5-6-2009

The Pennsylvania Achievement Gap Effort (PAGE1): A Multi-Year Quantitative Study of Student Achievement

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THE PENNSYLVANIA ACHIEVEMENT GAP EFFORT (PAGE1): A MULTI-YEAR QUANTITATIVE STUDY OF STUDENT ACHIEVEMENT

A Dissertation

Submitted to the School of Graduate Studies and Research

in Partial Fulfillment of the

Requirement for the Degree

Doctor of Education

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May 2009

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The purpose of this multi-year, quantitative study was to use existing data to determine if the Pennsylvania Achievement Gap Effort (PAGE1) was significantly effective or not in increasing student achievement in mathematics and literacy over a three year time period for economically disadvantaged students for the 16 PAGE1 schools as compared to 16 significantly similar schools selected based on socioeconomic status, demographics, school grade level structure and student population size. The grade levels compared were grades 5, 8 and 11. Although additional grades are tested today, all three of these grade levels were the only grade levels tested in the baseline year of 2004. PSSA individual student scaled scores were provided for testing years 2004 (baseline), 2005, 2006 and 2007 for each of the 32 schools and access to the data was made available by the Pennsylvania Department of Education through the secure eMetric database web site. Student names and identification numbers were not made available. Access to the data was authorized by Pennsylvania Secretary of Education Dr. Gerald Zahorchak in support of this study to evaluate the impact of PAGE1 on increasing student achievement.

The results of this study indicate that although the PAGE1 schools increased student achievement for economically disadvantaged students in many cases, this increase was not statistically significant when comparing results with the comparison schools.

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CHAPTER I

PAGE1: A STUDY OF STUDENT ACHIEVEMENT

Introduction

Education continues to be criticized by the public. Inequality of student achievement, the perceived ineptitude of teachers and lack of vision of administrators and poor student achievement on international comparisons is generally fuel for the public's critical comments. The perception of the public has become reality and has led to national and state legislation regarding how professional educators operate public schools in America. Everybody seems to be an expert on education. Those members of the public who have spent time in elementary, middle and high school classrooms as students believe they are experts on educational practices because they lived through the educational process. We have millions of "back seat drivers" in this country, when it comes to the education of our children. However, as long as the achievement of our students does not meet public expectations, the professional educational community will be continually in the public's critical eye.

The reasons for achievement gaps between groups of students have been studied for decades. Although success of closing achievement gaps exist in schools in this country (Education Trust, 2001), solutions to conquering the gap are not widely implemented. Therefore, as a response to this national dilemma, the Pennsylvania Department of Education (PDE) partnered with the Pennsylvania State Board of Education, the Pennsylvania Association of Intermediate Units and the Education Trust to address achievement gaps through the Pennsylvania Achievement Gap Effort, known as PAGE1. It was the hope of the Pennsylvania Department of Education that this group of

16 PAGE1 schools would serve as models in achievement gap reduction for not only all Pennsylvania schools but for schools across the country.

Included in this first chapter are key definitions, the purpose of the study, the significance of the study, the importance of the problem, the problem statement, research questions, conceptual framework, study design, limitations and summary.

Definitions of Terms

Economically disadvantaged students: Defined by the United States Department of Education and the Pennsylvania Department of Education (PDE), as those students qualifying for free and reduced lunches. Family income guidelines are set and used by both the federal and state government to determine eligibility for the program on an annual basis. Eligibility for free and reduced-price lunches is determined by students' household income in relation to the federally established poverty level. This poverty level is set by the Federal Government and varies from year to year. Free lunch qualification is set at 130 percent of the poverty level and reduced price lunch qualification is set at between 130 and 185 percent of the poverty level (USDOE, 2004).

Achievement gap: Exists when groups of students with relatively equal ability fail to achieve at the same levels in school. One group will far exceed the achievement level of the other.

Pennsylvania Achievement Gap Effort (PAGE 1): A three-year effort (2004-2007) led by the Pennsylvania State Board of Education in partnership with the Pennsylvania Association of Intermediate Units (PAIU), the Pennsylvania Department of Education and the Education Trust. This effort is a response to the achievement gap in Pennsylvania. The purpose of PAGE1 was to identify schools that could show academic

growth over a three-year period. Schools having subgroup achievement gaps would address this through support or remediation through opportunities of professional development, communication and visitations with high performing schools of similar demographics and/or direct support from PDE, the PA State Board, the Education Trust and the Intermediate Unit liaison (PDE, 2006).

Pennsylvania System of School Assessment (PSSA): A standards-based, criterion-referenced assessment used in Pennsylvania to measure a student's attainment of the Pennsylvania Academic Standards while also determining the degree to which school programs enable students to attain proficiency standards. PSSA results are produced at student and school levels. Student scores, which are provided to their respective schools, can be used diagnostically to identify students in need of additional educational opportunities (PDE, 2006).

Scaled Scores: Transformed number correct score. Anchored to some known point such as the same items in common sections of the PSSA. The PSSA scaled score metric has been anchored to a mean school level scaled score for the base year and that point has been arbitrarily labeled 1300 (PDE, 2007). The point on the scale one point above the standard deviation is 1400. The 1300 metric was chosen so that negative or fractional scaled scores are not needed and so that the PSSA scaled scores are not confused with results from other testing programs. A school with a scaled score of 1300 performed better than did the average school in the base year given (PDE, 2007).

The Education Trust: The Education Trust, located in Washington, D.C., was established in 1990 by the American Association for Higher Education as a special project to encourage colleges and universities to support K-12 reform efforts. At present,

the Education Trust has grown into an independent non-profit organization whose mission is to make schools and colleges work for all of the students they serve. It is the belief of the Education Trust that it is impossible to change K-12 education without simultaneously changing the way that postsecondary education practices education. However, they also believe that postsecondary education needs reforming as much as K-12 (Education Trust, 2001).

The Education Trust works for the high academic achievement of all students at all levels, pre-kindergarten through college and closing the achievement gaps that separate low income students and minority students from other youth. The basic premise of the Education Trust is that all children will learn at high levels when they are taught to high levels. The focus of the work of the Education Trust is improving the education of all students and particularly those students for whom the system has usually left behind. The Education Trust provides the following (Education Trust, 2002):

1. Advocacy that encourages schools, colleges and communities to effectively implement practices so that all students will reach high levels of academic achievement.
2. Analysis and congressional testimony on policies intended to improve education; writing and speaking for audiences about educational practices and patterns that cause and close achievement gaps between groups of students.
3. Research and dissemination of data identifying achievement patterns among groups of students.
4. Provide assistance to school districts, colleges and community based organizations to help efforts at raising student achievement.

Purpose of the Study

The purpose of this multi-year, quantitative study was to determine if the Pennsylvania Achievement Gap Effort (PAGE1) was significantly effective or not in increasing student achievement in mathematics and literacy for economically disadvantaged students for the 16 PAGE1 schools as compared to 16 similarly selected schools with similar socioeconomic status, school structure, demographic setting and student population size over a three year time period. The grade levels compared will be grades 5, 8 and 11. Although additional grades are tested today, all three of these grade levels were the only levels tested in the baseline year of 2004. Individual student PSSA scores, economic status and PSSA proficiency status were provided for testing years 2004 (baseline), 2005, 2006 and 2007 for each of the 32 schools and access to the data was made available by the Pennsylvania Department of Education through the secure eMetric database web site. Student names and identification numbers were not made available. Access to the data was authorized by Pennsylvania Secretary of Education Dr. Gerald Zahorchak in support of this study to evaluate the impact of PAGE1 on student achievement.

Significance of the Study

An achievement gap exists when groups of students with relatively equal ability fail to achieve at the same levels in school. One group will far exceed the achievement level of the other. In the United States, it is evident that an achievement gap exists by comparing how various groups of students perform on state and national tests and also comparing drop-out rates, graduation rates, college bound and college graduation rates. A few common gaps are the gaps between the following groups: girls and boys;

economically disadvantaged students and non-economically disadvantaged students; between ethnic groups; students with disabilities and those without disabilities. Across the U.S., a gap in academic achievement persists (Education Trust, 2001). This is one of the most important education challenges our country currently faces.

There is no one response as to why there are achievement gaps, although researchers have suggested a variety of explanations. Most agree that some of our students face challenges beyond the school that impact their academic achievement, including cultural and family circumstances, financial challenges, quality academic assistance and necessary materials and access to adequate nutrition and health care (Coleman, 1966; Jencks, et.al., 1972). However, these factors alone cannot explain gaps in achievement. Inequalities in the educational system have also contributed to disparities between groups of students, such as a lack of high expectations for poor and minority students, cultural stereotyping, inadequate approaches to involving families in their children's educations, tracking, the employment of uncertified and unskilled teachers and lack of funding (Edmonds, 1982; Brophy, J. and Good, T., 1986; Rutter, 2001; Carter, 2001; Barton, 2003; Parrett, 2005).

The Executive Director of the Education Trust, Dr. Kati Haycock, in her opening address at the Education Trust Conference in November of 2005, relates that recent state and national data tell an undeniable story. Achievement gaps in elementary and middle schools are closing but there is much more work ahead of us. However, in high school, the gaps are wider than ever. High school completion rates, once first in the world, are now 17th.

Public schools are responsible for educating all students; they historically have had greater success educating middle-to-upper income and white students than poor and minority students. The worst-performing schools across the nation are high-poverty schools. But more important, there are also striking exceptions to the pattern of low income/low performance. There are enough schools that defy the trend to prove that the background of the student body does not have to determine achievement results (Education Trust, 2002).

Since the signing of the *No Child Left Behind Act (NCLB)* in January 2002 (USDOE, 2004) by President George W. Bush, researchers, district personnel, educators, corporations, school reformers, and parents are demanding accountability for academic performance in schools. Schools and administrators cannot hide behind the excuses of poverty, ethnicity, race, disability and gender as reasons for the failure of our public schools. All of the nation's schools are now charged with providing an educational program that ensures academic achievement to the level of proficiency for 'all' children in the public schools. The foundation for this national accountability movement was actually initiated by school reform movements preceding passage of NCLB.

In Pennsylvania changes have occurred in academic standards, assessments and strategic/school improvement planning. An emphasis on state standards has continued, including curricular support through the development of assessment anchors and eligible content in areas of reading, math, and science, as well as, the development of the Standards Aligned Systems model (PDE, 2008). The written and adopted curriculum, which in many districts remained on the shelf, has now resurfaced to become a living document used daily by teachers. Additionally, the question of subgroup performance

and accountability has placed the burden on districts to examine curriculum for alignment and effectiveness, for depth and equality for all students. Many academic programs' outcomes are now being analyzed more closely to determine why gaps are occurring in the achievement of subgroups, specifically among the poor and disadvantaged populations. Neither school district nor school within a district is exempt from the following questions: What achievement are we seeing in our own schools? How are low socio-economic students comparing from district to district?

The Pennsylvania Achievement Gap Effort (PAGE1) was a statewide initiative to respond to closing the achievement gap between groups of students. The Pennsylvania Department of Education, the Pennsylvania State Board of Education, the Education Trust and the Pennsylvania Association of Intermediate Units combined efforts to identify 16 schools in Pennsylvania with achievement gaps and to work with these schools to close the achievement gap. These 16 PAGE1 schools were to then serve as models for all other schools in regards to closing the achievement gap for all students.

This study has determined the degree of success of Pennsylvania's PAGE1 project in reference to the achievement of economically disadvantaged students in reading and mathematics.

Importance of the Problem

Education is a basic right to which all children are entitled in the United States. For generations, education has been the most reliable path to a better life. The reason for this is that a solid education is the key to a better quality of life, including good jobs that pay better wages and offer opportunities for advancement. The benefits of education today are more important than ever for students to be successful in the future.

Student achievement for all students is why education exists. The educational system evolved so that the opportunity for all children to learn would be provided without regard to economic status or social position. Education can be a powerful tool in the development and growth of any democracy. An educated and informed population produces a successful society, government and economy. However, our diversified student population with a conglomeration of cultures has made the work of educators a most arduous task. The melting pot of the American culture and inequitable school funding has led to achievement gaps between many socioeconomic, gender specific and cultural subgroups and federal legislation has evolved to place continued pressure on public education to provide data oriented results that achievement gaps are closing and all students are being academically proficient.

The Elementary and Secondary Education Act (ESEA) is the main federal education law and was first passed by congress in 1965. Most of the nation's schools receive some form of federal financial aid under the law. The ESEA is revised every 5 to 7 years. The overall purpose of the law was to improve education for economically disadvantaged children. Funding through the ESEA is channeled through the states and proportioned to local education agencies based on their proportion of impoverished children (USDOE, 2007).

Accountability for public schools was soon to follow the federal funding of the ESEA. In 1969 the National Assessment of Educational Progress (NAEP) began reporting achievement scores in reading, mathematics, science, writing, U.S. history, civics, geography and the arts (NCES, 2003). The NAEP soon became known as the nation's report card because it supplied data for national and state student achievement

needs. Educational policy makers have used this objective measurement to evaluate the progress of our nation's schools. The NAEP offers results regarding subject-matter achievement, instructional experiences and school environment for overall populations of grade level students and subgroups of those populations. Although not all schools or all states have participated in the NAEP, the assessment has become a reflection of the success or lack thereof of in education in America.

In 1983, A *Nation at Risk* was published by the National Commission on Excellence in Education. This commission was directed by the Secretary of the United States Department of Education to report on the status of public schools and make recommendations for improvement. The Commission suggested a complete reform of public education to address improvement in student achievement. American schools were identified as falling behind schools in other countries. Recommendations from the study included higher professional standards for teachers, rigorous graduation standards, more instructional time for students, implementation of educational subject standards and increased fiscal support (*A Nation at Risk*, April 1983). As a result, the federal government put American education on the hot seat and educators began to measure achievement through the use of standardized tests.

What indicated to the Commission that the nation was at risk educationally? The results of the report highlight the concern of a nation (*A Nation at Risk*, 1983). First, on 19 international academic comparisons of student achievement and in comparison to other industrialized nations, the United States was last 7 times and was never first or second. The report also stated that 23 million adults were functionally illiterate based on everyday tests of reading, writing and comprehension. In addition to the adult

counterparts, 13 percent of all 17-year-olds in the United States could be considered functionally illiterate. Additionally disheartening, the achievement of high schools on standardized tests was reported as lower than 26 years previous. Lastly, from 1963 to 1980, scores on the Scholastic Aptitude Test declined on average by 40 points in math and 50 points in reading. These trends certainly were not in the interests of education nor the country.

In the late 1980's the focus of education changed from the amount of time students spent being instructed to the quality of the curriculum and instruction being provided. In 1989, the President and National Governor's Association adopted the National Education Goals. The intent of these goals was for the United States to build a nation of learners. Congress declared the National Education Goals, all to be accomplished by the year 2000 (USDOE, 2007). The goals focused on children and their needs and governmental expectations and are as follows:

1. All children will start school ready to learn through quality pre-school programs, parents teaching children and proper nutrition and health care.
2. The high school graduation rate will increase from 75% to 90% by reducing dropout rates.
3. All students will leave grades 4, 8 and 12 demonstrating competency in mathematics, English, science, foreign languages, civics, economics, art, history and geography, as well as prepare to be responsible citizens.
4. The nation's teachers will be involved in continuous professional development to obtain teaching skills and knowledge to prepare students for the next century.

5. The United States will be first in the world in math and science.
6. Every adult American will be literate and possess skills to compete in a global economy.
7. All schools will be free of drugs, alcohol, weapons and violence and will provide a disciplined learning environment.
8. Schools will promote parental partnerships to promote social, emotional and academic skills.

Overall, the commitment of these goals was to raise the academic achievement for all students.

These national goals were again highlighted with the Goals 2000: Educate America Act on March 31, 1994 (USDOE, 2007). Educate America legislation, along with state and local education reform efforts put the focus on comprehensive school change, school improvement and achievement for all children. Then, the ESEA was reauthorized through the Improving America's Schools Act in October of 1994. The fundamental principles of the law embodied that all students can learn through effective school leadership and locally developed reform strategies that involve the entire community.

Goals 2000 supported the development and implementation of State standards for student learning. Comprehensive reform plans for high student achievement based on standards aligned assessments would need coordinated with professional development and community involvement. The funding for these reforms was again supplied by federal dollars in the form of sub-grants to school districts and consortia of school districts. Goals 2000 became the first federal education initiative to provide the funding

and support needed to improve education planning at the State level. Only two States, Oklahoma and Montana, did not participate in Goals 2000 at the State level (USDOE, 2007).

Goals 2000 focused on standards-driven change by highlighting specific areas of need for students and schools. High standards for all students were one of the areas of focus. There needed to be a clear definition of what all students needed to know and be able to do. Low-income and low-achieving students were often subjected to endless drill and practice exercises. In order to achieve challenging standards, all students needed to experience conducting science experiments, working multi-step math problems, reading novels and creating stories.

Another key component of Goals 2000 dealt with professional development. Professional development for educators is also essential to the success of student achievement gains. Programs that impact student learning are connected to school-wide improvement plans that give teachers the tools to help students meet challenging standards. Instructional strategies needed to focus on interdisciplinary and team learning coupled with writing in all subject areas and application of technology. These changes in instruction would become the avenues by which activities for students would become integrated and achievement could flourish. The new ESEA promoted innovation, flexibility and connected programs that would impact educational reforms leading to student achievement. However, the Federal Government was not done influencing education (USDOE, 2007).

The No Child Left Behind Act (NCLB) of 2001, signed into law on January 8, 2002, has taken accountability to the level of a national commitment to eliminate the

achievement gap shown to exist through the results of the NAEP. This major federal education reform amended and reauthorized the Elementary and Secondary Education Act (ESEA), which provides most federal K-12 support and regulations and accounts for about 40% of school technology resources (USDOE, 2004).

Under the NCLB Act, school districts and each school within the districts must use a federally approved assessment instrument to measure the achievement of students in grades 3 through 8 and one grade level between 10th and 12th grades. Districts must assess these students in reading and math and break the data into subgroups based on ethnicity, minority status, economic background, gender, proficiency in English and students with disabilities. In Pennsylvania, the approved assessment is the Pennsylvania System of School Assessment (PSSA). Using disaggregated data from the PSSA, the high achievement of the majority of students cannot skew the low achievement of other groups of students in the schools. In order to meet the law's requirement of adequate yearly progress, the state establishes cut scores for proficiency in math and reading, which must be federally approved. All groups of students must achieve at a proficient level as set by the state by 2014 in reading and math to meet NCLB requirements.

Additionally, states are also required to participate on a biennial basis in the 4th and 8th grade National Assessment of Educational Progress (NAEP) in reading and mathematics. Participation in the NAEP was not required in the past although it is known as the Nation's Report Card. The NCLB accountability system is based largely on the state and NAEP reading and math assessments. States must set adequate yearly progress levels for increasing achievement of all students and student sub-groups. The results of student assessment are to be reported for disaggregated data including overall growth

within groups by ethnicity, income, class, grade, school, district and state. The goal is to require growth overall and growth within groups by ethnicity, income, class, grade, school, district and state.

NCLB provides for a series of remedies, penalties and rewards for schools, districts and states based on their ability to increase student achievement. For example, within a school, if any student subgroup persistently fails to meet performance targets, districts must provide public school choice and supplemental services to those students or eventually restructure the school's operation. This is required even if the school performs well overall. Also, school districts have been required to adopt policies in regards to giving parents school choice between schools and between districts.

The importance of scientifically-based research in implementing student achievement programs is also stressed today. In fact, under the *No Child Left Behind Act (NCLB)*, states and districts are required to ensure federally funded programs are based on scientific research (USDOE, 2004). According to the *No Child Left Behind Act*, scientifically-based research refers to research that involves the application of systematic and objective procedures to obtain reliable and valid knowledge relevant to education activities and programs. The research evidence must employ methodical and pragmatic methods that draw on observation or experiment. As with any research, data analysis that tests hypotheses and justifies conclusions is required of educational practices. The data provided by measurements of student achievement must also provide reliable and valid data across, evaluators, observers and multiple measurements and allow for replication.

The National Center for Educational Statistics (NCES) provides data to give the public a comprehensive picture of how the United States performs in regards to student

achievement. This data comes primarily from the NAEP and participation in international assessments, such as the Trends in International Mathematics and Science Study (TIMSS) and the Program for International Student Assessment (PISA), (NCES, 2007). These assessments are intended to reflect the best practices about the knowledge and skills for students to have an in-depth understanding of different subjects and at different grade levels. The NAEP is the source for information on math and science achievement at key educational stages based on national benchmarks of performance. The TIMSS is the international comparative source for math and science achievement at the primary and middle grades. The PISA is the source for international comparisons of student math and science literacy achievement for the high school level. The NAEP, TIMSS and PISA are all sample based assessments. Each of these assessments is given to a subgroup of U.S. students and results are generalized to the larger population (NCES, 2007).

The recent results of these three assessments do not paint a positive picture of American education. The PISA is coordinated by the Organization for Economic Cooperation and Development (OECD), which is an organization, composed of industrialized countries (NCES, 2007). The PISA focuses on the ability of 15 year olds to be successful in reading literacy, math literacy and science literacy. The 2003 average U.S. score in reading literacy was not significantly different from the OCED average and the science literacy score was below the OCED average. In mathematics literacy for 2003, the U.S. literacy and problem solving scores were lower than most OCED countries. Additionally, math literacy specific content area scores had dropped from the 2000 PISA scores and were below most OCED countries.

