment and percentage of economically disadvantaged students. The variables of enrollment and percent of low-income students were based on data from the SchoolDataDirect website. By using this method, the overall demographics of middle schools and junior high schools were similar.

Data concerning academic achievement were analyzed using descriptive statistics when discussing the schools comprising

the sample. T-tests were used to analyze academic achievement between school structures. Multiple regression analysis was used to determine a relationship between school structure, percentage of low – income students, and total school enrollment to any variable of academic achievement. To finish, the relationship between the control variables and the measure of academic achievement or the related variables were analyzed using multiple regression. The data were analyzed for all students in the sample, as well as, the special education and economically disadvantaged sub-populations.

Research Questions

Question 1. Based on the PSSA scores, what is the difference in academic achievement for students (all students, special education students, and economically disadvantaged students) in junior high schools as opposed to middle schools?

Sub-question 1: What is the difference in the changes between the 2005 fifth grade and 2008 eighth grade PSSA math and reading scaled scores (all students)in junior high scores as opposed to middle schools?

Multiple regression analysis indicated that the school structure was not related to any change from the 2005 fifth grade to the 2008 eighth grade PSSA mathematics and reading scores for all students. As a result, null hypothesis 1 (the change in a schools' scaled math and reading scores [all

students]from the 2005 fifth grade PSSA exam to the 2008 eighth grade PSSA exam is not related to school configuration) is not rejected.

Sub-question 2: What is the difference in the percentage of the schools' students (all students, special education students, and economically disadvantaged students)scoring in the advanced quartile on the 2005 fifth grade PSSA math and reading tests as compared to the number of students (all students, special education students, and economically disadvantaged students)scoring in the advanced quartile on the 2008 eighth grade PSSA math and reading tests between middle schools and junior high schools?

Multiple regression analysis indicated that the school structure was not related to the percentage of students (all students, special education students, and economically disadvantaged students) scoring in the advanced quartile on the 2005 fifth grade math and reading exam as compared to the number of students scoring in the advanced quartile on the 2008 eighth grade math and reading exam. As a result, null hypothesis 2 (the change in the percentage of students [all students, special education students, and economically disadvantaged students] scoring in the advanced quartile on the 2005 fifth grade PSSA math and reading exams as compared to the percentage of students [all students, special education students, and

economically disadvantaged students] scoring in the advanced quartile on the 2008 eighth grade PSSA math and reading exams is not related to school configuration) is not rejected.

Sub-question 3: What is the difference in the percentage of the schools' students (all students, special education students, and economically disadvantaged students)scoring in the proficient quartile in the 2005 fifth grade PSSA math and reading tests as compared to the number of students (all students, special education students, and economically disadvantaged students)scoring in the proficient quartile on the 2008 eighth grade PSSA math and reading tests between middle schools and junior high schools?

Multiple regression analysis indicated that the school structure was not related to the percentage of students (all students, special education students, and economically disadvantaged students) scoring in the proficient quartile on the 2005 fifth grade math and reading exam as compared to the number of students scoring in the advanced quartile on the 2008 eighth grade math and reading exam. As a result, null hypothesis 3 (the change in the percentage of students [all students, special education students, and economically disadvantaged students] scoring in the proficient quartile on the 2005 fifth grade PSSA math and reading exams as compared to the percentage

of students [all students, special education students, and economically disadvantaged students] scoring in the proficient quartile on the 2008 eighth grade PSSA math and reading exams is not related to school configuration) is not rejected.

Sub-question 4: What is the difference in the percentage of the schools' students (all students, special education students, and economically disadvantaged students) scoring in the basic quartile in the 2005 fifth grade PSSA math and reading tests as compared to the number of students (all students, special education students, and economically disadvantaged students)scoring in the basic quartile on the 2008 eighth grade PSSA math and reading tests between middle schools and junior high schools?

Multiple regression analysis indicated that the school structure was not related to the percentage of students (all students, special education students, and economically disadvantaged students) scoring in the basic quartile on the 2005 fifth grade math and reading exam as compared to the number of students scoring in the basic quartile on the 2008 eighth grade math and reading exam. As a result, null hypothesis 4 (the change in the percentage of students [all students, special education students, and economically disadvantaged students] scoring in the basic quartile on the 2005 fifth grade PSSA math and reading exams as compared to the percentage of

students [all students, special education students, and economically disadvantaged students] scoring in the basic quartile on the 2008 eighth grade PSSA math and reading exams is not related to school configuration) is not rejected.

Sub-question 5: What is the difference in the percentage of the schools' students (all students, special education students, and economically disadvantaged students) scoring in the below basic quartile in the 2005 fifth grade PSSA math and reading tests as compared to the number of students (all students, special education students, and economically disadvantaged students)scoring in the below basic quartile on the 2008 eighth grade PSSA math and reading tests between middle schools and junior high schools?