The TIMSS is conducted by the International Association for the Evaluation of Educational Achievement (IEA). The IEA is an international organization of research institutions and government agencies. The 2003 results showed that fourth grade students in the U.S. were fourth among all participant countries in math and science achievement but there were no measurable changes in the math or science scores between 1995 and 2003. However, six other countries showed improvement in math and science scores for fourth grade students. For the U.S., fourth grade students in the high poverty level had lower math and science scores than those students with less poverty (NCES, 2007).

Among eighth grade students, other countries outperformed the U.S. in math and science, including Hungary and Estonia (NCES, 2007). U.S eighth grade students did significantly improve their math and science scores between 1995 and 2003, as compared to 21 other countries. In 2003, eighth grade students in U.S. schools with high poverty had lower average math and science scores than did eighth grade students with less poverty.

The achievement scores on the NAEP also show a lack of achievement in U.S. schools. There was no significant change in NAEP reading scores between 1992 and 2005 for fourth or eighth grade students. Scores for fourth grade students eligible for free and reduced lunches also showed no significant change in reading between 2003 and 2005. However, NAEP math scores for fourth and eighth grade students were significantly higher in 2005 than in 2003. Math scores for students eligible for free and reduced lunches increased in 2005 but an achievement gap still existed with students not eligible for free and reduced lunches (NCES, 2007).

The data indicates that achievement for U.S. students is a problem within our country and on the international education arena. Therefore, the U.S. government has tried to pass laws that make achievement mandatory, such as NCLB.

Problem Statement

Under NCLB, schools now are considered successful only if they close the achievement gap. Accountability for student achievement for schools is "THE" issue in education today.

Why do gaps continue to exist? The Education Trust looks also at curriculum quality, resource equity (funding) and teacher quality. The Education Trust (Education Trust, 2005) summarizes NAEP data to indicate that the achievement gap remains in the United States. For example, 30% of 4th-grade students are able to read at the proficient level and 38% have not been taught even basic reading skills. Also, 29% of the 8th-grade math students in the United States can do math at the proficient level, while 32% do not even have basic math skills. On a national level there is a significant gap between the achievement of White students and minority students of the same grade level in math and reading. The only group to outperform White students, in mathematics, is Asian students, 47% to 37%. While nationally in reading for 4th-graders, Asians and Whites outperform all other ethnic groups by a significant margin. Therefore, achievement gaps exist in reading at grade 4 and mathematics at grade 8. White students (72%) and Asian students (79%) graduate much sooner than their African American, Latino or Native American students. Thus, more opportunities exist for White and Asian students for advancement to further education and careers. Finally, poor and minority students do not have the most

experienced teachers. The least qualified teachers often teach students of poverty and minority backgrounds. These identified subgroups are not receiving an equal education.

The problem is that many schools are struggling to meet achievement gap benchmarks and are searching for ways to reduce the achievement gap, especially in the subgroup areas. PAGE1 has tried to address the problem.

Conceptual Framework

The 2002 NCLB Act forced the Pennsylvania Department of Education's (PDE), in partnership with Pennsylvania's State Board of Education, Educational Trust from Washington, D.C., and local Intermediate Units, to address the issues of underachievement. This partnership led to the development and implementation of the Pennsylvania Achievement Gap Effort (PAGE1). The Pennsylvania Achievement Gap Effort (PAGE 1) was begun in June of 2004.

PAGE 1 was a three year project of the Pennsylvania Department of Education and the Pennsylvania State Board of Education in cooperation with the intermediate units. The Education Trust also was assisting with the PAGE 1 project. Sixteen schools from across Pennsylvania were selected to study and implement various strategies for closing the achievement gap. The purpose of PAGE1 was to identify schools that could show significant achievement gains over a three-year period. Selecting schools having subgroup achievement gaps that may have resulted from problems that could be immediately addressed, supported or remediated through opportunities of professional development, communication and visitations with high performing schools of similar demographics, and/or direct support from PDE, the State Board, the Education Trust, and the Intermediate Unit liaison, could lead to achievement success for the selected schools.

Thus, PAGE1 districts had to meet several criteria to qualify for participation in this achievement gap effort.

The required criteria that all participating districts had to meet were set by PDE (PDE, 2006). The schools were to be representative of the entire state, not one corner of the state. Thus, the schools would reflect the cross section of students in Pennsylvania a mix of rural, urban, or suburban. The PAGE1 schools should also have had an achievement gap, so as to have a basis from which to prove that the gap can be closed. These schools should have met overall annual yearly progress, but have at least two subgroups that show significant gaps in achievement. PDE was looking for subgroups for which there are achievement gaps that are about two-thirds the size of the statewide gaps between the subgroups and students as a whole in that grade level. The subgroups were: racial and ethnic groups, limited English proficiency, migrant students, students with individualized education plans and economically disadvantaged students.

The PAGE1 schools needed to show some indication that they are capable of making improvement in 2-3 years. While PDE did not want to weaken the power of the results, they wanted to do what they could to ensure there will be positive results. One indicator of potential success was that the schools had to be able to demonstrate a history of parental involvement, as well as community support. Likewise, the school board, school leadership and school community of the PAGE1 schools had to be supportive of the use of data and research-based best practices to improve achievement.

In order to demonstrate that the achievement gap can be reduced no matter what the grade level, there were a mix of grade levels – elementary, middle and secondary. Each school team had to have the vision and patience to sustain their efforts and had to realize this is not just a two or three-year project but a long-term commitment to achieving and sustaining the success of all students in their schools. Lastly, each school must serve as a host for other schools and be willing to share their expertise and the lessons they have learned.

The PAGE1 plan then began to evolve. Participating Intermediate Units identified a school to be its PAGE1 School, where the achievement gap is significant and where the ingredients for likely and quick success are present. Led by the Intermediate Unit liaison, each PAGE1 School then developed a School/Community Team of 6 to 10 individuals in the community and the school. Team members had to be selected from among those committed to the development of a plan to close the achievement gap in the selected school. The Pennsylvania State Board of Education recognized the success of creating sustained change is when all stakeholders of the community are involved.

Participating PAGE1 schools' teams had to attend a variety of meetings/trainings in regards to the reduction of the achievement gap. The Education Trust and the National Center for Educational Accountability (NCEA) took the leads for the trainings. Additionally, all the schools were matched with a high achieving school of similar demographics. The high achieving schools were identified by the Education Trust and the Pennsylvania participants sent teams to review why these "frontier" schools were successful (Education Trust, 2002). These high achieving schools were termed "frontier" schools because they were successful for at least three consecutive years in closing

achievement gaps as evidenced by their standardized test scores.

As previously stated, scientifically based research programs are defined in the No Child Left Behind (NCLB) Act of 2001. Basically, there must be proof based on demonstrated research that the instructional program a district chooses to use works in helping students learn the stated academic objectives. Only those programs that are proven to be aligned to the state academic standards of the district should be considered. Programs are implemented based on quantifiable data that they have increased student achievement in schools with similar student populations. Once proven effective and aligned, the successful implementation of the program required that the district ensure that all components of the program that led to increased student achievement are replicated. The district provides all necessary structure and support to use the instructional materials and to produce maximum gains in student learning. The quantifiable data linking the Frontier Schools with an increase in student achievement would lead one to believe that their programs were researched based as defined by NCLB and therefore suitable as models for the PAGE1 schools.

Use of data also became a way of life for PAGE1 schools to identify instructional needs of students. Logical use of data to improve teaching and learning requires leadership, training, and the development of a culture of use. As Mike Schmoker, author of *Results: The Key to Continuous Improvement* (Schmoker, 1999), says that schools need to move away from always adopting new trends and together focus on goals and regularly measure the impact of the methods. PAGE1 Schools and districts used data to identify strengths and weaknesses in student, teacher, and school performance. They tracked and shared the results of various interventions in order to pinpoint successful

strategies for achieving goals. Instructional methods linked to successfully closing the achievement gap were shared among schools.

The Frontier School visits provided many innovative ideas that could be easily introduced into school practices. Upon completion of the visits, the Pennsylvania State Board of Education had the 16 Pennsylvania schools reconvene in Arlington, Virginia to share experiences and strategies for closing the achievement gap. At the conclusion of the post-visit meeting, PAGE1 schools established an action plan to tackle the achievement gap in their schools. These plans included establishing common grade level planning time, providing more frequent performance data to parents and community, adopting procedural forms, and many other organizational ideas for implementation. There were also initiatives that were considered but would take much more planning, increased financial support and organization. The most critical initiatives were to increase after-school student tutoring programs, administer quarterly benchmark assessments to provide meaningful data through scoring quarterly assessments and providing performance reports and align curricula via mapping to the Pennsylvania assessment anchors and eligible content.

The PAGE1 schools worked diligently to create cost effective programs that would not jeopardize existing programs. The PAGE1 schools were committed to incorporate changes into their districts that Frontier Schools found successful in closing the achievement gap between the advantaged and disadvantaged as well as for all students in the various subgroups. However, recognizing that many other schools failed in their attempts to find successful programs that specifically addressed the inequity when addressing subgroup problems and acknowledging that the majority of the research

showed little improvement for students of poverty, the PAGE1 schools engaged in plans that encompassed school factors, teacher factors and student factors (Marzano, 2003) to close the achievement gap.

Related to Marzano's (2003) factors, additional research on student achievement also provides for direction in use of various technological, instructional strategies under control of the school to use with students. Instruction today must address a wide variety of learning modalities: visual, auditory, tactile and kinesthetic. Studies have also shown that animated graphics support higher levels of cognitive learning. Calvert (1990) found that animating objects within a vocabulary lesson improved the learning of less successful students in reading. Hays (1996) found gains in comprehension for both high and low spatial-ability students in mathematics. Carol Kimble (1999) cited research that technology has a positive impact on student learning under specific conditions. Additionally, Harold Wenglinsky (1998) examined technology's impact on student learning in mathematics for grades four and eight. Wenglinsky concluded that grade appropriate use of technology in the curriculum was found to be more important in producing increased learning than the amount of time computers are used. According to the study, when computers are used to perform tasks applying higher order concepts and when teachers are proficient in directing students toward productive uses, significant learning gains occur. PAGE1 schools became dedicated to the effective use of all instructional strategies to directly impact gains in learning for math, reading and language arts.

Research Questions

1. Is there any significant difference in the overall achievement for economically disadvantaged students for the PAGE1 schools as compared to non-PAGE1 schools of similar student population size, school grade level structure, demographic setting and free and reduced lunch percentage?

   Null hypothesis: No significant overall achievement differences between schools for economically disadvantaged students and non-economically disadvantaged students. Comparison of schools is at the 0.05 significance level.

2. Is there any significant difference in overall mathematics achievement for economically disadvantaged for the PAGE1 schools compared to non-PAGE1 schools of similar student population size, school grade level structure, demographic setting and free and reduced lunch percentage?

   Null hypothesis: No significant overall math achievement differences between schools for economically disadvantaged students and non-economically disadvantaged students. Comparison of schools is at the 0.05 significance level.

3. Is there any significant difference in the overall reading achievement for economically disadvantaged students for the PAGE1 schools as compared to non-PAGE1 schools of similar student population size, school grade level structure, demographic setting and free and reduced lunch percentage?

   Null hypothesis: No significant overall reading achievement differences between schools for economically disadvantaged students and non-economically disadvantaged students. Comparison of schools is at the 0.05 significance level.

4. Is there any significance difference in overall mathematics achievement from year to year (grades 5, 8, 11) for economically disadvantaged students in the PAGE1 schools as compared to non-PAGE1 schools of similar student population size, grade level school structure, demographic setting and free and reduced lunch percentage?

   Null hypothesis: No significant overall math achievement differences between schools for economically disadvantaged students and non-economically disadvantaged students. Comparison of schools is at the 0.05 significance level.

5. Is there any significance difference in overall reading achievement from year to year (grades 5, 8, 11) for economically disadvantaged students of the PAGE1 project for the PAGE1 schools as compared to non-PAGE1 schools of similar student population size, grade level school structure, demographic setting and free and reduced lunch percentage?

   Null hypothesis: No significant overall reading achievement differences between schools for economically disadvantaged students and non-economically disadvantaged students. Comparison of schools is at the 0.05 significance level.

6. Is there any significant difference in overall student achievement between grades 5 and 8 and grades 8 and 11 in PAGE1 schools with grade 5 students moving to only one grade 8 school and grade 8 students moving to only one grade 11 school?

   Null Hypothesis: No significant difference between grade levels.

Study Design

The purpose of this multi-year, quantitative study was to determine if the Pennsylvania Achievement Gap Effort (PAGE1) was significantly effective or not in increasing student achievement in mathematics and literacy for economically disadvantaged students for the 16 PAGE1 schools as compared to 16 significantly similar selected schools with similar socioeconomic status, school structure, demographic setting and student population size over a three year time period. The grade levels compared will be grades 5, 8 and 11. Although additional grades are tested today, all three of these grade levels were the only levels tested in the baseline year of 2004. Individual student PSSA scaled scores, economic status and PSSA proficiency status were provided for testing years 2004 (baseline), 2005, 2006 and 2007 for each of the 32 schools and access to the data was made available by the Pennsylvania Department of Education through the secure eMetric database web site. Student names and identification numbers were not made available.

The PAGE1 program was implemented in June 2004 for elementary, middle and high schools selected to participate by application to the Pennsylvania Department of Education. The comparison of Pennsylvania System of School Assessment scaled scores for individual students will be analyzed and compared for the PAGE1 schools and a randomly selected group of schools of similar student population size and socioeconomic status to determine the success of the project. Approximately 26,000 student scaled scores were compared. The baseline PSSA test year was 2004 and then successive years of 2004-2005, 2005-2006 and 2006-2007 provided the multi-year data to determine if any significance in the increase in achievement was made for the PAGE1 schools as

compared to the non-PAGE1 schools. The test scores were compared for each year and across years. The overall scores of economically disadvantaged students were compared to the overall scores of non-economically disadvantaged students. Scores for this subgroup of students were also analyzed for achievement gap reduction in the areas of mathematics and reading.

My hypothesis was: The achievement of students in mathematics and reading between economically disadvantaged students and non-economically disadvantaged students was reduced significantly by PAGE1 schools and was reduced more than the comparison schools.

Limitations of the Study

This comparative study was limited to the 16 PAGE1 schools as compared to 16 purposely selected, non-PAGE1 schools of similar student population size and free and reduced lunch percentage. All of the schools in this study are Pennsylvania schools and not reflective of the nation. The time frame of the PAGE1 project is from June 2004 through the fall of 2007. The data from this time frame may not be evidence for sustained change in these schools but rather a picture of success or failure in reduction of the achievement gap for the schools studied during that time period. However, the three year time frame of this study is the same number of years that the Education Trust uses data to determine if a school has closed the achievement gap successfully.

The subgroup studied was economically disadvantaged students. This subgroup was not necessarily reflective of all other subgroups. However, all students are placed in the categories of economically disadvantaged or non-economically disadvantaged. The designation of economically disadvantaged is determined by free and reduced lunch

percentages for the schools in this study. Although free and reduced lunch guidelines are federally determined, participation for families eligible for free and reduced lunches is optional and the percentages indicate actual participation. Therefore, families not participating but qualifying as economically disadvantaged may be counted as non-economically disadvantaged. On the other hand, the federal and state governments use the percent of students eligible for free and reduced lunches to determine school funding and school eligibility to participate in restricted programs.

PSSA individual, student scaled scores, student economic status and PSSA proficiency level were used as provided by PDE. The assumption is made that the data provided by PDE is accurate. Additionally, reports supplied by PDE indicate that the PSSA is reliable and valid as to be discussed in Chapter III.

Summary

At this point, there is truth to the idea that student achievement varies as identified by a variety of societal differences. However, there are several other factors that have a basis for impacting achievement, such as curriculum, teacher quality and factors that impact students from outside of school, such as socioeconomic status. The key to this or any other research on studying student achievement is to identify positive influences that increase student achievement. As an end result, these best practices may be used to help any and all students to achieve. Is the PAGE1 design model one of the positive influences on student?

The challenge issued to all schools, districts and states from the federal government is to have all students be proficient in math and reading by 2014. We have been issued other such mandates in the past including Goals 2000 and the National

Education Goals. All educators have been concerned by federal reports of the lack of achievement of American students. The impact of this study will have at least a local and state impact. The quantitative results of the PAGE1 project will hopefully spur on continued research and funding that will produce answers to help increase student achievement. The focus on achievement proves to be timely and student focused.

Chapter II

REVIEW OF LITERATURE

Introduction

The purpose of this multi-year, quantitative study was to determine if the Pennsylvania Achievement Gap Effort (PAGE1) was significantly effective or not in increasing student achievement in mathematics and literacy for economically disadvantaged students for the 16 PAGE1 schools as compared to 16 similarly selected schools with similar socioeconomic status, school structure, demographic setting and student population size over a three year time period. The Pennsylvania Achievement Gap Effort (PAGE1) was a statewide initiative with the purpose of to responding to closing the achievement gap between groups of students. The Pennsylvania Department of Education, the Pennsylvania State Board of Education, the Education Trust and the Pennsylvania Association of Intermediate Units combined efforts to identify 16 schools in Pennsylvania with achievement gaps and to work with these schools to close the achievement gap. These 16 PAGE1 schools were to then serve as models for all other schools in regards to closing the achievement gap for all students.

In order to provide a foundation for the study of the PAGE1 effort, a review of literature is provided in this chapter. This review includes a review of the existence of the achievement gap, historical perspective of the achievement gap, instruction in regards to student achievement and a theoretical perspective.

Existence of the Achievement Gap

Education is a basic right to which all children are entitled in the United States. For generations, education has been the most reliable path to a better life. The reason for

this is that a solid education is the key to a better quality of life, including good jobs that pay better wages and offer opportunities for advancement. The benefits of education today are more important than ever. Providing quality education to every child will go a long way toward fulfilling America's promise of equal opportunity for all. However, consider the following (Education Trust, 2004):

a. Nearly two-thirds of African American children do not read at even the basic level on the National Assessment of Educational Progress (NAEP).
b. African-American and Latino 17 year olds read and do math, on average, at the same level as White 13 year olds.
c. Low income students and students of color are less likely to enter college and less likely to graduate.

An achievement gap exists when groups of students with relatively equal ability fail to achieve at the same levels in school. One group will far exceed the achievement level of the other. An example of the gap in achievement is drawn from the National Assessment of Educational Progress (NAEP). The NAEP (2007) shows that by the time minority students reach grade 12, if they do so at all, minority students are about four years behind other young people (National Governor's Association, 2003). Another example is seen in the higher dropout rates of Hispanic and African-American students. For those who stay in school and enter college, the likelihood of earning a college degree is only half of what it is for white students.

Analyzing and comparing how various groups of students perform on state tests, advanced placement rates, drop-out rates, graduation rates, SAT scores and through the NAEP, it is evident that achievement gaps exist. A few common gaps are the gaps between the following: boys and girls; students above and below the poverty line;

between races; with limited English proficient students; students with learning disabilities. Across the U.S., a gap in academic achievement persists between minority and disadvantaged students and their white counterparts. This is one of the most important education challenges that we currently face and evidence exists to support this claim.

Results broken down by student's eligibility for free lunch and eligibility for reduced-price lunch are available on the NCES (2007) web site. At both grades 4 and 8, average mathematics scores in 2003 were higher than the scores in 1996 and 2000 both for students who were eligible and for students who were not eligible for free/reduced-price lunch. The average mathematics score for students who were eligible for free/reduced price lunch was lower than the average score for students who were not eligible at both grades. At grade 4, the average score gap between students who were eligible and students who were not eligible for free/reduced-price lunch decreased from 2000 to 2003, but the gap in 2003 was not found to be significantly different from the gap in 1996. No significant change was detected in the gap in 2003 compared to the gap in any of the previous assessment years at grade 8 either. At both grades 4 and 8, the average scores for male and female students were higher in 2003 than in any of the previous assessment years. In 2003, male students scored higher on average than female students at both grades. However, there was no significant difference in male and female math achievement by 2003.

According to the Education Trust (2007), students who took the NAEP assessment were identified as belonging to one of the racial/ethnic subgroups or labeled as "other" based on information obtained from schools. The results presented for 1990

through 2000 differ from those presented in earlier reports. At grades 4 and 8, White, Black, and Hispanic students all had higher average scores in 2003 than in any of the previous assessment years. The average score of Asian/Pacific Islander students was higher in 2003 than in 1990 at both grades 4 and 8. There was no significant change detected in the average score for Asian/Pacific Islander students between 2000 and 2003 at grade 8. American Indian/Alaska Native students had higher average scores in 2003 than in 2000 at grade 4, but the apparent increase at grade 8 was not found to be statistically significant. At both grades 4 and 8, Asian/Pacific Islander students scored higher on average in 2003 than White students. Both White and Asian/Pacific Islander students had higher average scores than Black, Hispanic, and American Indian/ Alaska Native students. Hispanic and American Indian/Alaska Native students scored higher on average than Black students at both grades. Average score gaps across assessment years between White and Black students and between White and Hispanic students are also evident. At grade 4, the score gap between White and Black students decreased between 2000 and 2003, and was smaller in 2003 than in 1990. The gap between White and Hispanic fourth-graders also narrowed between 2000 and 2003, but the gap in 2003 was not found to be significantly different from that in 1990.

At grade 8, the score gap between White and Black students was narrower in 2003 than in 2000, but the gap in 2003 was not found to differ significantly from 1990. The score gap between White and Hispanic eighth-graders in 2003 was not found to differ significantly from the gap in any of the previous assessment years. However, the data presents score gaps. These are based on differences between scaled scores. Therefore, even though the gaps are not as wide, there is still a significant difference

between the scores of White students and all other ethnicities.

The Education Trust (Education Trust, 2006) summarizes NAEP data to indicate that the achievement gap remains in the United States. For example, 30% of 4th-grade students are able to read at the proficient level and 38% have not been taught even basic reading skills. Also, 29% of the 8th-grade math students in the United States can do math at the proficient level, while 32% do not even have basic math skills. On a national level there is a significant gap between the achievement of White students and minority students of the same grade level in math and reading. The only group to outperform White students, in mathematics, is Asian students, 47% to 37%. While nationally in reading for 4th-graders, Asians and Whites outperform all other ethnic groups by a significant margin. Therefore, achievement gaps exist in reading at grade 4 and mathematics at grade 8. White students (72%) and Asian students (79%) graduate much sooner than their African American, Latino or Native American students. Thus, more opportunities exist for White and Asian students for advancement to further education and careers. Finally, poor and minority students do not have the most experienced teachers. The least qualified teachers often teach students of poverty and minority backgrounds. These identified subgroups are not receiving an equal education.

Subsequent national, state, and local assessments, including the National Assessment of Educational Progress (NAEP), have confirmed the existence of the achievement gap. Interestingly, over the past 40 years, attention to the achievement gap among policy makers, researchers, and educators, has been intermittent. However, the recent focus on standards based education, and high-stakes testing has brought the “gap” into the spotlight (NCES, 2003).

Even more interesting is that Pennsylvania had one of the largest achievement gaps in the country as per NAEP 2003 results (Education Trust, 2004). The Education Trust reports that in grade 4 reading Pennsylvania poor students have 14% proficiency on the NAEP as compared to 44% of students who are not poor. In mathematics for Pennsylvania grade 8 students, the NAEP proficiency is 10% for economically disadvantaged students and 38% for non-economically disadvantaged students. After analysis of the 2004 PSSA, the Education Trust highlights the following achievement gaps in Pennsylvania:

1. Grade 5 reading: all students 63% proficient; low income students 42% proficient.
2. Grade 8 mathematics: all students 58% proficient; low income students 35% proficient.
3. Grade 11 reading: all students 61% proficient; low income students 34% proficient.
4. Grade 11 mathematics: all students 49% proficient; low income students 24% proficient.

Additional information compiled by the Education Trust, indicated that by the end of 11th grade in Pennsylvania not even half of economically disadvantaged students reach even basic levels in reading and mathematics.

The achievement gap exists for a variety of reasons. Miller (2004) has identified research that targets theses reasons. Groups can be stigmatized (Miller, 2004) into conforming to a negative stereotype such as lower ability. Miller (2004) gives an example of this type of lower achievement with African-American students performing lower than expected even though they were prepared as well as their Caucasian counterparts.

Additionally, cultural and genetic inferiority is identified by Miller (2004) as adding to achievement gap issues and impacting many minority groups. Sometimes, intellectual deficits between whites and minorities are blamed for the lack of minority achievement. Because of these misperceptions, schools tend to ignore the ability of minority students and are not prepared to address the diverse backgrounds of students who need served (Miller, 2004).

Low income of the family has also been saddled with the reason for lower achievement scores. Low income students are identified as at risk because of decreased opportunities for learning at home and lower academic backgrounds of their parents (Miller, 2004). A low socioeconomic status of the family is also linked to high absenteeism, low self-esteem and a higher propensity to drop out of school. In addition to family economic status, districts with the highest child poverty also have fewer state and local funds to spend on education (Robinson, 2004). Robinson (2004) additionally points out that students living in poverty often have poorer nutrition and medical care, fewer educational resources in the home and are more transient. The more that children move, the harder it is for them to keep pace educationally. Lastly, Robinson (2004) indicates that those poor students lose more academically over the summer than do wealthy or middle class students. Wealthier students are provided family opportunities for learning throughout the summer, while poorer students are deprived of additional educational adventures such as museum trips, participation in camps, going to libraries and taking family vacations. As experiences for students broaden, they develop a foundation upon which to connect future experiences and thus provide for a basis for developing

understanding to abstract or uncommon learning situations. The students of low socioeconomic status are not able to develop these types of learning connections.

There is no single, straightforward response as to why there are achievement gaps, though researchers have suggested a variety of explanations. Most agree that some of our students face challenges beyond the school that impact their academic achievement, including neighborhood violence and access to adequate nutrition and health care. However, these factors alone cannot explain gaps in achievement. Inequalities in educational opportunities have also contributed to disparities between groups of students. Research points to several ways in which schools unintentionally worsen achievement gaps. These include: a lack of high expectations for poor and minority students, cultural stereotyping, well-meaning but inadequate approaches to involving families in their children's educations, tracking, the employment of uncertified and unskilled teachers, and lack of funding (Carter, 2001).

There are several factors that appear to make the critical difference in the strength of performance in schools (ETS, 2003). The primary factors include:

a. Teacher Quality. A recent study in Boston shows that in one academic year, the top third of teachers produced up to six times the learning growth as the bottom third of teachers. Investing in intensive, focused professional development and assuring that teachers are highly qualified are among the several recommendations regarding teachers that can make a significant difference.
b. Curriculum. A carefully aligned curriculum with a set of high standards must be the basis for student assessment, which should be conducted on a regular basis.

This is an important first step in bringing about improvement in achievement and closing the gap between groups of students.

c. Time and Support. Time, and not just the accumulation of course credits, needs to become a variable in what we offer students if they are all going to be expected to handle a rigorous curriculum. An analysis of the school schedule can help identify how to recover time to extend instruction for students who need support.

d. Belief. In closing the achievement gap, holding to the belief that all students can achieve to high standards and that the achievement gap can be closed is critical.

For many years, educators and researchers have debated which school variables influence student achievement. As politicians become more involved in school reform, student achievement takes on new importance since many initiatives rely on previous relationships between various education-related factors and learning outcomes. Some research has suggested that schools do not influence student achievement (Coleman et. al., 1966; see also Jencks et. al., 1972). Other evidence suggests that factors like class size (Glass et al., 1982; Mosteller, 1995), teacher qualifications, school size, and other school variables may play an important role in what students learn.

The existence of the achievement gap has been well documented (Molen, 2005). Molen indicates that lack of funding has been refuted as a cause of the achievement gap. States such as California and New Jersey having equitable funding but still have achievement gaps. Gender, ethnicity and socialization have all been linked to a gap in academic achievement, as well. Yet, socioeconomic status correlates more strongly with academic achievement than any other variable (Singham, 1998). The educational differences are seemingly caused by economic differences. However, further research

indicates that the achievement gap may really be indicating that there are problems with the way instruction is conducted (Singham, 1998). Teaching has impacted student achievement. Molen has found support that the achievement gap can only be closed with programmatic changes geared to low income students. The effort to close the achievement gap between economic groups has been and is one the goals of educational reform (Molen, 2005).

In reviewing the achievement gap subgroups, all subgroups have low socioeconomic students and this subgroup contains the other subgroups. However, poverty alone cannot account for the lack of student achievement and success can be found across the country for high poverty schools. For example, Robinson (2004) writes that military schools serve low-income and highly mobile minority students. These students often move from school to school with different opportunities and different resources. Military children learn to adjust quickly because of the many moves they make. However, success is not lacking. Why? Parents are involved with the schools. The military culture and resources are used to support education. Teachers are carefully recruited. There is one standard curriculum with no basic skills emphasis and no fluff. Students are regularly assessed. These are just a few reasons for the success of low income minority students in military schools.

Additionally, in a further study by the Education Trust (2007) a comprehensive trend analysis of student achievement on state assessments since enactment of NCLB, the Education Trust finds that the achievement gap exists but is fading away. Most states they examined are moving in the right direction in reading and math at the elementary grades. But in many places, the pace of improvement is too slow to ensure all students

will be proficient in reading and math by 2014. Three years worth of longitudinal data is needed for comparative purposes when looking at student growth (Mosteller, 1995). Of the 24 states for which at least three years' worth of comparable state assessment math data were publicly available, the Education Trust found overall achievement up in 23 states since 2002. Of the 23 states that had three years of reading data, 15 had an increase in reading achievement. In five states, student performance in reading declined. Three saw no change. These gains range from a 15-percentage point gain in overall reading achievement in Florida to improvements of 1-percentage point in states like Maine, Iowa and Minnesota.

The Education Trust (2007) reports the following:

In reading, Achievement:

a. The African American-White gap narrowed in 16 states and widened in three.
b. The Latino-White gap shrank in 14 states and grew wider in three. The gap remained the same in two states.
c. The Native American-White gap grew smaller in 13 states. It widened in two states and stayed the same in two.
d. The gap between poor and non-poor students shrank in nine states and widened in one. (Only 10 states provided data for both poor students and their non-poor peers, allowing us to analyze gaps between the two groups.)

In math, Achievement:

a. The African American-White gap shrank in 17 states. It grew wider in two and did not change in one state.

b. The Latino-White gap narrowed in 16 states, widened in three and stayed the same in one.

c. The Native American-White gap narrowed in 14 states. The gap widened in two states and made no change in two.

d. The gap between poor and non-poor students narrowed in all 10 states examined.

NCLB has put a special focus on closing achievement gaps. The pattern clearly is positive. In the overwhelming majority of states examined, gaps are narrowing while performance is up for all groups of students.

Achievement Gap: Historical Perspective

In October of 1957, the Soviet Union successfully launched Sputnik I. This was the world's first artificial satellite. This event started a new political initiative surrounded education. Americans did not want to be second to any other country. November of 1957 saw the Soviet Union launch Sputnik II. This satellite carried a larger payload and a small dog. Rationalizations that evolved from debates as to why the Soviet Union beat the United States to space focused on education. Critics of the public school system blamed the schools for not preparing our youth to compete with other countries in the space race. The lack of our efforts to compete in space was a direct reflection on our educational system and process. We were shown not to be high achievers.

The following decade was convinced of the notion that schools made little difference in the achievement of students. The conclusion of the report entitled *Equality of Educational Opportunity* published in 1966 (Coleman et. al., 1966) was that schools did not and could not make a difference in student achievement. The report is commonly referred to as the Coleman Report in reference to the senior author, James Coleman. After

analyzing data from 600,000 students and 60,000 teachers in more than 4,000 schools, Coleman concluded that the quality of schooling a student receives accounts for only about 10 percent of the differences in student achievement. Coleman and his commission wanted to know what influenced the remaining 90 percent. The report concluded that the majority of differences in student achievement can be attributed to factors such as the student's natural ability or aptitude, the socioeconomic status of the student and the student's home environment. These are all things that cannot be changed by schools; therefore, schools can do little to impact student achievement.

At the beginning of the 1970s, researchers began to study the effects of instruction on student learning. The Coleman (1966) findings were confirmed by Harvard researcher Christopher Jencks in his book *Inequality: A Reassessment of the Effects of Family and Schools in America* (Jencks, et. al., 1972). Jencks reanalyzed much of the data used in the Coleman report. Again, he concluded that schools make little difference in the achievement of students. Most differences in test scores are due to factors that schools do not control.

However, there have been criticisms to the conclusions of Jencks and Coleman. The technique used by Coleman and Jencks of focusing on the percentage of differences in scores gives a picture that is not statistically important. This point was made by researcher Robert Rosenthal (1991) and John Hunter and Frank Schmidt (1990). They indicate that the realistic way to interpret the Coleman and Jencks reports are in terms of percentile gain in achievement. For example, the finding that schools account for only 10 percent of the differences in student achievement translates into a percentile gain about

23 points. This means that an average student attending a good school will obtain a score that is 23 points higher than an average student attending a poor school.

Benjamin Bloom (Bloom, 1964) began in the early 1960s to focus on student learning differences. He was able to conclude that although out of school influences impacted student learning, teachers also had an influence on student learning. Bloom suggested that since students learn differently, instruction needs to be differentiated. Within the school there is a great deal of variation in the quality of instruction from teacher to teacher. Identifying and implementing what highly effective teachers do will allow for even more increases in student achievement.

In the 1970s, research was provided that contained evidence that individual teachers can have an influence on student learning. Jere Brophy and Thomas Good (1986) reviewed many school studies and commented: "The myth that teachers do not make a difference in student learning has been refuted" (p. 370). More recently, researcher William Sanders and his colleagues (Sanders and Horn, 1994; Wright, Horn and Sanders, 1997) have noted that the individual classroom teacher has even more of an effect on student achievement than originally thought. As a result, they concluded that more can be done to improve education by improving the effectiveness of teachers than by any single factor. Effective teachers are effective with students of all achievement levels. If the teacher is ineffective, students taught by this teacher will show inadequate progress academically regardless of how similar or different they are regarding their academic achievement (Wright et al., 1997).

In 1982, Ron Edmonds published a report called *Programs of School Improvement: An Overview* (Effective Schools, 2001). This paper began the effective

schools movement. Schools were identified that had records of success in educating students regardless of socioeconomic status or cultural backgrounds. Edmonds found that successful schools existed in many and varied locations across the country. Once the effective schools were identified, the characteristics of these schools needed to be identified.

There were several factors of the effective schools and these characteristics became known as the Correlates of Effective Schools. Edmonds found that all effective schools had a principal as a leader who attended to quality instruction. The focus of instruction was on student learning and expectations for learning were high. The climate of the schools was safe and all teachers conveyed that all students were expected to at least minimally attain the instructional expectations. These schools also used data to judge their success. Frequent, pupil achievement measures were used to evaluate and revise programs.

Edmonds' work was centered on elementary schools. However, Michael Rutter was conducting similar research in the United Kingdom at the high school level (Effective Schools, 2001). The conclusions that Rutter (2001) reached about factors of effective schools mirrored those of Edmonds. Conclusions from both studies included those stated above and also contained positive home school relations, opportunities for all children to learn and time for students to focus on academic tasks. This early research on effective schools focused on differing socioeconomic groups and provided guides for educators to improve their organizations. As a result, school organizations, in order to foster continuous improvement and organizational development, had to incorporate interdependence of the characteristics of effective schools on each other.

Since 1982, additional research has supported the work of Edmonds and Rutter. Parrett (2005) identified eight essential components or interventions to school improvement through his study of reversing low achievement for Native American students. These components are related to general research on effective schools. First and foremost is ensuring effective district and school leadership by creating a shared vision and high expectations for all students. Additionally, schools need to develop an understanding of the cultural and family supports that help students succeed. Even students of poverty have strong family support. Teachers need to connect content to student and family cultural and social characteristics.

Parrett emphasizes the need to change instructional practices, especially in reading, will increase academic achievement. With instructional changes, schools need to extend instructional time and begin instruction with pre-school. Instructional improvements also need coupled with alignment of curricula to state standards and assessments. Use of the assessments will assist to build data and develop an understanding of how to use data at the classroom level. Teachers must believe that all students will achieve, must collaborate to use data to drive instruction and create caring environments. These are noticeably similar conclusions to what Edmonds (1982) and Rutter (2001) found for schools to be effective.

Barton (2003), in *Parsing the Achievement Gap,* has pooled the research and identified 14 correlates of elementary and secondary school achievement. The 14 correlates are viewed as comprehensive research of related factors that impact the achievement gap. These correlates are divided into school factors and those factors before or beyond school. Within the teaching and learning environment (school factors), the

factors impacting the achievement gap are rigor of the curriculum, teacher preparation, teacher experience and attendance, class size, and availability of appropriate technology-assisted instruction. In regards to the learning environment, Barton reports that the factor influencing the achievement gap most is school safety. In reviewing achievement gap influence factors related to before and beyond school, Barton states the development environment which includes weight at birth, exposure to lead and hunger/nutrition impact achievement. Barton also refers to the home learning connection achievement gap. Influence factors are reading to young children, amount of TV watching and parent availability. Lastly, Barton identifies the community factor as student mobility and the home school connection factor as parent participation. Barton's research notes that one is likely to find inter-correlations both within and among the clusters of influences on the achievement gap. The degree of variability is dependent on the school, teacher and student. The factors that educators have direct control over are the schools and the teachers.

Instruction and Achievement

As new standards for student learning have been introduced across the states, greater attention has been given to the role that teacher quality plays in student achievement (National Commission on Teaching and America's Future, 1996; National Education Goals Panel, 1998).In the last few years, more than 25 states have enacted legislation to improve teacher recruitment, education, certification, or professional development (NCTAF, 1996). While some evidence suggests that better qualified teachers may make a difference for student learning at the classroom, school, and district levels, there has been little inquiry into the effects on achievement that may be associated

with large-scale policies and institutional practices that affect the overall level of teachers' knowledge and skills in a state or region.

What is effective instruction? Effective instruction is the instruction resulting in an increase in student achievement. Teaching strategies can be employed and taught to prospective teachers and current teachers. However, the human elements of the practice of teaching and the learning of students impact the result of student achievement gains. Much like a physician needs to adjust treatments to different patients, teachers, in order to be effective, must adjust instructional strategies to meet the educational needs of all students.

Instructors whose classes exhibit higher levels of student achievement involve themselves in instructional planning, instructional delivery and formative and summative assessments. The first function of instructional planning is to identify the learning objectives in terms of what the student will know and be able to do. Diagnostic assessments are used to identify the student readiness to meet the objectives of the lesson. The lesson design is planned by the teacher according to the interaction of the specified curricular objectives. Teachers set clear instructional goals that enable students to clearly understand what is expected from any given lesson. The lessons are also constructed to provide feedback to students about their progress toward the intended learning goals. Effective teachers design learning activities to elicit specific behaviors and demonstrations of learning they want from students. Effective teachers give students many opportunities to respond to learning opportunities.

Instructional delivery is a practice that few teachers master and some never have the expertise to implement it effectively. The key to the delivery is whether the students

what they need to master the specific objective. The effective instructor must also make decisions as to what practice opportunities to employ during the delivery of the instruction and monitor the effectiveness of these strategies. Monitoring is continuous and guides future lesson planning. Guided by the information obtained through continuous monitoring and analysis, the teacher decides whether to teach a new lesson, re-teach the current objective or provide enrichment opportunities.

Effective teachers will align their teaching to the content and context specified by curricular objectives and any assessments. Teaching not aligned to the curriculum and assessments will fragment the students so that their educational experience does not match the type of knowledge, skills and processes that are encountered on assessments. Teachers must also modify their instruction based on ongoing diagnostic assessments, provide differentiated instruction based on student learning needs and teach prerequisite knowledge. In other words, effective teachers are always aware of the instructional needs of their students and make appropriate modifications to instruction to maximize learning for all students. Hence, the effective teacher is always looking for the best strategy to improve their classroom methods and base their effectiveness on the learning of their students. In fact, effective teachers use a variety of well-researched practices and methods that have high engagement rates to ensure student learning and lead to student understanding (Marzano, 1998).

The future for all students is through academic achievement. In particular, the achievement of minority students remains one of our main problems (Miller, 2004). Miller studied the impact of instructional strategy changes to improve literacy, especially with African American children. Miller's study points out clearly that teaching strategies

directly impact student achievement. Using the results of test scores, students in classes that changed instructional practices intentionally scored significantly higher than students in classes where no instructional changes took place. The emphasis in these successful classrooms that closed the achievement gap in literacy was on instruction not on curriculum.

Efforts to improve instruction have focused on professional development activities designed to promote instruction that is consistent with professional standards (McCaffery, et. al., 2001). This study describes an investigation to study the degree to which teachers' use of instructional practices aligned with these reforms is related to improved student achievement. The study used three types of data in analysis: student achievement test scores, teacher questionnaire responses and student demographics. The focus of the study was on the effects of curriculum on the relationship between instructional practices and student outcomes. Teacher methods of instructional practices were measured through a teacher questionnaire and student performance was measured on multiple choice and open-ended components of the Stanford Achievement tests. The use of reform practices or standards-based curricula was positively related to student achievement, whereas use of reform practices was unrelated to achievement in traditional mathematics courses. These results suggest that changes to instructional practices may need to be coupled with changes in curriculum to realize effects on student achievement.

Horn's case study (2000) of Rockcastle County, Kentucky indicates that achievement can be improved through building on local changes to improve math and science scores and is an example of closing gaps for a high poverty area. Rockcastle County was part of the Appalachian Rural Systemic Initiative (ARSI). The county is

characterized by isolation, poverty, low achievement and low self-esteem. The initiative focused on six “drivers” of the educational system. These “drivers” included: implementation of standards based curriculum, supportive policies, convergence of resources to support science and math, broad based community and parent support, improved student achievement and improved equity of achievement. The history and current circumstances of education in the county were examined in the context of the ARSI program. ARSI was aimed at improving student achievement through instructional reform. ARSI’s three strategic goals are as follows:

a. Strengthen the knowledge and skills of teachers so they can teach math and science more effectively.

b. Establish a system for helping schools deliver an active and standards based curriculum.

c. Build local leadership and local community involvement for educational improvement.

ARSI provided for program audits in math and science and provided guidance for these programs in relation to the three goals. The case study team concluded upon the completion of the project that Rockcastle County received moderate to strong ratings on all six educational components.

Attitudes about academics also play a factor in achievement. The interaction among ethnicity, math achievement, socioeconomic status and gender on attitudes about themselves as learners of mathematics was studied through in-depth interviews with high school students (Singer, 1996). This exploratory research study questioned students regarding constructs that are acknowledged as influencing mathematics learning. They

are achievement, motivation, career expectations, influence of teachers and parents, parental education and occupation, enjoyment of mathematics, self-esteem as a mathematics student, math stereotypes and locus of control. The final objective was to generate hypotheses about the interaction of the student variables with the constructs that influence attitudes towards mathematics. Half of the students interviewed were of low socioeconomic status. The findings revealed that there were many reported interactions involving math achievement and socioeconomics. However, socioeconomic status (SES) was not statistically significant in relation to current math achievement or math self-concept. SES was a statistically significant factor as related to academic aspirations in mathematics.