Multiple regression analysis indicated that the school structure was not related to the percentage of students (all students, special education students, and economically disadvantaged students) scoring in the below basic quartile on the 2005 fifth grade math and reading exam as compared to the number of students scoring in the below basic quartile on the 2008 eighth grade math and reading exam. As a result, null hypothesis 5 (the change in the percentage of students [all students, special education students, and economically disadvantaged students] scoring in the below basic quartile on

the 2005 fifth grade PSSA math and reading exams as compared to the percentage of students [all students, special education students, and economically disadvantaged students] scoring in the below basic quartile on the 2008 eighth grade PSSA math and reading exams is not related to school configuration) is not rejected.

Key Findings

The relationship between school structure and academic achievement was the focus of this study. Previous studies have indicated an association between middle schools and higher levels of student achievement (Aycock, 2005; Baker, 2001; Carothers, 1997; Caswell, 2003; Gray, 2004; Marten, 1998; & Russell, 1994). Aycock (2005) studied the difference in academic achievement, attendance and behavior between Mississippi middle schools where interdisciplinary teaming was implemented and middle schools where a junior high approach was used. Forty-nine middle schools with a grade configuration of six through eight were used for this study. The results of this study concluded that there was no significant difference in student achievement, attendance and behavior in grades six and seven between the middle schools that implemented interdisciplinary teaming and middle schools that did not. There was a significant difference in academic achievement in grade eight. Carothers (1997) evaluated a specific middle school exploratory program by

interviewing administrators, teachers and students. The study looked at perceptions from these stakeholders on the effectiveness of the program in regards to curricular and extracurricular decisions at the high school level. Results of the study concluded that the program was successful. There were student intellectual, social and emotional gains. Half of the seniors stated that they had an enriching experience in the exploratory programs in middle school. Gray (2004) interviewed students from three urban middle schools to assess their opinions on the effectiveness of interdisciplinary teaming. The results of this study showed that the use of interdisciplinary teaming was a highly effective way to prepare middle school students for high school and improve their attitudes about learning. Marten (1998) studied the effects of middle school practices (including exploratory programs) at four middle schools in Kansas. Marten collected data through observations, interviews and focus groups. Results indicated that the strategies implemented were believed to be the reason for success. Russell (1994) studied the implementation of middle level programs on student achievement. Professional staffs from ten urban school districts were surveyed and results of eighth grade students on the California Achievement Test served as the dependent variable. Results of this study showed that five of the six middle level program concepts were relayed to enhanced

student achievement. The results of this study were inconsistent with these previous studies. Overall, there were no significant differences in academic achievement between middle schools and junior high schools for all students, as well as, the economically disadvantaged and special education sub – groups. Other studies have shown no association between middle level practices and student achievement or have had mixed results (Dooly, 2005; Moeller, 2001; Pamperien, 1997; & Sharts, 1998). Sharts (1998) evaluated the effects of interdisciplinary teaming on Illinois eighth grade achievement on students that attended large (N=600+) middle schools. Achievement was measured from the state standardized test for grade configurations between grade five and nine. Results indicated that interdisciplinary teaming was a statistically significant predictor of math achievement but not for writing and reading.

The use of the PSSA exam was a consistent way to measure academic achievement between schools. The inconsistencies found in previous studies remained with the findings of this study. This study analyzed the effects of school structure, percentage of low – income students, and total student enrollment to many measures of academic achievement for all students, as well as, the special education and economically disadvantaged sub – groups. Although the results in the changes between 2005 and 2008 for math and reading on the PSSA exam were consistent in

showing no statistically significant relationship between middle schools and junior high schools, there was much variation when comparing individual academic measures between the two school structures. In many instances, the results of this study agreed with existing literature, but in many studies there were contradictions.

Summary

Due to the *No Child Left Behind Act,* there is a considerable amount of pressure placed upon public schools to perform to certain levels of academic achievement in math and reading in grades three through eight and eleven. Writing and science are also assessed by the use of standardized exams in Pennsylvania but only math and reading count toward Annual Yearly Progress. This AYP measure is connected with funding and punitive measures placed upon public schools by the state. There are many ways of determining academic achievement but the PSSA exam is the measure by which all public schools in Pennsylvania are held accountable. Because all students in grades three through eight and eleven take the PSSA math and reading exams, this measure of academic achievement was chosen for this study. By looking at academic achievement measures for demographically similar cohorts of students i.e. school classification, percentage of low – income students, and total student enrollment between the years 2005 and 2008, no relationship was

found between school structure and the change in PSSA scores for all students, special education students, and economically disadvantaged students. The use of middle school practices did have an association with students scoring in certain quartiles and overall scaled scores in math and reading but not in the changes between 2005 and 2008 for all students, as well as, special education and economically disadvantaged students. For special education and economically disadvantaged students, there were virtually no relationships between the independent variables and any of the academic achievement measures. This was compared to existing literature that showed widely varying results. Previous studies have shown increases and decreases in academic achievement by implementing middle school practices.