The achievement scores of students of low socioeconomic status were significantly different from other students but so were their attention spans (Dean, 2006). The purpose of this study was to examine the relationship between attention, memory and achievement gaps. Differences in attention and memory were correlated to achievement gaps between high and low achievers in math and writing. The significance of this study was for teachers to be able to address attention and memory differences through instructional practices and therefore be able to address reducing the achievement gap. As a result, professional development for teachers needs to keep current with research devoted to learning in the classroom.

These studies point to successes in a variety of schools in regards to achievement gap efforts. These types of programs showing success are only individualized direct attacks on the achievement gap. Schools need to develop and implement a more universal attack on the deficiencies of student achievement. Schmoker (1999) indicates that schools

need to move away from adopting innovations or the latest and greatest methods of instruction and instead together focus on goals and measure the impact of the methods to perform a more diagnostic approach to the actions of educators. This process would focus on the systematic use of data.

It is imperative that school leaders focus on data driven results and research based decisions to solve academic dilemmas. School leaders need to collect the information; principals and faculty must analyze and interpret the data to make instructional decisions; and all educators must be trained to use and analyze data. Leadership is a key to solving the achievement gap.

Theoretical Framework

The PAGE1 project was specifically designed to address the problem of the achievement gap. In order to increase student achievement, the PAGE1 schools had to make commitments to make the necessary student centered changes to be successful, be open minded to new strategies from beyond their school walls, think outside the traditional norms of schools and be willing to admit that what they have been doing was not adequate to produce success for all students. Additionally, the PAGE1 schools were committed to an in depth data analysis of PSSA scores for disaggregated groups of students and they would track this data over time with the goal of increased success for all students each year. The commitment of the PAGE1 schools relates directly to Fullan's (2006) leadership strategies for successful schools. The PAGE1 schools all possessed Fullan's (2006) main component of change, which is motivation. They are all motivated to achieve success. They are also focused on Fullan's overarching goal of closing the gap.

Within the achievement gap problem, there are issues related to schools and factors beyond the school walls impacting student achievement. Barton (2003) again addresses the lingering factors inside and outside schools that impact student achievement. Collins (2001) recognizes that transformational change within an organization is needed to address factors within and outside an organization to maintain a focus on their passion, their economic engine and reason for existence. Parrett (2005) addresses components of success for schools and these can be correlated to Senge's (1999) challenges of the growth process for sustained success.

The Education Trust in Washington D.C. was not only utilized as a catalyst for data analysis for PAGE1 but also a key disseminator of student achievement success information from across the United States that occurred in the most unlikely places. The Education Trust could highlight schools that broke conventional norms and over time were found to be continually successful, just like the companies identified by Collins (2001). Systematic use of data to improve teaching and learning requires leadership, training, and the development of a culture of use. Fullan (2006) indicates that schools must first focus on achievement through leadership to turn schools around. Schools need to move away from adopting innovations (Schmoker, 1999) and focus on quality and quantitatively measure the results of the methods employed (Fullan, 2006) to ensure accountability. The PAGE1 schools embraced the concept that inspired leadership, transformational change and sustained success were all hallmarks to become havens of prolonged student success. The way to present these changes to the public is through the use of achievement data and their main focus was on student achievement.

Research Questions and the Theoretical Framework

Research questions are as follows:

1. Is there any significant difference in the overall achievement for economically disadvantaged students for the PAGE1 schools as compared to non-PAGE1 schools of similar student population size, school grade level structure, demographic setting and free and reduced lunch percentage?

   Null hypothesis: No significant overall achievement differences between schools for economically disadvantaged students and non-economically disadvantaged students. Comparison of schools is at the 0.05 significance level.

2. Is there any significant difference in overall mathematics achievement for economically disadvantaged for the PAGE1 schools compared to non-PAGE1 schools of similar student population size, school grade level structure, demographic setting and free and reduced lunch percentage?

   Null hypothesis: No significant overall math achievement differences between schools for economically disadvantaged students and non-economically disadvantaged students. Comparison of schools is at the 0.05 significance level.

3. Is there any significant difference in the overall reading achievement for economically disadvantaged students for the PAGE1 schools as compared to non-PAGE1 schools of similar student population size, school grade level structure, demographic setting and free and reduced lunch percentage?

   Null hypothesis: No significant overall reading achievement differences between schools for economically disadvantaged students and non-economically disadvantaged students. Comparison of schools is at the 0.05 significance level.

4. Is there any significance difference in overall mathematics achievement from year to year (grades 5, 8, 11) for economically disadvantaged students in the PAGE1 schools as compared to non-PAGE1 schools of similar student population size, grade level school structure, demographic setting and free and reduced lunch percentage?

   Null hypothesis: No significant overall math achievement differences between schools for economically disadvantaged students and non-economically disadvantaged students. Comparison of schools is at the 0.05 significance level.

5. Is there any significance difference in overall reading achievement from year to year (grades 5, 8, 11) for economically disadvantaged students of the PAGE1 project for the PAGE1 schools as compared to non-PAGE1 schools of similar student population size, grade level school structure, demographic setting and free and reduced lunch percentage?

   Null hypothesis: No significant overall reading achievement differences between schools for economically disadvantaged students and non-economically disadvantaged students. Comparison of schools is at the 0.05 significance level.

6. Is there any significant difference in overall student achievement between grades 5 and 8 and grades 8 and 11 in PAGE1 schools with grade 5 students moving to only one grade 8 school and grade 8 students moving to only one grade 11 school?

   Null Hypothesis: No significant difference between grade levels.

Each of these research questions yielded results by which the PAGE1 project can be measured on an overall basis and in literacy and mathematics student achievement.

The impact of the PAGE1 project on the increase in student achievement has been measured through quantitative means and then related to the theories of Fullan (Turnaround Leadership), Collins (organizational transformation theory) and Senge (change theory). Therefore, this data can be used to determine if the changes of the PAGE1 project were significantly successful. Senge (1999) looks at change theory and the success and sustainability of changes of the PAGE1 schools can be quantitatively determined, like suggested by Senge's change process. Fullan (2006) theorizes about factors leading districts to success and the success of the leadership of the PAGE1 project and schools can be quantitatively analyzed as successful or not, just as Fullan states that the overarching goal is to close the achievement gap. Collins (2001) looks at organizational transformation theory and the transformations of the PAGE1 schools can be quantitatively determined as successful or not, much like the business organizations studied by Collins.

Since the PSSA is used as the data source, baseline data for the PAGE1 schools and comparative schools was the 2004, individual, PSSA economically disadvantaged data mean scaled scores in grades 5, 8 and 11. Students would have been tested in April of 2004 in all Pennsylvania schools prior to the start of the PAGE1 project. Thus, the success of the PAGE1 project was a multi-year study over three years using PSSA data from 2005, 2006 and 2007. The sustained success of the PAGE1 schools, their changes, their transformations and their leadership were evaluated purely on quantitative data generated throughout the course of the project. Fullan (2006, pg. 64) said, "Confidence is not granted by requesting it in advance of performance." Achievement of schools is routinely measured using standard tests. The performance of the PAGE1 schools and all

schools in Pennsylvania are judged solely on PSSA data and relate to the NCLB mandates. In today's world of education we are expected to change and lead based on quantitative data and success is judged in a correlation manner. Without supporting data, you are just somebody with another opinion.

A Theoretical Framework for PAGE1: Organizational Transformation, Turnaround Leadership and Change Theory

As a result of the *NCLB Act of 2002,* the Pennsylvania Department of Education (PDE), in partnership with Pennsylvania's State Board of Education, the Education Trust from Washington, D.C., and local Intermediate Units, joined together to address the issues of underachievement. This partnership led to the development and implementation of the Pennsylvania Achievement Gap Effort (PAGE1). PAGE1 was a three-year effort (2004-2007). This effort was a response to the achievement gap in Pennsylvania. The purpose of PAGE1 was to identify schools that could show dramatic academic growth over a three-year period. Schools having subgroup achievement gaps would address this through support or remediation through opportunities of professional development, communication and visitations with high performing schools of similar demographics and/or direct support from PDE, the PA State Board, the Education Trust and the Intermediate Unit liaison. In this section, I will attempt to review different theorist's concepts and relate these to the PAGE1 project.

The PAGE1 schools participated in training supported by the Pennsylvania State Board of Education and the Pennsylvania Department of Education. The Education Trust, a think tank located in Washington, D.C., provided example after example of schools facing Barton's (2003) obstacles and proving that their students could achieve. As the

PAGE1 schools visited the “frontier” schools, they learned firsthand that the factors identified by Barton were obstacles for these schools to handle. The “frontier” schools were those who had a proven record of high achievement for at least three successive years. Their main focus was on student achievement and Barton’s obstacles were not a hindrance to that task. As a result, the culture of the schools themselves overcame any beyond the school obstacles. The in school obstacles were eradicated through policy, professional expectations, personnel selection, emphasis on pedagogy and constructive use of quantitative data that applied to student needs.

PAGE1 schools were committed to changing for the benefit of all students they served. The Pennsylvania Department of Education, the Pennsylvania State Board of Education and the Education Trust were equally committed to assisting these PAGE1 schools increase achievement for all students. Marzano (2003) outlines changes occurring in schools. He identifies three levels as the school, the teacher and the student and has also broken down 11 factors that are most important to student achievement. Two of the three levels are in direct control of the educational experts. For example, to be successful, schools need to have a well grounded curriculum. The curriculum must have goals that are challenging and feedback that promotes constructive growth. In the school’s safe environment, teachers act as professional colleagues and invite the participation of parents and community in the learning process. Hence, instruction is geared to student needs and the classroom curriculum, although viable, must become part of the classroom environment that is well-managed by the teacher. Students, parents and families must also bring support to the school environment. Homes from which students come must support education and provide examples, background, motivation and an out of school

environment conducive to learning.

Marzano (2003), additionally discusses three principles are also identified to correlate with modern school reform and student success. In the new era of school reform, those working with education must realize that reform is highly customized. In other words, what is working and good for one school might be different for another school. Schools are unique to their students, parents and community. Thus, reform efforts need to meet the unique needs of the clientele. Secondly, Marzano (2003) indicates that school reform today will need to rely heavily on data. Data is needed to identify the effectiveness of any intervention. Those interventions that improve achievement should also have data to support those claims. When data is used as a school or student measurement in an appropriate manner, then school leaders, communities and students can attest to the achievement of any particular objective. Lastly, in today's day and age, reform must be undertaken in a step wise fashion. Reforms cannot happen all at once but each part of each successful reform must become part of the way of life of the school, teachers and students for which it is successful.

Parrett (2005), furthermore, identified eight essential components or interventions to school improvement through his study of reversing low achievement for Native American students. These components relate to general research on effective schools and PAGE1 efforts. Effective district and school leadership needs to create a shared vision and high expectations for all students. All PAGE1 schools committed to this concept upon application to the program. PAGE1 schools also pledged to understand the culture of poverty: students have many cultural and family supports that strengthen resiliency. All PAGE1 schools face the fact that economically disadvantaged students attend school

and will require additional monitoring, assistance and attention for success to occur. The PAGE1 effort recognizes, as Parrett indicates, that low performing students are targeted, especially in reading: every student must achieve reading proficiency through changing instructional approaches. However, PAGE1 schools target the needs of all students and as a result instructional approaches change to meet the needs of ALL students.

Parrett also relates that pre-school education, all day Kindergarten and longer instructional times in math and reading. PAGE1 schools and the "frontier" schools moved to before/after school instruction, including Saturday and summer programs, and focused more on early childhood instruction. As a result, curriculum and instruction improvements needed completed to vertically align curricula to state standards and assessments. PAGE1 schools were committed to mapping curriculum to state assessment anchors and applying applicable instructional techniques.

Parrett concludes by stating that use of quantitative data is needed for schools to address the achievement gap. Building data and assessment literacy has become second nature for PAGE1 schools. Led by the Education Trust, they developed an understanding of how to use data at the classroom level. By virtue of the project, PAGE1 schools were required to collect, analyze and apply data obtained through regular state and local assessments. Through this data application, parents, schools and the community became engaged to understand the meaning of test results as related to students. Teachers could then connect content to student and family cultural and social characteristics. PAGE1 schools were required to involve parents and community members on each school improvement team resulting in an early development of the use of data.

Lastly, the PAGE1 schools supported effective teaching. Teachers learned about

effective teaching strategies used in successful schools and applied the techniques, although modified, to their school situations. Teachers must believe that all students will achieve, must collaborate to use data to drive instruction and create caring environments for the gap to be closed. PAGE1 schools have become the Pennsylvania banner waivers for student achievement.

Historical information on studying the achievement gap supports Barton's fourteen identified factors of influencing the achievement gap and Parrett's eight components of school improvement. Additionally, Barton, Parrett and previous research (Edmonds, 1982, Brophy, J and Good, T., 1986) supports that a strong relationship between achievement and teaching exists. Within these factors of Barton and Parrett, the three key areas of leadership, change and transformation were "must haves" to influence the culture of student achievement. Others have studied these influences on organizations and they can be related to PAGE1.

The PAGE1 project has a direct relationship to three major theories. These are organizational transformation theory (Collins, 2001), Turnaround Leadership theory (Fullan, 2006) and change theory (Senge, 1999). All schools are a part of the overall organization of education. PAGE1 had to entail an overall organizational transformation beginning with the educational philosophy of the Pennsylvania Department of Education (PDE) and flowing to each PAGE1 school. This transformation and focus has a broader link to NCLB and has made direct impact with each PAGE1 school. A broad direction was given by NCLB, implemented by PDE and became the direction of each PAGE1 school. This direction was that all students can achieve and data was available to show that this was possible.

Within the larger educational organization, each PAGE1 school is a smaller nuclear organization. Each school was charged with leading a turnaround of the achievement gap, thereby, leveling the playing field for all students and causing each organization to make changes to the norms of those schools. The PAGE1 teams were to lead their districts to success utilizing partnerships from outside the school. Therefore, the collective capacity of the schools was increased through their leadership, parent involvement and community connections. Classroom doors were opened, school walls were torn down and educational culture led to school and community combined efforts to battle the achievement gap issue.

In order to combat the achievement gap, growth changes needed to occur on the school and classroom level. Changes at this level were essential to reach individual students and the traditional classroom norms had to be challenged and changed to sustain any success. The routine business of the classroom needed flexibility, coaching and placed in tune with the values of the larger organization that all students can and will achieve. As changes occurred at the classroom level, they were diffused throughout the school, district and community of education. Sustainability of success was a goal of the PAGE1 schools and diffusion of the change process is a key to that sustainability.

Think of the theories of Collins, Fullan, Senge and PAGE1 as one would the components of an “atom.” Each atom is composed of protons (Collins) that provide identity the atom; a nucleus (PAGE1) around which everything else revolves and provides stability; electrons (Fullan) that whirl around the nucleus and interact with other components both outside and within the atom; and neutrons (Senge) that give balance to the atom and counteract the electrons. In my model, the PAGE1 project is the nucleus.

These schools provided the component parts of all schools just like the nucleus does for the atom and for all different elements. The Turnaround Leadership (Fullan, 2006) components are the electrons. A constant flow of items needed for growth, change and synergy. The leadership components travel in high energy levels that provide a continual barrage of different achievement characteristics to always evaluate and balance. Senge (1999) and change theory reflect the neutrons. The neutrons keep the electrons in balance in the atom. Change is what keeps the main factors impacting education in balance, as well. Education changes as our culture and times change. Change then becomes what balances education with the needs of a growing community and world. Lastly, organizational transformation and sustainability (Collins, 2001) are the protons of the atom. The protons give identity to the atom. The protons impact the other components of the atom. The atom stays as is unless the proton structure differs. The same is true of organizational transformations. For example, education at the nuclear level will remain the same unless impacted by other larger educational groups or initiatives, such as NCLB. It takes the larger components to start the atom transforming. NCLB impacts PDE and PDE impacts PAGE1 schools. All of these components work in balance together and toward the growth and strength of the atom. They all work toward student achievement.

Collins: Organizational Transformation

Collins (2001) studied corporate transformations. Overall, he found that each success story had a down to earth, and committed to excellence framework under which its leaders and people were kept on track. In each case, the Hedgehog Concept of identifying what to become best in the world at, what drives the economics and what the

organization was passionate about would push the Flywheel over the Doom Loop. In the Flywheel concept, it only takes one push, idea or concept to keep the organization moving toward the Hedgehog Concept originally developed. PAGE1 itself has pushed that mythical flywheel.

Collins notes that moving from good to great does not happen overnight. The transformation process moves slowly at first and continually builds momentum until reaching a breakthrough. The transformation process happens in distinct stages. Disciplined people are the key to the success of the transformation process. Leaders, known as level 5 leaders, build enduring greatness through a blend of personal humility and professional determination. The PAGE1 project has leaders with this professional determination and the will to want all students to succeed. People come first in Collins's first stage. The right people had to be in the right places for the organization to figure out where to go and then how to get there. The PAGE1 teams organized people from all aspects of the school and included administration, teachers, parents, board members and community members. The teams were made of people determined that all students can and will be successful. The Education Trust personnel lead the way in regards to examples and guidance that students across the country, just like Pennsylvania students, were successful and the success was maintained. These right people were also confronted with obstacles but as Collins (2001) says that you must maintain faith that you can and will prevail to the end, regardless of the issues that confront you with the harshest facts of your current existence.

Additionally, schools needed to face the "brutal reality" that change is needed to reduce achievement gaps and the PAGE1 project often stands alone because they speak

up for what is right for students. Schools and communities need to face the fact that data shows there are many ineffective schools regardless of what local individuals believe.

The PAGE1 teams had to confront the brutal fact that although the schools were perceived by the public as good schools, they had deficiencies within student disaggregated subgroups that exposed these schools as not providing for all students to achieve, when school wide data will cover up these inadequacies. PAGE1's Hedgehog Concept deals with being the best in student achievement because this is what educators are passionate about and drives educational economics. The PAGE1 disciplined thought was providing statewide leadership in an effort to close the achievement gaps that separate low income students and students of color from other young Americans pre-K through college. PAGE1 schools were to become the model schools for others to visit to learn from and hence their main purpose was simply "student achievement." PAGE1 is the pusher of the flywheel by rousing schools to action on a pressing education problem of providing schools with the data and knowledge to reshape the future of education. This passion was embraced by the PAGE1 schools and their teams. The Hedgehog Concept of PAGE1 is completed by looking at how this is funded. The economic interests of foundations and Federal funds provided the resources necessary to keep the project viable, for training, for learning from other successful organizations and minimal funds for school specific activities. As a result of identifying the PAGE1 Hedgehog Concept, the schools took disciplined action to remedy their inadequacies with student achievement.

The actions taken by PAGE1 schools were focused on their individual data pointing to the needs of their students. Actions were specific to the culture and needs of

the individual schools. Collins summarizes that in building greatness, there is no magic formula, no miracle or no single defined action for all organizations to follow. This is specific to the organization and relies on a continual pushing until the organization achieves a breakthrough. As activities of the PAGE1 schools are dedicated to closing the achievement gap, the leadership base focuses actions related to that goal. The leadership base grows to include all groups and within the groups discipline toward achieving the goal is the key to sustained success.

The PAGE1 story is fundamental: develop an educational system that equips all young Americans with the skills and knowledge they need to participate fully in the civic and economic life of this country. Their responsibility is less as articulating or even imposing as bringing about a collective vision both of our role and of our goals for the educational system. If there were two words to characterize the PAGE1 efforts they would be relentless and unafraid.

PAGE1 initiated change outside of the organization through a combination of NCLB pressures, inspirational educators and support from the state. They had to initiate changes inside the organization collectively—in response either to perceived problems or perceived opportunities. Inside the organization, the group reflected regularly on how things were going. They also solicited the views of others outside of the organization and incorporated these into their own reflection. PAGE1 became a reflective and data oriented organization of supportive and interactive educational leadership teams.

Fullan: Turnaround Leadership

Fullan (2006) introduces ten key features that guide his study on leading school districts to success and closing the achievement gap is the main theme. Fullan states that

decreasing the gap between high and low performers is crucial because it impacts society. By reducing the achievement gap, schools level the societal playing field and this is a critical component of improving economic and health conditions for all. Better performance equals more support from the public. In order to have these societal impacts, schools need to close the gap by attending to three basics and these are numeracy, literacy and the wellbeing of students. The emotional wellbeing of students strongly supports cognitive achievement. Schools must supply the best people to address these basics. Talent breeds talent. Exemplary leaders influence indirectly through products they create and stories they relate. Those with talent are needed in challenging situations and therefore support, finances and resources need to be supplied to improve the most difficult situations.

With resources in place, the leaders can establish positive pressure. This is pressure that motivates; all excuses are removed; evolving to a system to where there is no reason to not be successful. The main theme of addressing the achievement gap leads to internal accountability that is linked to external accountability. The data needs to be used not only to identify weaknesses but also to get at improvements. The goal is to erase stereotypes and focus on the student with dignity and respect. Teachers must explore their own practices openly and honestly and how students are treated. Hence, trust must exist between the school and the home for student success to occur. These strategies are socially based and action oriented. Schools need deep engagement with the change process in refining and improving instruction and collaboration. School leaders and teachers need to assume that lack of capacity is the initial problem with instruction and handling students and society and then must work from there. New experiences lead

people to different beliefs. People need proof that higher expectations are realistic and thus cause them to experience positive improvements. As a result, others in the organization need to be developed into leaders. This capacity building develops skills, clarity and motivation. Effective leaders also develop leadership in others. The organization needs to stay the course through good direction and leadership.

PAGE1 schools hold the position of both a direct and indirect leader. The traditional scholarly knowledge in regards to educational practices and data interpretation as related to educational practices is well founded in the expertise of PDE, the State Board and the Education Trust. The PAGE1 story is a simple one: an educational system that equips all young Americans with the skills and knowledge they need to participate fully in the civic and economic life of this country. However, PAGE1 has the responsibility less of articulating or even imposing that story than as bringing about a collective vision both of each school's role and of each school's goals for the educational system. If I were to choose two words to characterize the PAGE1 project, they would be relentless and unafraid.

The PAGE1 project initiates change outside of the organization through a combination of pressure, inspiration and support. The participant schools initiated change inside the organization collectively in response either to perceived problems or perceived opportunities. Inside each school, the educators reflect regularly on how things are going. They also solicited the views of others outside of the school and incorporated these into their own reflection. They have the benefits of regular outside evaluation of some of their key projects and therefore have the opportunity to sustain success through data driven and people oriented change.

Senge: Change Theory

Senge (1999) refers to the ten challenges of the growth process of profound change. These challenges begin whenever business begins to be conducted in unfamiliar ways, such as the PAGE1 schools changing how education looks to help students achieve. The challenges of initiating change include time management (to include reflection and practice), adequate coaching/guidance, relevance to organizational goals and consistency of the behavior of management and the values of the organization. The issue of time goes beyond how much of it is available and relates to flexibility and control. As all schools, PAGE1 schools can only control the time they have with students. Thus, the schools extended time to before school, after school and with summer educational programs. These times were in their control and were used for assisting students achieve.

After initiating change, momentum must be sustained. The challenge of sustaining momentum includes the fear and anxiety of inadequacy, the negative assessment of progress and believers versus the non-believers. Leaders need to build a solid case for the change and insist that others step up to the plate in a compassionate manner. In professional careers, the quality and ability of professionals to coach each other is the element that matters most when sustaining the initiated change. Organizations need to establish a culture where the training is geared to the development of people to ask questions that yield information. These organizations are competent with uncertainty and comfortable with figuring things out as they go along. The organizations sustaining change have given more meaning to the goals of the organization rather than just doing more work.

Lastly, the challenges of redesigning and rethinking appear when change initiatives gain credibility and challenge previous norms. The challenge of redesigning includes identifying who is in charge, making the organization build upon each other's success; Senge calls this diffusion, and determining the purpose of the organization's existence. In order to diffuse ideas, the power of the sustainability of change is in the ideas not the individuals. Knowledge is best diffused through connecting people to people and change is merely sustaining success. These key individuals identify useful information and put it to use. PAGE1 schools connect the factors of change, leadership and transformations in order to close the achievement gap.

In relation to the challenges and successful school characteristics identified by Senge, PDE, the Pennsylvania State Board of Education and the Education Trust (2004) have identified the following community-wide challenges for PAGE1 participants:

a. Working directly with teachers and administrators in schools and districts serving concentrations of low-income and minority children, helping them with strategies to improve student achievement; this requires changing instructional practices.

b. Analyzing data on educational achievement and opportunities, reporting to educators and the public on progress in raising achievement and closing gaps; interpreting data in a manner to apply to identifying student needs and recognizing that achievement gaps exist.

c. Identifying, celebrating and studying schools, districts and colleges that are unusually effective in getting low-income students and students of color to high levels of achievement; the Education Trust managed and implemented this type of information for the PAGE1 schools and included visits to high achieving schools.

d. Working with the media to improve the quality and accuracy of education coverage, especially that which focuses on the achievement gap.

e. Working with parent and community organizations to enhance their understanding of standards-based reform and increase the demand for quality education.

Therefore, community/school collaboration is where many of our improvement efforts need to be focused. The educational answer to the problems of children today is in a stronger community. It is a strong professional learning community that is a process for turning information into knowledge. The PAGE1 schools were involved organizations and part of the large community. These pioneer Pennsylvania schools, in all of their work, state and local, work with and through outside partners. Sometimes those are educators. Sometimes those are community members or policymakers. Sometimes those are the media and financial backers.

Yet, the challenge in all change is people's behavior. People change their thinking because they are shown something that influences their feelings. Successful organizations know what to reject and recognize improvement as gradual. All individuals in an organization can learn and change. In regards to PAGE1, teaching behavior has changed as a result of the efforts of this project. They have had evaluations of their work in classrooms to know that they produced changes in teaching behavior. It is suspected that the changes are primarily from anecdotes and personal testimony and evidence of changes, for the better or worse, in response to NCLB have been collected and reported via PAGE1 school publications.

The change strategy of PAGE1, as a reform project, is always to look ahead of the reform movement and pick the next important issue. They then work to ripen it through

research and writing, through public speaking, or any number of other strategies. When enough other people pick it up, it becomes widely embraced. It was not too many years ago that nobody else would touch the topic of the achievement gap because it dealt with race and economics but now it has been widely embraced.

Conclusions

Across the United States a gap in academic achievement persists between minority and disadvantaged students and their counterparts. Since the signing of the *No Child Left Behind Act (NCLB)* in January 2002 by President George W. Bush, researchers, district personnel, institutes of higher education, corporations, school reformers, and parents alike are demanding accountability for academic performance in schools. No longer can school boards and administrators hide behind the excuses of poverty, ethnicity, race, and gender as insurmountable reasons for the failure of the public schools. All the nation's schools are now charged with providing an educational program that ensures academic achievement to the level of proficiency for 'ALL' children in the public schools.

Throughout the history of our nation, many researchers have attempted to analyze, synthesize, and interpret research to determine how effectively our American education institution was performing. However, many of our students, especially our children of poverty, continue to demonstrate overall poor academic achievement in our educational system. The success of PAGE1 schools in their effort to close their achievement gap within a particular subgroup and thus resulting in improvement of all students has created a model of success for all schools. In time when the existence and success of schools is being challenged, PAGE1 School Districts solidified with their

community and found focus. PAGE1 teachers, principals, parents, school board members and community with the support of the Pennsylvania Department of Education and the Pennsylvania State Board of Education, committed to increasing achievement for 'all' students with special focus on the disadvantaged. They are vigilant in participating in continued school reform and ensuring that all students receive equity and quality in both instruction and assessment. PAGE1 was dedicated to the ideals of schools and display pride throughout the schools and the communities of its accomplishments. They will persist in their efforts to examine the effectiveness of instructional and curricular programs and adjust according to the needs of the students and district, hence, impacting society for many years to come.

The methodology of this study centers purely on quantitative analysis. Collins, Senge, Fullan, Barton and Parrett all used quantitative analysis to determine sustained successful organizations and schools. The stories of these schools can be colorful, interesting and intriguing but sustained success is analyzed based on quantitative analysis, NCLB requirements are based on quantitative analysis and PAGE1 will be judged on quantitative results.

There is a continual comparison of educational research and politics. The following is a summary of the evolution of politics as relates to educational research on schools and student achievement:

Political Influences

1. 1957: Sputnik (America falls behind; schools do not produce enough scientists)
2. 1965: ESEA (Lyndon Johnson)
3. 1969: NAEP (Nation's Report Card)

4. 1983: A Nation at Risk (improvements needed for public schools) (Ronald Reagan)
5. 1989: National Education Goals (children's needs and government expectations) (George H.W. Bush)
6. 1994: Educate America- Goals 2000-school improvement and achievement (Bill Clinton)
7. TIMSS and NAEP data (American schools are not internationally competitive)
8. 2001: NCLB (George W. Bush)

Educational Research on Student Achievement

1. 1964: Bloom (instruction impacts student learning)
2. 1966: Coleman Report (student background influence cannot be overcome)
3. 1972: Jencks (Supports Coleman)
4. 1982: Edmonds and Rutter (Effective Schools Characteristics)
5. 1984: Goodlad…school a safe place.
6. 1986: Brophy & Good (Schools Can Make a Difference)
7. 2000-2008: Barton, Parrett, Miller, Robinson, Marzano, Sanders, Carter, Horn, Dean, the Education Trust (schools and teachers can increase student achievement through instruction, support programs and proper data usage).

Collins	Fullan	Senge	Barton	Parrett	PAGE1
Culture: People, Thought, Action	Success is socially based	Conduct business differently	Curricular and instructional expectations	High expectations for all	Student Achievement for all
Right people on the bus	Attend to literacy, numeracy and well-being	Initiate, Sustain Reflection, Goals...Coach	Logistics, technology and safety	Effective leadership	Education Trust, PDE, State Board, PAGE1 Schools
Hedgehog Concept: Best; Economics; Passion	Achievement Focus: Closing the Gap is the goal	Values of the organization	Reduce the achievement gap	Target populations, change curriculum and instruction	Close the Achievement Gap
Action is Needed: Push the Flywheel	Internal and external accountability linked	Sustain momentum: Fear/Trust	Influence factors outside of school	Start as early as possible	Instructional Changes
Build Momentum in 1 Direction	Establish positive pressure	Diffusion-Direction build upon success, connect to values	Community impact on sustainability	Engage parents, the community and use data to help students	Quality and continuous school improvement

Figure 1: Comparison of theories, research and PAGE1.

CHAPTER III

METHODOLOGY

Introduction

The purpose of this multi-year, quantitative study was to determine if the Pennsylvania Achievement Gap Effort (PAGE1) was significantly effective or not in increasing student achievement in mathematics and literacy for economically disadvantaged students for the 16 PAGE1 schools as compared to 16 significantly similar selected schools with similar socioeconomic status, school structure, demographic setting and student population size over a three year time period. The grade levels compared will be grades 5, 8 and 11. Although additional grades are tested today, all three of these grade levels were the only levels tested in the baseline year of 2004. Individual student PSSA scores, economic status and PSSA proficiency status were provided for testing years 2004 (baseline), 2005, 2006 and 2007 for each of the 32 schools and access to the data was made available by the Pennsylvania Department of Education through the secure eMetric database web site. Student names and identification numbers were not made available. In support of this study to evaluate the impact of PAGE1 the achievement gap reduction, access to the data was authorized by Pennsylvania Secretary of Education Dr. Gerald Zahorchak,

This chapter covers the methodological elements of this study. In this chapter the following will be presented: the school selection process, school requirements; reliability and validity of the Pennsylvania System of School Assessment; the proposed analysis of the PSSA data in regards to analyzing the impact of PAGE1 on the achievement gap. Research questions are as follows:

1. Is there any significant difference in the overall achievement for economically disadvantaged students for the PAGE1 schools as compared to non-PAGE1 schools of similar student population size, school grade level structure, demographic setting and free and reduced lunch percentage?

   Null hypothesis: No significant overall achievement differences between schools for economically disadvantaged students and non-economically disadvantaged students. Comparison of schools is at the 0.05 significance level.
2. Is there any significant difference in overall mathematics achievement for economically disadvantaged for the PAGE1 schools compared to non-PAGE1 schools of similar student population size, school grade level structure, demographic setting and free and reduced lunch percentage?

   Null hypothesis: No significant overall math achievement differences between schools for economically disadvantaged students and non-economically disadvantaged students. Comparison of schools is at the 0.05 significance level.
3. Is there any significant difference in the overall reading achievement for economically disadvantaged students for the PAGE1 schools as compared to non-PAGE1 schools of similar student population size, school grade level structure, demographic setting and free and reduced lunch percentage?

   Null hypothesis: No significant overall reading achievement differences between schools for economically disadvantaged students and non-economically disadvantaged students. Comparison of schools is at the 0.05 significance level.

4. Is there any significance difference in overall mathematics achievement from year to year (grades 5, 8, 11) for economically disadvantaged students in the PAGE1 schools as compared to non-PAGE1 schools of similar student population size, grade level school structure, demographic setting and free and reduced lunch percentage?

   Null hypothesis: No significant overall math achievement differences between schools for economically disadvantaged students and non-economically disadvantaged students. Comparison of schools is at the 0.05 significance level.

5. Is there any significance difference in overall reading achievement from year to year (grades 5, 8, 11) for economically disadvantaged students of the PAGE1 project for the PAGE1 schools as compared to non-PAGE1 schools of similar student population size, grade level school structure, demographic setting and free and reduced lunch percentage?

   Null hypothesis: No significant overall reading achievement differences between schools for economically disadvantaged students and non-economically disadvantaged students. Comparison of schools is at the 0.05 significance level.

6. Is there any significant difference in overall student achievement between grades 5 and 8 and grades 8 and 11 in PAGE1 schools with grade 5 students moving to only one grade 8 school and grade 8 students moving to only one grade 11 school?

   Null Hypothesis: No significant difference between grade levels.

For this study, all of the PAGE1 schools were used. The sixteen similar schools were a purposeful selection from schools with similar free and reduced lunch

percentages, school grade level structure, demographic setting and school populations. These free and reduced price lunch percentages, grade level structures, demographic setting and school populations will be used from the 2004-2005 school year (the first year of the PAGE1 effort). These characteristics (free and reduced lunch percentages, school grade level structure, demographic setting and school populations) are publicly available on the Pennsylvania Department of Education's website at www.pde.state.pa.us.

Since the PSSA was used as the data source, baseline data for each PAGE1 participant school and the sixteen similar schools will be taken from the PSSA test given in the Spring of 2004, individual student scaled scores for economically disadvantaged students in grades 5, 8 and 11 will be used. Students would have been tested in April of 2004 in all Pennsylvania schools prior to the start of the PAGE1 project. Thus, the success of the PAGE1 project was a multi-year study over three years using PSSA data from 2005, 2006 and 2007.

The Achievement Gap

An achievement gap exists when groups of students with relatively equal ability fail to achieve at the same levels in school. One group will far exceed the achievement level of the other. Looking and comparing how various groups of students perform on state tests, advanced placement rates, drop-out rates, graduation rates, SAT scores and through the National Assessment of Educational Progress (NAEP), it is evident that achievement gaps exist. A few common gaps are the gaps between the following subgroups of students, as identified by disaggregated data: boys and girls; students above and below the poverty line; between ethnic groups; with limited English proficient students; students with learning disabilities. Across the United States a gap in academic

achievement persists between minority and disadvantaged students and their white counterparts.

Since the signing of the *No Child Left Behind Act (NCLB)* in January 2002 by President George W. Bush, researchers, district personnel, institutes of higher education, corporations, school reformers, and parents are demanding accountability for academic performance in schools. No longer can educators use the stereotypes of poverty, ethnicity, race, and gender as excuses for the failure of students in our public schools. All the nation's schools are now charged with providing an educational program that ensures academic achievement to the level of proficiency for 'all' children in the public schools.

Senge (2000) discusses key characteristics of successful schools. Successful schools learn to expand personal capacity to create positive results. In doing so, they create an environment that encourages taking steps toward chosen goals. The successful school builds a sense of commitment by developing images of the future goals that guide the principles and practices of how to get there. Reflection, clarifying and improving are hallmarks of the successful schools. These three components are used to improve the school's picture of what the world should look like and define their behavior. As a result, the groups within these schools develop an intelligence that is greater than the sum of all individuals' intelligence. Successful schools describe and understand the interrelationships that shape the long term behavior of all individuals in all groups, thereby sustaining success. Successful schools measure this sustained success through data.

The mandates in the *NCLB Act of 2002* inspired the Pennsylvania Department of Education's (PDE), in partnership with Pennsylvania's State Board of Education, the

Education Trust from Washington, D.C., and local Intermediate Units, to address the issues of underachievement. This partnership led to the development and implementation of the Pennsylvania Achievement Gap Effort (PAGE1).

What is PAGE1?

The Pennsylvania Achievement Gap Effort (PAGE 1) was a three-year effort (2004-2007) led by the Pennsylvania State Board of Education in partnership with the Pennsylvania Association of Intermediate Units (PAIU), the Pennsylvania Department of Education and the Education Trust. This effort is a response to the achievement gap in Pennsylvania. The purpose of PAGE1 was to identify schools that could show academic growth over a three-year period. Schools having subgroup achievement gaps would address this through support or remediation through opportunities of professional development, communication and visitations with high performing schools of similar demographics and/or direct support from PDE, the PA State Board, the Education Trust and the Intermediate Unit liaison (PDE, 2006). Hence, districts had to meet several criteria to qualify for participation in this achievement gap effort.

School Selection Process

The selection criteria for the PAGE1 participants were determined by the Pennsylvania Department of Education. It is important to note that the selection criteria were purposely limited to schools demonstrating an achievement gap within subgroups. According to the Pennsylvania Department of Education (PDE), participating PAGE1 districts had to meet many criteria. The schools were to be representative of the entire state, not one corner of it. The overall project was to be a reflection of all Pennsylvania schools and therefore replicable in any area for any school.

These schools were to have an achievement gap, so as to have a basis from which to prove that the gap can be closed. These schools should have met overall annual yearly progress (AYP) under the NCLB requirements. AYP is achieving required proficiency levels for all schools, all subgroups and the district. However, the PAGE1 schools had to still have at least two subgroups that show significant gaps in achievement. However, PDE did not want to select schools where performance of the subgroups shows the largest percentage of students in the groups at the below basic level since this may be indicative of problems in the school that cannot be affected with this project effort. The schools had to show that they were capable of making improvement in 2-3 years. While PDE did not want to influence the results, they wanted to do what they could to ensure there would be positive results. On the other hand, as with any project, there were no guarantees. The achievement gaps existed in the PAGE1 schools and the examination of data over the three year time span would indicate if the achievement gaps were significantly closed or not.

In order to demonstrate that this can be done no matter what the grade level, PDE hoped to have a mix of grade levels: elementary, middle and secondary. Additionally, the collection of schools was to be a mix of rural, urban and suburban schools. It was crucial that the school board and school leadership be supportive of the use of data and research-based best practices to improve achievement, as per NCLB. Additionally, it was important that these sites were in communities that were open to such endeavors. Lastly, each school had to be willing to serve as a host for other schools in the region, and be willing to share their expertise and the lessons they have learned. Sixteen schools met the criteria established for selection to participate in the PAGE1 initiative. The sixteen

schools are as follows: Murray Elementary School, Park Elementary School, Sheridan Elementary School, Fairhill Elementary School, Stroudsburg Intermediate Elementary School, Elkins Park Elementary School, Washington Park Middle School, Bellwood-Antis Middle School, Feaser Middle School, Trexler Middle School, East Allegheny Jr/Sr High School, Strong Vincent High School, York County School of Technology, Shenandoah High School, Strath Haven High School and Scranton High School.

Comparison School Selection

The sixteen similar schools was a purposeful selection from all Pennsylvania schools with similar free and reduced lunch percentages, school demographics, school structure and school populations. The guidelines for free and reduced price lunch participation are annually set by the Federal Government. These free and reduced price lunch percentages and school populations will be used from the 2004-2005 school year (the first year of the PAGE1 effort). The percentages and student totals are publicly available on the Pennsylvania Department of Education's website at www.pde.state.pa.us.

However, this is not the only information used to select the comparison schools. Schools selected as comparison schools must also have had a school population or total number of students significantly similar to the PAGE1 schools. The 2004 student grade and school totals were used because 2004 is the baseline year for PSSA data. Information as to the total number of students per school is available on the Pennsylvania Department of Education web site. The size of the school impacts the size of the classrooms. The size of the classrooms impacts the student to teacher ratio. The number of students a teacher faces during a period of instruction is typically referred to as class size and determines

the student to teacher ratio. Average class size provides insight on students' learning environment. The issue of class size has received a great deal of attention in U.S. education policy, since it is commonly looked upon as a factor influencing the interaction between teachers and students. Smaller classes are generally valued because they may allow students to receive more individual attention from their teachers (NCES, 2007). However, the impact of class size on the overall learning environment is related to such factors as teaching style, student behavior, and the opportunity for students to meet with teachers outside of class (NCES, 2007). The clearest result with respect to correlates of achievement is that average achievement scores are higher in schools with smaller class sizes (NCES, 2007).

Across the state of Pennsylvania, schools vary in grade level classification. Some schools are structured K-8, some schools K-2, some schools 3-5, some schools 6-8, some schools 9-12, some schools 5-8 and there are a variety of compositions depending on student need, community and numbers of students to be served. Comparison schools also have similar structures as the PAGE1 schools. Because of curricular needs of the varying grade levels, it was intended by this study that grade 5 will represent elementary school, grade 8 would represent middle school and grade 11 will represent high school.

Lastly, in the selection of the comparison schools, the demographic setting was considered. An attempt was made to compare urban schools to urban schools, rural schools to rural schools and suburban schools to suburban schools. All Pennsylvania schools are labeled as urban, rural or suburban based on locale codes derived from a classification system originally developed by the National Center for Educational Statistics (NCES, 2007). A locale code is assigned to all schools and districts.

Locale codes are based on the physical location represented by an address that is matched against a geographic database maintained by the Census Bureau. This database is the Topographically Integrated and Geographically Encoded Referencing system, or TIGER. The Census Bureau redesigned the original locale codes because of many changes in the U.S. population and the definition of key geographic concepts (NCES, 2007). The locale codes are based on an address's distance to an urban area (a densely settled area with densely settled surrounding areas). The locale code system classifies territory into four major types: city, suburban, town, and rural. Each type has three subcategories. For city and suburb, these are differences of size: large, midsize, and small. Towns and rural areas are further distinguished by their distance from an urbanized area. They can be characterized as fringe, distant, or remote. Technology has made it possible to know the exact latitude and longitude of about 91 percent of schools.