This study is one of several that have looked at academic achievement in relation to middle school practices. It provided strong evidence that no relationship exists between school structure and academic achievement. However, when added to the existing body of literature, it is difficult to determine definitively that middle school practices positively affect academic achievement. More studies will be needed before this issue can be resolved.

Recommendations

As public schools come under increasing pressure to reform, not only from *No Child Left Behind,* but the push for twenty –

first century skill development, technology integration, differentiating instruction for sub-groups, and fiscal difficulties, the decision to move towards or away from a middle school model needs to be done carefully. Based on the results of this study, along with other studies, districts who are contemplating reform in grade levels or structure to improve academic achievement will need to spend considerable time outlining their goals and analyzing the effectiveness of their current practices before decisions are made. Although there are many studies that show that middle school practices improve academic achievement, there are also many that show no change. In today's economic and political climate, decisions of this type can prove to be costly with little to show for the efforts.

Districts also must consider the deep rooted nature of middle schools. These schools have been around for many years and countless communities would not be in favor of moving away from this concept. Even though many studies have shown no association between middle schools and academic achievement, there may be other factors such as social, emotional, and physical reasons that the middle school concept is appropriate and positive for young adolescents. As students move from elementary to middle school, they experience rapid changes in their physical, emotional, and interpersonal development. These changes can produce a great deal of stress which in turn can

lead to a decline in academic performance, self – image, perceived social support, and perceptions about the quality of school life (Blyth, Simmons, and Carlton – Ford, 1983). According to the Carnegie Council (1989), middle schools are vital institutions for millions of American youth who are likely to show poor achievement and motivation to learn, as well as, poor conduct and mental health problems. Because of these concerns, middle schools are not only a place to learn academics but to learn social and emotional lessons. According to Taylor and Larson (1999), social and emotional learning begins and builds on students' innate ability to understand themselves and others. Without social and emotional skills, students lack the ability to manage life tasks such as solving everyday problems, controlling impulsive behavior, and working cooperatively. Social and emotional learning also effects motivation and attendance (Glasser, 1997). This study showed that the middle school structure had no significant affect on student achievement. However, this researcher believes that the middle school years are more importantly spent on cultivating students' social and emotional health. The elementary years focus on skill development such as reading and basic math. The high school years focus on content and preparation for life after school. Because of the vast changes that occur to young adolescents, the middle school structure may be the ideal place to transition

students from elementary to high school. Because of this, academics may not be affected by the structure but other very important lessons are learned.

Future Studies

The question then remains, “Why are some middle schools successful when it comes to academic achievement while others are not”? The school structure alone appears incapable of increasing academic achievement, but yet there are many successful middle schools. It is likely that there are practices that are employed by successful middle schools that could be identified and then used by other middle schools. Successful practices could also transcend school structure and be successful in traditional junior high schools.

Besides academic achievement, the original intent of middle schools was to meet the social and psychological needs of young adolescents (Cuban, 1992). Perhaps the environment created by the use of middle level practices is enough to facilitate a positive learning environment conducive to improved achievement. Qualitative research studies could be conducted to investigate how the middle level components such as teaming, exploratory classes, and advisory impact the learning environment and therefore the emotional, social, and physical needs of young adolescents. There is no doubt that this is an area that requires additional research so that schools that are deciding

upon the correct school structure for their specific needs will have predictable results.

Also, future quantitative studies could be conducted by expanding to schools outside of Pennsylvania. Specific states could be used or a national study conducted to determine any significant differences between middle schools and junior high schools.

Finally, this study could be replicated using other academic assessments other than the PSSA exam. Perhaps, assessments such as the Terra Nova or state approved local assessments could be used.

Conceivably what we are looking for may be right before us. As districts spend copious amounts of money and time trying to improve student performance through technology, new programs, reform efforts, and curriculum, perhaps our efforts should be concentrated on the one entity that may have the greatest impact on student achievement – teachers. Future studies will need to focus on the specific tools that successful teachers utilize to help students perform.

Conclusion

The relationship between school structure and academic achievement is uncertain. The research noticeably shows that there are high achieving middle schools but there are also mediocre and poor performing middle schools. The same can be

said for traditional junior high schools since student performance can be high, average, and low. The focus needs to shift from which type of school is more successful to what practices yield the type of academic results that all are striving toward.

School structure alone cannot guarantee academic success for all students. This study has shown that there is no significant difference between middle schools and junior high schools in relation to the Pennsylvania System of School Assessment (PSSA). Success in school is analogous to a recipe. It takes many ingredients added in the right amounts at the right time to make it correct. To ensure the best possible chance for success, the right amounts of curriculum, technology, programs, type of schedule, school structure, and teachers must be combined at the right time to produce successful students. We must also keep in mind that success can be defined in many ways. This study used standardized test scores to measure student success. As schools and districts strive to increase student achievement, this study will help decision makers make choices that will affect students and the community for years to come.

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