However, a school district's locale code is not assigned on the basis of the central office location. It is derived from the addresses of the schools in the district. If 50 percent or more of the public school students attend schools with the same locale code, that locale code is assigned to the district. For example, if 60 percent of students were enrolled in schools with a "rural - distant" locale code, and 40 percent were enrolled in schools with a "town - small" locale code, the district would be assigned a "rural or distant" locale code. If no single locale code accounts for 50 percent of the students, then the major category (city, suburb, town, or rural) with the greatest percent of students determines the locale. The locale code assigned is the smallest or most remote subcategory for that category. Information for the locale code for Pennsylvania schools is located on the Pennsylvania Department of Education web site.

The comparison schools did not take part in the PAGE1 project. If any initiatives were implemented in the comparison schools, the initiatives were district driven. Professional development would have also been implemented by the district. Instead of listing the names of all comparison schools, because their students were anonymous, these schools will only be identified as a comparison elementary, middle or high school.

PAGE1 School Participants were Required to

Schools participating in the PAGE1 project also participated in numerous activities. Participating Intermediate Units identified a school to be its PAGE 1 School. Each PAGE 1 School was required to have 6 to 10 individuals in the community to serve on a School/Community Team. Team members were selected from among those committed to the development of a plan to close the achievement gap in the selected school.

School/Community Teams were invited to forums in Harrisburg, Pennsylvania. These presentations included presentations and workshops on closing the achievement gap. The Education Trust, a non-profit organization based in Washington, D.C., and the National Center for Educational Accountability (NCEA) were key leaders in the training. School/Community Team members also made site visits to schools with similar demographics that had documented success in closing the achievement gap for three consecutive years. These exemplary schools are called “Frontier” Schools. Upon their return from these school visits, each team developed a plan for each year of the project to attempt to implement strategies to close the achievement gap. These strategies included but were not limited to: more class time in core subjects, before and after school student remediation, analyzing quarterly student assessments to identify student academic needs,

providing information to parents on assisting children academically at home, providing on-line academic assistance, curriculum mapping and gearing instruction toward Pennsylvania Assessment Anchors.

The Pennsylvania Department of Education and the intermediate units contributed technical assistance to the selected PAGE 1 schools as needed. The Intermediate Units in conjunction with the Pennsylvania State Board of Education Oversight Committee monitored the progress of these PAGE 1 Schools for the duration of the project.

Measuring Student Achievement: A Data Driven Process

As previously stated, scientifically based research programs are defined in the No Child Left Behind (NCLB) Act of 2001. Basically, there must be proof based on demonstrated research that the instructional program a district chooses to use works *in helping students learn the stated academic objectives.* Only those programs that are proven to be aligned to the stated academic objectives of the district should be considered. Programs are implemented based on quantifiable data that they have increased student achievement in schools with similar student populations. Once proven effective and aligned, the successful implementation of the program requires that the district ensure that all components of the program that led to increased student achievement are replicated. The district provides *all necessary structure and support* to use the instructional materials and to produce maximum gains in student learning. The quantifiable data linking the Frontier Schools with an increase in student achievement would lead one to believe that their programs were researched based as defined by NCLB.

Use of data also became a way of life for PAGE1 schools to identify instructional

needs of students. Logical use of data to improve teaching and learning requires leadership, training, and the development of a culture of use. As Mike Schmoker, author of *Results: The Key to Continuous Improvement* (Schmoker, 1999), puts it, schools need to move away from always adding new practices and instead focus on achievement and regularly measure the impact of the methods used. PAGE1 Schools and districts used data to identify strengths and weaknesses in student, teacher, and school performance. They tracked and shared the results of various interventions in order to pinpoint successful strategies for achieving goals. Instructional and organizational methods linked to successfully closing the achievement gap were shared among schools.

Exemplary schools and districts use data to identify strengths and weaknesses in student, teacher, and school performance. They track and share the results of various interventions in order to pinpoint successful strategies for achieving goals. Proven strategies can then be replicated in other schools and other subject areas. School leaders can use data to identify high-performing schools with similar student populations and then find out what methods were used so successfully. For years, test scores and end-of-semester report cards were the primary sources of feedback for students and parents. Scores on standardized achievement tests typically have been of little use to educators, as the turnaround time is slow and students have moved on, or the data is aggregated and yields little information about what practices and factors produce better scores. These conditions are changing in light of tough state standards, high-stakes testing, and an intense focus on accountability.

Educators can answer almost any question about the effectiveness of schools by gathering, intersecting and analyzing four kinds of data (Bernhart, 2003). Demographic

data describes the students, the school's staff, the school and the community. This information defines the context in which the school operates and is needed to understand the data. If the demographic data is disaggregated, the impact the education system has on different groups of students can be shown. Student learning data includes a variety of measurements such as, norm and criterion referenced tests, teacher grades, standards assessments and authentic assessments. These show the impact of the education system on the student. Perceptions data, gathered through questionnaires, interviews and observations, give a picture about what the district clients think about the school. To change a group's perceptions, you need to know what they believe to motivate them. School process data includes the schools programs, instructional strategies, assessment strategies and classroom practices. Tracking this data assists in building a variety of learning and building knowledge of what impacts achievement.

There are several ways to measure the achievement gap. One common method is to compare academic performance based on state standards among African-American, Hispanic, and white students on standardized assessments. Data from the National Assessment of Educational Progress (NAEP) shows that reading scores for 17-year-olds narrowed dramatically for both African-American and Hispanic students from 1975 through 1988. From 1990 to 1999, however, these gaps either remained constant or grew slightly in both reading and mathematics. Looking at the NAEP data, the Education Trust (2004) concluded that when minority students reach grade 12, if they do, these students are about four years behind other young people. In fact, 17 year-old African American and Latino students have skills in English, mathematics and science similar to those of 13-year-old white students.

Another way to measure the achievement gap is to compare the highest level of educational attainment, again based on state standards, for various groups. Here too there are gaps at all levels. Hispanic and African-American high school students are more likely to drop out of high school in every state. Of these high school graduates, college matriculation rates for African-American and Hispanic high-school students remain below those of white high-school graduates. Furthermore, of those students enrolling in college, Hispanic and black young adults are only half as likely to earn a college degree as white students (Education Trust, 2004).

Successful schools study, interpret, analyze and present data to individuals or groups of people who want to know how to use data to understand how their schools are doing and how to go about improving them. The Education Trust was created to provide leadership in the effort to close the achievement gaps that separate low income students and students of color from other young people. Their vision is an educational system that equips all students with the skills and knowledge they need to participate fully in the civic and economic life if this country. The Education Trust (2001) reports that data can tell you the following:

1. Whether students are mastering the skills and knowledge they need to be successful in later grades, college or the workforce.
2. Whether achievement gaps exist between certain groups of students, that is, whether some students are doing well while others are lagging behind.
3. Whether student achievement has been improving over time and whether achievement gaps are increasing or decreasing.

4. Whether all students are being provided with the opportunities they need to learn, including qualified teachers, a rigorous curriculum and adequate resources.
5. Whether schools are doing well with student achievement so we can learn from them.

Through the *No Child Left Behind Act*, achievement data and teacher qualifications must be provided to parents and communities. They have a right to know whether all students and groups of students are meeting state determined proficiency goals for each year, known as Adequately Yearly Progress (AYP) targets. They also have a right to know whether schools have been identified as needing improvement for not meeting state goals for two or more consecutive years. AYP data is analyzed in an effort to focus on improving educational practices and identifying those schools that have overcome the achievement gap. Data in regards to students placed in high level classes that will help them achieve, disproportionately placed special education students, fair share of educational dollars and other schools that are achieving is interpreted for all stakeholder groups.

The data that is presented may be difficult for people to hear. Data may reveal significant differences in achievement and opportunity between different subgroups of students. It may challenge the beliefs people have held for many years about their schools. People may then place the responsibility for the achievement gap on the students rather than on the schools and districts that have failed to give them what they need to be successful. School and district data tells us about the quality of public education in a community and reveals ways to make sure all students meet high standards. However, all

stakeholders must know what type of data is needed and what it says to make informed decisions.

The Education Trust has identified steps to analyzing data for schools and communities. The first step, when interpreting data, is to look at and understand achievement data. This data will tell you whether students as a whole are meeting the standards for what they should know and be able to do. Next, the data can be interpreted to determine achievement gaps between groups of students. Data on overall achievement is important. However, achievement of different groups of students must be interpreted to determine if some groups consistently outperform others.

The next step to review when analyzing data is 'opportunity'. Do all students have sufficient opportunities to learn in school? Poverty and family issues prevent minority and low income students from achieving at high levels. These students face challenges outside of school and also face challenges in school. National data shows that the educational opportunities are fewer for minority and low income students and thus they have the least access to the factors that contribute to academic success and further education.

Community groups also need educated about how to use data to lead to success. Test results provide feedback to parents, students and teachers on whether students know and are able to do what is necessary to meet state standards for proficiency. When students perform below the proficient level, this is a sign that schools need to alter instruction or otherwise intervene to help those students. Under NCLB, results from state tests in reading and math must be broken down by race/ethnicity, poverty, disability status and limited English proficiency. This information is made public through the

district report card and a variety of other methods. All students must now be assessed in reading and math at least annually in grades 3-8 and once from grades 10-12. These types of overall scores are commonly used to compare schools. However, overall scores do not tell you much about what is happening to different groups of students within a school. Because an overall score is an average, it can conceal large achievement gaps between groups of students. Test scores can be broken down by race, ethnic group, income level and English proficiency.

Providing evidence of success is important to support curricular, instructional and additional academic interventions for students. The Education Trust has worked closely with many school districts across the country to assist in analyzing data, reviewing best instructional practices and implementing plans to reduce the achievement gap. When studying the achievement gap, the Education Trust points out that it is important to also study and disseminate information about schools and districts succeeding with all students. Across the country, there are districts that are successfully closing achievement gaps and educating low income and minority students. The Education Trust (2002) has provided the following examples of schools closing achievement gaps. Central Elementary closed the gap in 4th-grade reading over a four year time period going from 56% proficient to 96% proficient. West Manor Elementary School closed the gap in reading for African American students so much that outperformed the state 99% to 90%. Centennial Place closed the gap in math proficiency for African American (88%) and low income (84%) students as compared to 89% proficient for all students. Lastly, Lapwai Elementary School increased reading achievement from 27% to 84% proficient and in math from 32% to 88% proficient over a span of six years. The previous examples are

quantitative resources used by legislatures to make policy and budget decisions. Success is judged using a quantitative method and funding follows success.

In a study by the Education Trust (2004), a comprehensive analysis of student achievement on state assessments since enactment of NCLB, the Education Trust finds that the achievement gap exists but is being reduced. Most states they examined are moving in the right direction in reading and math at the elementary grades. But in many places, the pace of improvement is too slow to ensure all students will be proficient in reading and math by 2014. Of the 24 states for which at least three years' worth of comparable state assessment data were publicly available, the Education Trust found overall achievement up in 23 states since 2002. Of the 23 states that had three years of reading data, 15 had an increase in reading achievement. In five states, student performance in reading declined. Three saw no change. These gains range from a 15-percentage point gain in overall reading achievement in Florida to improvements of 1-percentage point in states like Maine, Iowa and Minnesota (NCES). NCLB has put a special focus on closing achievement gaps. The pattern clearly is positive. In the overwhelming majority of states examined, gaps are narrowing while performance is up for all groups of students.

Another method to analyze the achievement gap used by the Education Trust was to examine in detail how elementary school students performed on statewide, standards-based assessments in states that publicly release on their Web sites comparable achievement data for at least the three years. Three years of comparable data is required to make it more reliable to determine trends (Mosteller, 1995). The focus first was on elementary achievement because these schools have been at the center of reform efforts

and the effects of change driven by new accountability systems are likely to be felt first in elementary schools. These schools also represent the biggest share of schools receiving federal aid to help educate poor children. This type of analysis focused on fourth-grade level reading and math. When results were not available in all three years for fourth-grade performance, then the scores for three years worth of fifth-grade data in a state is examined. When neither fourth-grade nor fifth-grade data is available, then the Education Trust looked at three years of third grade results in a state. The same rules apply on results broken down by students' race and ethnicity. The Education Trust applied these rules to the examination of student performance by family income. However, only 10 states publicly reported data for poor and non-poor students. As a result, only in those states could there be calculated and analyzed achievement gaps based on family income. Data is an important component of the achievement gap analysis.

Use of data assists educators in determining the effectiveness of instruction, as well. Data, as shown in the use of value added assessment, can be used to predict student success as related to instruction. The idea behind value-added assessment is straightforward. It assumes that changes in test scores from one year to the next accurately reflect student progress in learning. By keeping track of this progress across several years and linking it to the particular schools and teachers who taught the student during that period, the model asserts that the educational effects of these schools and teachers can be evaluated. The larger the aggregated gains attributed to a school or a teacher, the more "value" is said to have been added by them to their students' learning.

The Tennessee Value-Added Assessment System determines the effectiveness of school systems, schools, and teachers based on student academic growth over time. An

integral part of TVAAS is a longitudinally merged database linking students and student outcomes to the schools and systems in which they are enrolled and to the teachers to whom they are assigned as they transition from grade to grade. Research conducted utilizing data from the TVAAS database has shown that ethnicity, socioeconomic level, class size, and classroom heterogeneity are poor predictors of student academic growth. Rather, the effectiveness of the teacher is the major determinant of student academic progress (Sanders, 1994).

TVAAS, referred to as the "Sanders Model", was the basis designated to determine the effectiveness of school systems, schools, and teachers in producing academic growth in Tennessee students, thereby linking student academic outcomes to educational evaluation for the first time. TVAAS required the convergence of a statewide testing program, which tests each student each year in several academic subjects, and an application of a statistical approach that enables a massive multivariate longitudinal analysis even with fractured student records, which are always present in real world student achievement data.

Using annual data from the norm-referenced tests that make up the Tennessee Comprehensive Assessment Program (TCAP), schools and school systems are expected to demonstrate progress at the level of the national norm gain (as determined by a national sample of students who took the same tests) in five academic subject areas: math, science, social studies, reading, and language arts. Beginning in 1993, reports have been issued to educators and the public on the effectiveness of every school and school system in Tennessee (Sanders, 1994).

In 2002, the Pennsylvania Department of Education (PDE) implemented a pilot project for selected districts to access a web-based assessment analysis tool called the Pennsylvania Value Added Assessment System (PVAAS). School districts have been selected to participate in a project focused on the use of the value added assessment system (PVAAS), a web-based statistical analysis system that studies a school's own historical assessment information to demonstrate measures of the school's influence on indicators of student learning. PVASS was mandated for all Pennsylvania schools beginning with the 2005-2006 school year. Pennsylvania Value-Added Assessment System (PVAAS) is a statistical analysis of achievement data that reveals academic **growth over time** for students and groups of students, such as those in a grade level or in a school. PVAAS is a tool that gives feedback to school leaders and teachers on student progress. It allows districts to follow student achievement over time and provides schools with a longitudinal view of student performance. Districts can see where growth is occurring even though overall achievement rates may be below benchmark performance. PVAAS provides valuable information, based on data, for teams of teachers to make informed instructional decisions. All effective decisions are based on data that is reliable and valid.

Reliability and Validity of the PSSA

As part of Pennsylvania's System of School Assessment (PSSA), students in Grades 3 through 8 and 11 take tests in reading and mathematics. Students in Grades 6, 9, and 11 are assessed in writing. The annual PSSA is a standards-based, criterion-referenced assessment used to measure a student's attainment of academic standards while also determining the degree to which school programs enable students to attain

proficiency standards. PSSA results are produced at student and school levels. Student scores, which are provided to their respective schools, can be used diagnostically to identify students in need of additional educational opportunities.

The PSSA tests students' abilities in relation to Pennsylvania's academic standards. The standards identify what students should know and be able to do within each subject area at each designated grade level. PSSA test items are linked to the standards and PSSA scores are used to delineate student performance within the standards. Students receive designations of Below Basic, Basic, Proficient, or Advanced, depending on how they score in each tested subject. These proficiency levels are determined using cut scores on the PSSA measurement scale. Cut scores were determined using the Bookmark (Lewis, Mitzel & Green, 1996) and Borderline Groups (Livingston & Zieky, 1978) standards-setting procedures. Because the PSSA serves as an assessment for individual students and for schools, it is configured using common and matrix items. Common items are administered to all students and are used to create all student-level measures. Matrix items are administered by form such that each student only takes a portion of the matrix items. There are typically 10-12 matrix forms, spiraled within classrooms to ensure that a random and representative sample of students receives each form. The matrix items add to the content coverage of the PSSA and allow for better diagnostic data to be produced at school and district levels.

The quality of an assessment is characterized by its reliability and validity. The usual measure of reliability is an indication of how similar a student's scores on an assessment would be if a student took the test multiple times. Reliability is largely concerned with the consistency of an assessment. Reliability coefficients are provided in

the PSSA technical manuals produced by Data Recognition Corporation (DRC) each year (Mead & Melby, 2002; Mead & Melby, 2003; and Mead, Smith, & Swanlund, 2003). PSSA test-retest reliabilities ranged from 0.93 to 0.94 for math and from 0.92 to 0.94 for reading for the full set of items (common + matrix) in 2002. They were slightly lower for the common items only, 0.92 for math for all grades and ranging from 0.88 to 0.91 for reading (estimates were very similar in 2001 and 2003).

Validity, simply put, does the PSSA measure what it is supposed to measure? One way of investigating validity is to compute convergent validity coefficients. Convergent validity coefficients are measures of the relationship between two separate tests of student ability for the same subject matter; they are correlations between students' performance on the two tests. Prior investigations demonstrate convergent validity evidence for PSSA when correlated with commercially available norm-referenced and criterion-referenced assessments (Koger, Thacker & Dickinson, 2004; Thacker, Dickinson, & Koger, 2004). Same-subject correlations were highest for math, typically ranging from about .70 to about .90. For reading, correlations were also quite high ranging from about 0.60 to about 0.80. Moreover, Koger et al. (2004) found that correlations are very high between PSSA and SAT (r = 0.78 for reading/verbal, and r = 0.87 for Math in 2003). They also found that PSSA is positively correlated with students' course grades and grade point average (GPA), although not as highly as with SAT (r = 0.46 to r = 0.55).

In October of 2006, the Pennsylvania State Board of Education presented information from HumRRO Report No. FR-04-34. HumRRO (Human Resources Research Organization) conducted a series studies for the Pennsylvania State Board of

Education related to the validity and reliability of the Pennsylvania System of School Assessment (PSSA). The results of this study are summarized below.

All PSSA test forms contain approximately the same number of items per academic standard. Multiple choice items tend to discriminate at the lower and middle portions of the test scale, while performance tasks are discriminated across the scale and reached by only high ability students. Content is not distributed evenly by item type. Content items are written such that the standard is implied (HumRRO Report No. FR-04-34).

DRC reports high reliability coefficients of greater than 0.9 for PSSA reading and mathematics tests. Convergent validity coefficients were about the same from year to year. The PSSA has a high internal consistency reliability estimate partly due to the large number of items on each test (HumRRO Report No. FR-04-34).

PSSA scaled scores correlate positively with the SAT, CTBS/Terra Nova, CAT-5 (California Achievement Test, version 5), NWEA (Northwest Evaluation Association) tests and NSRE (New Standards Reference Exam).Sufficient numbers of students were matched for these studies that all correlations were statistically significant ($p < 0.05$) and convergent validity coefficients (correlations from different tests of the same or similar content) were high. Convergent validity coefficients for Terra Nova, NSRE and CAT-5 for math were about 0.8 and about 0.7 for reading. Convergent validity coefficients for the SAT and NWEA for math were about 0.9 and about 0.8 for reading. These correlations show that the PSSA aligns with similar norm referenced tests and predictive ability tests (HumRRO Report No. FR-04-34).

Pennsylvania, as noted above, used both the Bookmark and Borderline Groups methods for establishing cut scores. Borderline Groups is one of the most reliable methods of setting cut scores and Bookmark procedures lead to low standard deviations. Other states have used these same methods of setting cut scores that have resulted in reasonable outcomes (HumRRO Report No. FR-04-34). Therefore, the PSSA is a reliable and valid measure of student achievement related to the Pennsylvania Academic Standards.

Proposed Analysis of PAGE1 PSSA Data

Each of the sixteen PAGE1 participant schools and comparison schools must have ALL students take the PSSA in the spring of each school year as required by the Pennsylvania Department of Education. The Pennsylvania Department of Education determines the testing window annually. Data is reported publicly by PDE by grade in percent advanced, proficient, basic and below basic for reading and mathematics. Using the individual, PSSA, scaled scores of the economically disadvantaged subgroup for all PAGE1 schools and the comparison schools, as provided by the Pennsylvania Department of Education on a secure eMetric site, t-tests and ANOVA will be conducted between all PAGE1 and comparison schools with overall data, mathematics and reading data for economically disadvantaged students in grades 5, 8 and 11.

Scaled individual student scores were used for this comparison. The PSSA scaled score metric has been anchored to a mean school level scaled score for the base year and that point has been arbitrarily labeled 1300 (PDE, 2007). The point on the scale one point above the standard deviation is 1400. The 1300 metric was chosen so that negative or fractional scaled scores are not needed and so that the PSSA scaled scores are not

confused with results from other testing programs. A school with a scaled score of 1300 performed better than did the average school in the base year given.

Data for grade 3 was available for the first time in 2005 and will not be analyzed because baseline data was not available for grade 3 in 2004, since the PAGE1 project was underway for one year by spring of 2005 grade 3 testing. The 2003-2004 school year results (the year prior to the start of PAGE1) will be used as baseline data for the sixteen PAGE1 schools. Comparison schools were purposefully selected from the remaining Pennsylvania schools. The same number of each grade classification was selected as there are numbers of PAGE1 schools. For example, if there are 4 elementary PAGE1 schools, then 4 elementary comparison schools will be selected. The total number of individual student scores analyzed is approximately 20,000.

The comparison schools had similar economic status as the PAGE1 schools as determined by the Federal free and reduced lunch percentages. The free and reduced lunch percentages used were for the 2004-2005 report, the first year for PAGE1. The comparison schools will also have similar grade level structure, such as elementary, middle school or high school and K-4 or 5-8 or K-8 or 9-12, depending on the school.

Lastly, in the selection of the comparison schools, the demographic setting was considered. An attempt was made to compare urban schools to urban schools, rural schools to rural schools and suburban schools to suburban schools. All Pennsylvania schools are labeled as urban, rural or suburban based on locale codes derived from a classification system originally developed by the National Center for Educational Statistics (2007). A locale code is assigned to all schools and districts.

Locale codes are based on the physical location represented by an address that is matched against a geographic database maintained by the Census Bureau. This database is the Topographically Integrated and Geographically Encoded Referencing system, or TIGER. The Census Bureau redesigned the original locale codes because of many changes in the U.S. population and the definition of key geographic concepts (NCES, 2007). The locale codes are based on an address's distance to an urban area (a densely settled area with densely settled surrounding areas). The locale code system classifies territory into four major types: city, suburban, town, and rural. Each type has three subcategories. For city and suburb, these are differences of size – large, midsize, and small. Towns and rural areas are further distinguished by their distance from an urbanized area. They can be characterized as fringe, distant, or remote. Technology has made it possible to know the exact latitude and longitude of about 91 percent of schools.

However, a school district's locale code is not assigned on the basis of the central office location. It is derived from the locale codes of the schools in the district. If 50 percent or more of the public school students attend schools with the same locale code, that locale code is assigned to the district. For example, if 60 percent of students were enrolled in schools with a "rural - distant" locale code, and 40 percent were enrolled in schools with a "town - small" locale code, the district would be assigned a "rural – distant" locale code. If no single locale code accounts for 50 percent of the students, then the major category (city, suburb, town, or rural) with the greatest percent of students determines the locale. The locale code assigned is the smallest or most remote subcategory for that category. Information for the locale code for Pennsylvania schools is located on the Pennsylvania Department of Education web site.

Examples of the data tables analyzed are as follows:

Math, Reading and Composite Overall Analysis

Null hypothesis: No significant overall math achievement differences between schools for economically disadvantaged students and non-economically disadvantaged students. Comparison of schools is at the 0.05 significance level.

Table 1

Means and Standard Deviations for Math Scores by Economically Disadvantaged and PAGE1 Example

Page1	Economically Disadvantaged								
	No			Yes			Total		
	M	SD	N	M	SD	N	M	SD	N
No									
Yes									
Total									

Table 2

ANOVA on Math Scores by Factors of Economically Disadvantaged and PAGE1 Example

Factors	*df*	*F*	Sig.
Page1			
Economically Disadvantaged			
Page1 * Economically Disadvantaged			
Error			

The same types of tables, as the above, will be used for overall reading and composite overall data comparisons.

Math and Reading Grade to Grade and Year to Year Overall Analysis

Null hypothesis: No significant overall math achievement differences between schools for economically disadvantaged students and non-economically disadvantaged students. Comparison of schools is at the 0.05 significance level.

Table 3

Means and Standard Deviations for 5th Graders Math Scores by Economically Disadvantaged, PAGE1 and Years Example

Year	Page1	Economically Disadvantaged								
		No			Yes			Total		
		M	SD	N	M	SD	N	M	SD	N
2004	No									
	Yes									
	Total									
2005	No									
	Yes									
	Total									

Table 4

ANOVA on 5th Graders Math Scores by Economically Disadvantaged, PAGE1 and Years Example

Factors	*df*	*F*	Sig.
Page1			
Economically Disadvantaged			
Year			
Page1 * Economically Disadvantaged			
Page1 *Year			
Economically Disadvantaged* Year			
Error			

The same types of tables, as the above, will be used for each year (2004-2005; 2005-2006; 2006-2007) of grades 5, 8 and 11 for math and reading scores.

Vertically Aligned Analysis

Null hypothesis: No significant overall student achievement differences between grades 5 and 8 and grades 8 and 11 in PAGE1 schools with grade 5 students moving to only one grade 8 school and grade 8 students moving to only one grade 11 school for economically disadvantaged students and non-economically disadvantaged students. Comparison of schools is at the 0.05 significance level.

Table 5

Means and Standard Deviations for Math/Reading Composite Scores for Participants Vertically Aligned by Grades in Years Economically Disadvantaged and PAGE1 Example

Page1	Economically Disadvantaged								
	No			Yes			Total		
	M	SD	N	M	SD	N	M	SD	N
No									
Yes									
Total									

Table 6

ANOVA on Math/Reading Composite Scores for Participants Vertically Aligned by Grades in Years by Factors of Economic Disadvantage and PAGE1 Example

Factors	*df*	*F*	Sig.
Page1			
Economically Disadvantaged			
Page1 * Economically Disadvantaged			
Error			

Statistical significance, of students scaled scores, are analyzed at the 0.05 level from the baseline year, to year one of PAGE1, to year two of PAGE1 and to year three of PAGE1 was analyzed through t-tests and ANOVA to interpret the impact of the PAGE1 project on the increase in student achievement for the sixteen PAGE1 schools as compared to the similar comparison schools in regards to economically disadvantaged students.

Given the availability of the data above, different areas can be analyzed in regards to statistical significance. Huck (2004) states that statistical significance can be determined using the level of significance at 0.05. The null hypothesis for the PAGE1 project is that the project made no significant difference in reducing the achievement gap for the economically disadvantaged students for the sixteen PAGE1 schools as related to the comparison schools. The alternative hypothesis is that the PAGE1 project made a significant difference in reducing the achievement gap for the economically disadvantaged students for the sixteen PAGE1 schools as related to the comparison schools. These three steps are the first three hypothesis testing steps according to Huck (2004). The next step is collecting data. Examples of the data that will be used are shown in the tables above and will be data from only the sixteen PAGE1 schools and comparison schools for economically disadvantaged students in grades 5, 8 and 11 for the test years of 2004, 2005, 2006 and 2007. Progress from the baseline year (2004) to each of the completed PAGE1 participation years will be analyzed for statistical significance based on percent proficient for each data year.

The data will be analyzed for statistical significance at the 0.05 level, using the statistical software package SPSS Graduate Pack 14.0. The 2004 baseline data year is the

testing year before the implementation of the PAGE1 project. The schools involved in the project attended their first meeting after the year was complete in June of 2004. In determining if the project was statistically significant in reducing the achievement gap or not, the risk of a Type I or Type II error is possible (Huck, 2004). A Type I error would be that the null hypothesis is rejected but it should not be rejected. A Type II error would be that the null hypothesis is accepted but it should be rejected.

Charts, as the above, will be completed and analyzed for grades 5, 8 and 11 of the PAGE1 schools as a collective group and the comparison schools as a collective group for economically disadvantaged students for significant difference in student academic math and reading proficiency.

Each of the sixteen PAGE1 participant schools and sixteen comparison schools must have ALL students take the PSSA in the spring of each school year as required by the Pennsylvania Department of Education. The Pennsylvania Department of Education determines the testing window annually. Data is reported publicly by PDE by grade in percent advanced, proficient, basic and below basic for reading and mathematics. Using the individual, PSSA, scaled scores of the economically disadvantaged subgroup for all PAGE1 schools and the comparison schools, as provided by the Pennsylvania Department of Education on a secure eMetric site, ANOVA was conducted between all PAGE1 and comparison schools with overall data, mathematics data and reading data for economically disadvantaged students in grades 5, 8 and 11. Note: The data lacks any student identifiers. The ANOVA value must be significant at the 0.05 level to reject the null hypothesis.

Gilbert (2004) states that the population (PAGE1 schools and comparison schools) validity can be quantified by comparing like statistics from the sample and population by obtaining sampling error. In this case, the PAGE1 schools would be compared to the comparison schools as a whole to obtain any sampling error. Gilbert's longitudinal study analyzed results on the Washington State Assessment of Learning (WASL) for grades 4 and 7 for reading and divided further by subgroup.

In Gilbert's study, individual school district data was used to compare difference in reading scores for grades 4 and 7 for 1999 and 2002. The study was to determine the effectiveness of the Washington State reform effort based on the implementation of state standards. Fouts (2002) also examined student performance over time on the Washington State Assessment; the main measure of academic achievement. Fouts analyzed data by subgroup to determine if an achievement gap existed. Fouts (2002) conducted the first longitudinal study of student performance on the WASL using data from 1998 and 2001.

Gilbert (2004) reaffirms that in a simple relationship study, data can be analyzed by correlating scores on a measured variable representing the phenomena of interest, in this case student achievement, with similar measures related to the phenomena. Technical data for the WASL indicates that the tests share a common metric, scale scores (as the PSSA), and are therefore appropriate for tracking changes in student achievement. It is stated by Gilbert that the Pearson product moment correlation is the most appropriate statistic with the smallest standard error when examining the strength of the relationship between two scores. Thus, it may be appropriate in PSSA analysis to also use the Pearson product moment. However, Huck (2004) and Gilbert (2004) concur that ANOVA is necessary to determine the strength of the score relationships.

Huck (2004) indicates that this type of study would be one focused on group membership. This type of study is nominal. The research (Huck, 2004) data can be nominal in nature. Several tests can be used to analyze nominal data. Differences between scaled scores between years can be tested. This type of research is comparing two independent samples. The sample of grade 5, 8 and 11 proficient students for PAGE1 schools in 2004 is independent of the sample of grade 5, 8 or 11 proficient students in 2005 or 2006 or 2007 and of the comparison schools.

An ANOVA (Analysis of Variance) is closely related to the t-test. The t-test measures the difference between the means of two groups; an ANOVA tests the difference between the means of two or more groups. A **one-way ANOVA**, or single factor ANOVA, tests differences between groups that are only classified on one independent variable. In this study, the independent variable is the PSSA mean, scaled scores. You can also use multiple independent variables. The advantage of using ANOVA rather than multiple comparisons is that it reduces the probability of a type-I error. Making multiple comparisons increases the likelihood of finding something by chance, making a type-I error. An ANOVA controls the overall error by testing all means against each other at once, so your alpha remains at .05.

Given the availability of the data above, different areas can be analyzed in regards to statistical significance. Huck (2004) states that statistical significance can be determined using the level of significance at 0.05. The null hypothesis for the PAGE1 project is that the project made no significant difference in reducing the achievement gap for the economically disadvantaged students for the sixteen PAGE1 schools as related to the comparison schools. The alternative hypothesis is that the PAGE1 project made a

significant difference in reducing the achievement gap for the economically disadvantaged students for the sixteen PAGE1 schools as related to the comparison schools. These three steps are the first three hypothesis testing steps according to Huck (2004). The next step is collecting data. Examples of the data that will be used are shown in the tables above and will be data from only the sixteen PAGE1 schools and comparison schools for economically disadvantaged students in grades 5, 8 and 11 for the test years of 2004, 2005, 2006 and 2007. Progress from the baseline year (2004) to each of the completed PAGE1 participation years will be analyzed for statistical significance based on percent proficient for each data year.

The data will be analyzed for statistical significance at the 0.05 level, using the statistical software package SPSS Graduate Pack 14.0. The 2004 baseline data year was the testing year before the implementation of the PAGE1 project. The schools involved in the project attended their first meeting after the year was complete in June of 2004. In determining if the project was statistically significant in reducing the achievement gap or not, the risk of a Type I or Type II error is possible (Huck, 2004). A Type I error would be that the null hypothesis is rejected but it should not be rejected. A Type II error would be that the null hypothesis is accepted but it should be rejected.

Gilbert states that in a simple relationship study, data can be analyzed by correlating scores on a measured variable representing the phenomena of interest, in this case student achievement, with similar measures related to the phenomena. Technical data for the WASL indicates that the tests share a common metric, scale scores (as the PSSA), and are therefore appropriate for tracking changes in student achievement.

Chapter IV

FINDINGS AND DATA ANALYSIS

Introduction

This chapter covers the findings and data analysis for this study. Data analysis from this study is presented in two main ways. First, a summary of the descriptive statistics for PAGE1 and non-PAGE1 schools are given which match the characteristics used for the purposeful method of selection of the comparison schools. This is to show the direct substantial manner in which the PAGE1 and non-PAGE1 schools are similar. The second section presents the results and analysis for each research question. Information presented for each research question includes demographic data and results of the analysis of variance (ANOVA). The ANOVA was done in order to compare the individual scaled scores of economically disadvantaged students and non-economically disadvantaged students, as well as, PAGE1 and non-PAGE1schools to identify if there were any significant differences in the scaled scores from the baseline year of 2004 and over the three years (2005, 2006, and 2007) of the PAGE1 project.

The purpose of this multi-year, quantitative study was to determine if the Pennsylvania Achievement Gap Effort (PAGE1) was significantly effective or not in increasing student achievement in mathematics and literacy for economically disadvantaged students for the 16 PAGE1 schools as compared to 16 significantly similar selected schools with similar socioeconomic status, school structure, demographic setting and student population size to be studied over a three year time period. The grade levels compared are grades 5, 8 and 11.

Descriptive Statistics for School Selection Rationale

The participant schools were the sixteen PAGE1 schools and sixteen similar schools selected by a purposeful selection. The comparison schools were selected from all Pennsylvania schools and had similar free and reduced lunch percentages, school demographic information, school structure and school populations to the PAGE1 schools. The following descriptive statistics emphasize these aforementioned factors.

The PAGE1 schools were selected by criteria as determined by the Pennsylvania Department of Education with a detailed description in Chapter III. According to the Pennsylvania Department of Education, participating PAGE1 districts had to meet many criteria and agree to participate in three years of activities related to the improvement of student achievement. The PAGE1 schools were to be representative of the entire state, not one corner of it. The overall project was to be a reflection of all Pennsylvania schools and therefore replicable in any area for any school. The sixteen PAGE1 schools are as follows: Murray Elementary School, Park Elementary School, Sheridan Elementary School, Fairhill Elementary School, East Stroudsburg Elementary School, Elkins Park Elementary School, Washington Park Middle School, Bellwood-Antis Middle School, Feaser Middle School, Trexler Middle School, East Allegheny Jr/Sr High School, Strong Vincent High School, York County School of Technology, Shenandoah High School, Strath Haven High School and Scranton High School.

Economic Disadvantage Comparison

Table 7 shows the free and reduced lunch percentages for each of the PAGE1 schools and each of the comparison schools.

Table 7

School Free/Reduced Lunch Percentages for Participant Schools for the Baseline Year of 2004

PAGE1 School	Free/Reduced Lunch	Comparison School	Free/Reduced Lunch
Bellwood-Antis MS	22.53	James Wilson MS	22.84
East Allegheny HS	35.30	Mountain View HS	35.09
East Stroudsburg ES	35.25	Laceyville ES	35.26
Elkins Park ES	8.64	Neil Armstrong ES	8.71
Fairhill School	95.74	Douglas Frederick	95.88
Feaser MS	27.32	Gateway MS	27.51
Murray ES	69.24	East Side ES	69.12
Park ES	59.42	Juniata ES	60.75
Scranton HS	36.37	Pocono Mt. West	36.71
Shenandoah Valley JSHS	53.45	Mapletown JSHS	53.45
Sheridan ES	94.16	Lauers Park ES	93.35
Strath Haven HS	8.14	Red Land HS	8.19
Strong Vincent HS	67.51	Peabody HS	68.78
Trexler MS	70.62	Conwell Russell MS	71.08
Washington Park MS	62.23	Valley MS	61.24
York County CTC	24.02	Greensburg Salem HS	24.05

Table 7 shows that the Fairhill School and Sheridan ES with Douglas Frederick and Lauers Park ES had the highest free/reduced lunch percentages at over 90%. Elkins Park ES and Strath Haven HS with Neil Armstrong ES and red Land HS had the lowest rates of free/reduced lunch with less than 10%. The rest of the schools fell between 22% and 72% for free/reduced lunches.

Economically disadvantaged is defined by the United States Department of Education and the Pennsylvania Department of Education (PDE), as those students qualifying for free and reduced lunches. Family income guidelines are set and used by both the federal and state government to determine eligibility for the program on an annual basis. Eligibility for free and reduced-price lunches is determined by students' household income in relation to the federally established poverty level. This poverty level is set by the Federal Government and varies from year to year. Free lunch qualification is set at 130 percent of the poverty level and reduced price lunch qualification is set at between 130 and 185 percent of the poverty level (USDOE, 2004).

Table 8 further exemplifies that the economics for the students of the PAGE1 schools and non-PAGE1 schools are similar.

Table 8

Average Percentage of Free/Reduced Lunch for Participant Schools

	PAGE1 Schools	Comparison Schools
Average Free/Reduced Lunch	48.12	48.25

Table 8 shows the average free and reduced lunch percentage for the PAGE1 (48.12) schools compared to the comparison schools (48.25). The average for PAGE1

schools and the comparison schools is close to 50% of the total school populations. A similarity exists between PAGE1 schools and the comparison schools. The research questions are structured to compare composite results not individual school comparisons. Research has shown that poverty impacts student achievement more than any other identifiable student characteristic (Education Trust, 2007). Free/Reduced lunch percentages were the first school characteristic compared to identify comparison schools in this study. There are similarities of Free/Reduced lunch percentages between each PAGE1 school and their comparison schools. The percentages are publicly available on the Pennsylvania Department of Education's website at www.pde.state.pa.us.

School Population Comparison

Table 9 (displayed on the following page) shows the school population for each of the PAGE1 schools and each of the comparison schools.

Table 9

School Population for Participant Schools for the Baseline Year of 2004

PAGE1 School	Number of Students	Comparison School	Number of Students
Bellwood-Antis MS	435	James Wilson MS	521
East Allegheny HS	962	Mountain View HS	761
East Stroudsburg ES	122	Laceyville ES	156
Elkins Park ES	671	Neil Armstrong ES	746
Fairhill School	680	Douglas Frederick	655
Feaser MS	648	Gateway MS	738
Murray ES	738	East Side ES	826
Park ES	451	Juniata ES	479
Scranton HS	1842	Pocono Mt. West	2179
Shenandoah Valley JSHS	507	Mapletown JSHS	333
Sheridan ES	651	Lauers Park ES	602
Strath Haven HS	1290	Red Land HS	1246
Strong Vincent HS	791	Peabody HS	647
Trexler MS	1004	Conwell Russell MS	892
Washington Park MS	535	Valley MS	583
York County CTC	1399	Greensburg Salem HS	1156

Table 9 shows that East Stroudsburg ES and Laceyville ES have the smallest school populations at less than 200 students. Scranton HS (1842), Trexler MS and York County CTC with Pocono Mountain West and Greensburg Salem had the largest school

populations at over 1000 students each. The rest of the schools had student populations of between 333 students and 962 students.

Schools selected as comparison schools also had to have a school population or total number of students significantly similar to the PAGE1 schools. After free/reduced lunch percentage, this was the second factor used to compare PAGE1 and non-PAGE1 schools. The 2004 student grade and school totals were used because again 2004 is the baseline year for PSSA data. The size of the school impacts the size of the classrooms. The size of the classrooms impacts the student to teacher ratio. The number of students a teacher faces during a period of instruction is typically referred to as class size and determines the student to teacher ratio. Average class size provides information on students' learning environment. The issue of class size has received a great deal of attention in U.S. education policy, since it is commonly looked upon as a factor influencing the interaction between teachers and students. Smaller classes are generally valued because they may allow students to receive more individual attention from their teachers (NCES, 2007).

Table 10 (see next page) further exemplifies that the school population of the PAGE1 schools and non-PAGE1 schools are similar.

Table 10

Total School Population and Urban and Rural Percentages for Participant Schools

	PAGE1 Schools	Comparison Schools
Total Number of Students	12726	12520
	PAGE1 Schools	Comparison Schools
Urban Population	75	75
Rural Population	25	25

Table 10 shows the total school population for the PAGE1 (12726) schools compared to the comparison schools (12520). The research questions are structured to compare composite results not individual school comparisons. Therefore, the total school size is important as having an impact on class size and on the overall learning environment is related to such factors as teaching style, student behavior, and the opportunity for students to meet with teachers outside of class (NCES, 2007). The clearest result with respect to correlates of achievement is that average achievement scores are higher in schools with smaller class sizes (NCES, 2007). The numerical comparisons in Table 4 would indicate that the schools have a similar class size. Information as to the total number of students per school is available on the Pennsylvania Department of Education web site.

Demographic Setting

Table 10 also shows that the percent of urban and rural schools for PAGE1 as compared to the number of urban and rural schools for the comparison schools are identical.

Table 10 shows 75% of the PAGE1 schools as urban and 75% of the comparison schools are also urban. The rural percentage for PAGE1 schools is 25% and this is the same for the comparison schools (25%). Recent research on comparative student academic performance in rural and urban districts show that students from both highly rural and highly urban areas perform similarly, but less well, in terms of educational achievement than students from moderate areas. Empirical studies of student educational performance should always include measures of both cognitive skills and educational market competition as explanatory variables. The policy implications suggest that policy makers should consider students from highly urban areas to be subjects of concern similar to students from highly rural areas in attempts to affect expected student achievement (Education Trust, 2008).

In the selection of the comparison schools, the demographic setting was considered. An attempt was made to compare urban schools to urban schools, rural schools to rural schools and suburban schools to suburban schools. All Pennsylvania schools are labeled as urban, rural or suburban based on locale codes derived from a classification system originally developed by the National Center for Educational Statistics (NCES, 2007). Locale codes are assigned to all schools and districts.

Locale codes are based on the physical location represented by an address that is matched against a geographic database maintained by the Census Bureau. This database is the Topographically Integrated and Geographically Encoded Referencing system, or TIGER. The Census Bureau redesigned the original locale codes because of many changes in the U.S. population and the definition of key geographic concepts (NCES,

2007). The locale codes are based on an address's distance to an urban area (a densely settled area with densely settled surrounding areas).

Grade Level Structure Comparison

Table 11 shows the grade level classifications of the PAGE1 and comparison schools, as well as, the grade level studied for this dissertation.

Table 11

Grade Level Configurations of Participant Schools

PAGE1 School	Grade Levels	Grade Studied	Comparison School	Grade Levels	Grade Studied
Bellwood-Antis MS	5-8	8	James Wilson MS	5-8	8
East Allegheny HS	9-12	11	Mountain View HS	9-12	11
East Stroudsburg ES	K-6	5	Laceyville ES	K-6	5
Elkins Park ES	5-6	5	Neil Armstrong ES	5-6	5
Fairhill School	K-8	5	Douglas Frederick	K-8	5
Feaser MS	6-8	8	Gateway MS	6-8	8
Murray ES	K-5	5	East Side ES	K-5	5
Park ES	K-6	5	Juniata ES	K-6	5
Scranton HS	9-12	11	Pocono Mt. West	9-12	11
Shenandoah Valley HS	9-12	11	Mapletown HS	9-12	11
Sheridan ES	K-5	5	Lauers Park ES	K-5	5
Strath Haven HS	9-12	11	Red Land HS	9-12	11
Strong Vincent HS	9-12	11	Peabody HS	9-12	11
Trexler MS	5-8	8	Conwell Russell MS	5-8	8
Washington Park MS	5-8	8	Valley MS	5-8	8
York County CTC	9-12	11	Greensburg Salem HS	9-12	11

Across the state of Pennsylvania and the country, schools vary in grade level classification. Some schools are structured K-8, some schools K-2, some schools 3-5,

some schools 6-8, some schools 9-12, some schools 5-8 and there are a variety of compositions depending on student need, community, curricular structure and cognitive development of students to be served. Developmental levels of the students determine curricular needs and instructional components of the teaching process. Therefore, because of the same grade level structures, the teaching process and student development, in regards to content and instruction for the PAGE1 and non-PAGE1 schools would indicate an equal learning opportunity for students within the building with respect to information taught and student ability to learn.

As noted in Table 11 above, non-PAGE1 schools also have the same structures as the PAGE1 schools. Because of curricular and student levels of the varying grade levels, it is intended by this study that grade 5 will represent elementary school, grade 8 will represent middle school and grade 11 will represent high school.

Summary

The participant schools are the sixteen PAGE1 schools and sixteen similar schools selected by a purposeful selection. The comparison schools were selected from all Pennsylvania schools and had similar free and reduced lunch percentages, school demographic information, school structure and school populations to the PAGE1 schools.

The PAGE1 schools were selected by criteria as determined by the Pennsylvania Department of Education with a detailed description in Chapter III. According to the Pennsylvania Department of Education, participating PAGE1 districts had to meet many criteria and agree to participate in three years of activities related to the improvement of student achievement. The PAGE1 schools were to be representative of the entire state,

not one corner of it. The overall project was to be a reflection of all Pennsylvania schools and therefore replicable in any area for any school.

The PAGE1 and non-PAGE1 schools, according to the data above are substantially similar. The characteristics used to purposefully select the comparison schools were selected to show the direct substantial manner in which the PAGE1 and non-PAGE1 schools are similar.

Analysis of Research Questions

Question 1 Analysis

Is there any significant difference in the overall achievement for economically disadvantaged students for the PAGE1 schools as compared to non-PAGE1 schools of similar student population size, school grade level structure, demographic setting and free and reduced lunch percentage?

Null hypothesis: No significant overall achievement differences between schools for economically disadvantaged students and non-economically disadvantaged students. Comparison of schools is at the 0.05 significance level.

To analyze question 1, an analysis of variance (ANOVA) was conducted to determine if mean differences exist on math/reading composite scores (dependant variable) by economic disadvantage and PAGE1 participation (independent variables).

Means and standard deviations for math/reading composite by PAGE1 and economic disadvantage are presented in Table 12 as follows.

Table 12

Means and Standard Deviations for Math/Reading Composite Scores by Economically Disadvantaged and PAGE1

PAGE1	Economically Disadvantaged								
	No			Yes			Total		
	M	SD	N	M	SD	N	M	SD	N
No	1402.50	236.83	6349	1266.50	210.58	4979	1342.72	235.54	11328
Yes	1406.12	231.89	7539	1257.30	210.58	4716	1348.85	235.34	12255
Total	1404.47	234.16	13888	1262.03	210.62	9695	1345.91	235.45	23583

Table 12 indicates the following:

1) Participants in PAGE1 and not at an economical disadvantage had a larger mean (*M* = 1406.12, *SD* = 231.89) on math/reading composite scores compared to those who were economically disadvantaged participants in PAGE1 (*M* = 1257.30, *SD* = 210.58).

2) Participants not in PAGE1 and not at an economic disadvantage had a larger mean (*M* = 1402.50, *SD* = 236.83) on math/reading composite score as compared to economically disadvantaged non-participants (*M* = 1266.50, *SD* = 210.58).

3) Participants at an economic disadvantage and not in PAGE1 had a larger mean (*M* = 1266.50, *SD* = 210.58) on math/reading composite scores compared to those who were economic disadvantaged participants in PAGE1 (*M* = 1257.30, *SD* = 210.58).

4) Participants in PAGE1 and not at an economic disadvantage had a larger mean (*M* = 1406.12, *SD* = 231.89) on math/reading composite scores compared to participants not in PAGE1 and not at an economic disadvantage had a larger mean (*M* = 1402.50, *SD* = 236.83)

The results of the ANOVA revealed that a significant difference exists between economic disadvantage and PAGE1. Independent t-tests revealed the following significant findings: 1) For participants in PAGE1, those who were not at an economic disadvantage, t (12253) = 35.80, p <.001 had a larger mean (M = 1406.12, SD = 210.62) on math/reading composite scores compared to those who were economically disadvantaged participants (M = 1257.30, SD = 210.58). 2) For participants that were not in PAGE1, those who were not at an economic disadvantage, t (11326) = 31.84, p <.001 had a larger mean (M = 1402.50, SD = 236.83) on math/reading composite score compared to economically disadvantaged participants (M = 1266.50, SD = 210.58). 3) For those participants at an economic disadvantage and not in PAGE1, t (9693) = 2.15, p =.032 had a larger mean (M = 1266.50, SD = 210.58) on math/reading composite scores compared to participants in PAGE1 (M = 1257.30, SD = 210.58).

The ANOVA reveals no significant difference exists for math/reading composite scores by PAGE1 participation. However, the ANOVA revealed that significance exists between economic disadvantage and PAGE1 participation (Table 13).

Table 13

ANOVA on Math/Reading Composite Scores by Factors of Economically Disadvantaged and PAGE1

Factors	*df*	*F*	Sig.
PAGE1	1	0.87	.350
Economically Disadvantaged	1	2284.02	<.001
PAGE1 * Economically Disadvantaged	1	4.63	.032
Error	23579	(50520.17)	

Note. Value in parentheses represents the mean square error.

Since F (1, 23579) = 2284.02, p < .001, the results reveal that a significant difference exists between math/reading composite scores and those who are economically disadvantaged versus those who are not economically disadvantaged. By looking at their means, those who were not economically disadvantaged scored better on the math/reading composite scores (M = 1404.47, SD = 234.16) than those who were economically disadvantaged (M = 1262.03, SD = 210.62).

The mean for economically disadvantaged students is below the state PSSA composite math/reading mean (M = 1366.67, SD = 249.54). However, the economically disadvantaged students studied would be within the composite math/reading Proficient range (1257 to 1508) for grades 5, 8 and 11. Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB. Basic scores would not qualify to meet annual yearly progress under NCLB. Economically disadvantaged student scores would meet NCLB requirements.

Also, the results also reveal that significance exists on math/reading composite score by the interaction between PAGE1 participation and economic disadvantage status since F (1, 23579) = 2284.02, p = .032, suggesting that participants that were not at an economic disadvantage and did not participate in PAGE1 (*M* = 1402.50, *SD* = 236.83) had a larger mean on math/reading composite score compared to participants that were at an economic disadvantage and did participate in PAGE1 (*M* = 1257.30, *SD* = 210.58).

The mean for non-economically disadvantaged and non-PAGE1 students is larger than the state PSSA composite math/reading mean (M = 1366.67, SD = 249.54), while the mean for PAGE1 and economically disadvantaged students is below state composite mean. Additionally, the mean for PAGE1 and economically disadvantaged students for

the years compared would be within the composite math/reading Proficient range (1257 to 1508) for grades 5, 8 and 11. Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB and those in the Basic range would not have made annual yearly progress. Thus, the economically disadvantaged PAGE1 scores would meet NCLB requirements.

Question 2 Analysis

Is there any significant difference in overall mathematics achievement for economically disadvantaged for the PAGE1 schools compared to non-PAGE1 schools of similar student population size, school grade level structure, demographic setting and free and reduced lunch percentage?

Null hypothesis: No significant overall math achievement differences between schools for economically disadvantaged students and non-economically disadvantaged students. Comparison of schools is at the 0.05 significance level.

To analyze question 2, an analysis of variance (ANOVA) was conducted to determine if mean differences exist on mathematics composite scores (dependant variable) by economic disadvantage and PAGE1 participation (independent variables).

Means and standard deviations for mathematics composite by PAGE1 and economic disadvantage are presented in Table 14 as follows:

Table 14

Means and Standard Deviations for Math Scores by Economically Disadvantaged and PAGE1

PAGE1	Economically Disadvantaged								
	No			Yes			Total		
	M	SD	N	M	SD	N	M	SD	N
No	1393.05	249.14	6360	1273.43	211.50	5013	1340.32	240.73	11373
Yes	1404.14	248.20	7558	1270.00	212.53	4771	1352.23	243.94	12329
Total	1399.07	248.68	13918	1271.75	212.00	9784	1346.52	242.47	23702

Table 14 indicates the following:

1) Participants in PAGE1 and not at an economical disadvantage had a larger mean (*M* = 1404.14, *SD* = 248.20) on mathematics composite scores compared to those who were economically disadvantaged participants in PAGE1 (*M* = 1270.00, *SD* = 210.58).

2) Participants not in PAGE1 and not at an economic disadvantage had a larger mean (*M* = 1393.05, *SD* = 249.14) on mathematics composite score as compared to economically disadvantaged non-participants (*M* = 1273.43, *SD* = 211.50).

3) Participants at an economic disadvantage and not in PAGE1 had a larger mean (*M* = 1273.43, *SD* = 211.50) on mathematics composite scores compared to those who were economic disadvantaged participants in PAGE1 (*M* = 1270.00, *SD* = 210.58).

4) Participants in PAGE1 and not at an economic disadvantage had a larger mean (*M* = 1404.14, *SD* = 248.20) on mathematics composite scores compared to participants not in PAGE1 and not at an economic disadvantage had a larger mean (*M* = 1393.05, *SD* = 249.14).

The results of the ANOVA revealed that a significant difference exists between economic disadvantage and PAGE1 participation. Independent t-tests revealed the following significant findings: 1) For participants in PAGE1, those not at an economic disadvantage, t (12327) = 30.87, p <.001 had a larger mean (M = 1404.14, SD = 248.20) on math scores compared to economically disadvantaged participants (M = 1270.00, SD = 212.53). 2) For participants that were not in PAGE1, those not at an economic disadvantage, t (11371) = 27.15, p <.001 had a larger mean (M = 1270.00, SD = 212.53) on math scores compared to economically disadvantaged participants (M = 1273.43, SD = 211.50). 3) For participants that participated in PAGE1, those not at an economic disadvantage, t (9782) = 2.62, p = .009 had a larger mean (M = 1404.14, SD = 248.20) on math scores compared to participants that were not in PAGE1 (M = 1393.05, SD = 249.14).

The ANOVA reveals no significant difference exists for mathematics composite scores by PAGE1 participation. However, the ANOVA revealed that significance exists between economic disadvantage and PAGE1 participation (Table 15).

Table 15

ANOVA on Math Scores by Factors of Economically Disadvantaged and PAGE1

Factors	*df*	*F*	Sig.
Page	1	1.53	.216
Economically Disadvantaged	1	1680.44	<.001
Page * Economically Disadvantaged	1	5.50	.019
Error	23698	(54852.54)	

Note. Value in parentheses represents the mean square error.

Since F (1, 23698) = 1680.44, p < .001, the results reveal that a significant difference exists between mathematics composite scores and those who are economically disadvantages versus those who are not economically disadvantaged since p <.001. By looking at their means, those who were not economically disadvantaged scored better on the mathematics composite scores (M = 1399.07, SD = 248.68) than those who were economically disadvantaged (M = 1271.75, SD = 212.00).

The mean for economically disadvantaged students is below the state PSSA composite math mean (M = 1371.67, SD = 239.43). However, the economically disadvantaged students studied would be within the composite math Basic range (1158 to 1311) for grades 5, 8 and 11. Basic scores would not qualify to meet annual yearly progress under NCLB. Economically disadvantaged student scores for mathematics would not meet NCLB requirements.

The results also reveal that a significant difference exists on mathematics composite score by the interaction between PAGE1 participation and economic disadvantage status since F (1, 23698) = 5.50, p = .019, suggesting that participants that were not at an economic disadvantage and did not participate in PAGE1 (*M* = 1393.05, *SD* = 249.14) had a larger mean on mathematics composite score compared to participants that were at an economic disadvantage and did participate in PAGE1 (*M* = 1270.00, *SD* = 212.53).

The mean for non-economically disadvantaged and non-PAGE1 students is higher than the state PSSA composite math mean (M = 1371.67, SD = 239.43), while the mean for PAGE1 and economically disadvantaged students is below state composite mean. Additionally, the mean for PAGE1 and economically disadvantaged students for the

years compared would not be within the composite math Proficient range (1284 to 1508) for grades 5, 8 and 11. Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB and those in the Basic range would not have made annual yearly progress. Thus, the economically disadvantaged PAGE1 scores would not meet NCLB requirements.

Question 3 Analysis

Is there any significant difference in the overall reading achievement for economically disadvantaged students for the PAGE1 schools as compared to non-PAGE1 schools of similar student population size, school grade level structure, demographic setting and free and reduced lunch percentage?

Null hypothesis: No significant overall reading achievement differences between schools for economically disadvantaged students and non-economically disadvantaged students. Comparison of schools is at the 0.05 significance level.

To analyze question 3, an analysis of variance (ANOVA) was conducted to determine if mean differences exist on reading composite scores (dependant variable) by economic disadvantage and PAGE1 participation (independent variables).

Means and standard deviations for reading composite by PAGE1 and economic disadvantage are presented in Table 16 as follows:

Table 16

Means and Standard Deviations for Reading Scores by Economically Disadvantaged and PAGE1

PAGE1	Economically Disadvantaged								
	No			Yes			Total		
	M	SD	N	M	SD	N	M	SD	N
No	1411.12	262.10	6359	1259.46	243.42	4995	1344.40	264.96	11345
Yes	1406.77	253.70	7561	1244.38	243.24	4744	1344.16	261.92	12305
Total	1408.76	257.57	13920	1252.11	243.44	9739	1344.28	263.38	23659

Table 16 indicates the following:

1) Participants in PAGE1 and not at an economical disadvantage had a larger mean (*M* = 1406.77, *SD* = 253.70) on reading composite scores compared to those who were economically disadvantaged participants in PAGE1 (*M* = 1244.38, *SD* = 243.24).

2) Participants not in PAGE1 and not at an economic disadvantage had a larger mean (*M* = 1411.12, *SD* = 262.10) on reading composite score as compared to economically disadvantaged non-participants (*M* = 1259.46, *SD* = 243.42).

3) Participants at an economic disadvantage and not in PAGE1 had a larger mean (*M* = 1259.46, *SD* = 43.42) on reading composite scores compared to those who were economic disadvantaged participants in PAGE1 (*M* = 1244.38, *SD* = 243.24).

4) Participants in PAGE1 and not at an economic disadvantage had a larger mean (*M* = 1406.77, *SD* = 253.70) on reading composite scores compared to participants not in PAGE1 and at an economic disadvantage (*M* = 1259.46, *SD* = 243.42).

The results of the ANOVA revealed that a significant difference exists between economic disadvantage and PAGE1 participation. Independent t-tests revealed the

following significant findings: 1) For participants that participated in PAGE1, those not at an economic disadvantage, t (12327) = 30.87, p <.001 had a larger mean (M = 1406.77, SD = 253.70) on reading scores compared to economically disadvantaged participants (M = 1244.38, SD = 243.24). 2) For participants that were not in PAGE1, those not at an economic disadvantage, t (113714) = 27.15, p <.001 had a larger mean (M = 1411.12, SD = 262.10) on reading scores compared to economically disadvantaged participants (M = 1259.46, SD = 243.42). 3) For participants that participated in PAGE1, those not at an economic disadvantage, t (13916) = 2.62, p = .004 had a larger mean (M = 1404.14, SD = 248.20) on reading scores compared to participants not in PAGE1 but at an economic disadvantage (M = 1259.46, SD = 243.42).

The ANOVA reveals no significant difference exists for reading composite scores by PAGE1 participation. However, the ANOVA revealed that significance exists between economic disadvantage and PAGE1 participation (Table 17).

Table 17

ANOVA on Reading Scores by Factors of Economically Disadvantaged and PAGE1

Factors	*df*	*F*	Sig.
PAGE1	1	8.50	.004
Economically Disadvantaged	1	2220.48	<.001
PAGE1 * Economically Disadvantaged	1	2.59	.107
Error	23655	(63406.90)	

Note. Value in parentheses represents the mean square error.

Since F (1, 23655) = 2220.48, p < .001, the results reveal that a significant difference exists between reading composite scores and those who are economically disadvantaged versus those who are not economically disadvantaged since p < 0.001. By

looking at their means, those who were not economically disadvantaged scored better on the reading composite scores (M = 1408.76, SD = 257.57) than those who were economically disadvantaged (M = 1252.11, SD = 243.44).

The mean for economically disadvantaged students is below the state PSSA composite reading mean (M = 1361.67, SD = 259.55). Additionally, the economically disadvantaged students studied would be within the composite reading Basic range (1112 to 1279) for grades 5, 8 and 11. Basic scores would not qualify to meet annual yearly progress under NCLB. Economically disadvantaged student scores for reading would not meet NCLB requirements.

The results also reveal that a significant difference exists on reading composite score by the interaction with PAGE1 participation status since F (1, 23655) = 8.50, p = .004, suggesting that participants that did not participate in PAGE1 (*M* = 1344.40, *SD* = 264.96) had a slightly larger mean on reading composite score compared to participants that did participate in PAGE1 (*M* = 1344.16, *SD* = 261.92).

The mean for non-PAGE1 students is below than the state PSSA composite reading mean (M = 1361.67, SD = 259.55), while the mean for PAGE1 students is also below state composite mean. Additionally, the mean for PAGE1 students for the years compared would be within the composite reading Proficient range (1257 to 1496) for grades 5, 8 and 11. Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB and those in the Basic range would not have made annual yearly progress. Thus, the PAGE1 scores would meet NCLB requirements.

Question 4 Analysis

Is there any a significant difference in overall mathematics achievement from year to year (grades 5, 8, 11) for economically disadvantaged students in the PAGE1 schools as compared to non-PAGE1 schools of similar student population size, grade level school structure, demographic setting and free and reduced lunch percentage?

Null hypothesis: No significant overall math achievement differences between schools for economically disadvantaged students and non-economically disadvantaged students. Comparison of schools is at the 0.05 a significant difference level.

To analyze question 4, a analysis of variance (ANOVA) was conducted for each grade level and between each of the years of the study to determine if mean differences exist on mathematics composite scores (dependant variable) by economic disadvantage and PAGE1 participation (independent variables).

The analysis is presented by grade level and year for mathematics composite scores as follows:

Grade 5 2004-2005

Table 18

Means and Standard Deviations for 5th Graders Math Scores by Economically Disadvantaged, PAGE1 and Years (2004 vs. 2005)

Year	PAGE1	Economically Disadvantaged								
		No			Yes			Total		
		M	SD	N	M	SD	N	M	SD	N
	No	1404.83	229.19	217	1319.09	230.36	580	1342.43	233.05	797
2004	Yes	1441.93	226.10	881	1283.19	204.64	446	1388.58	231.53	1327
	Total	1434.60	227.09	1098	1303.48	220.17	1026	1371.26	233.12	2124
	No	1484.10	180.25	96	1310.35	223.92	351	1347.67	226.65	447
2005	Yes	1463.16	202.10	723	1377.06	242.50	302	1437.80	218.24	1025
	Total	1465.62	199.68	819	1341.20	234.89	653	1410.43	224.61	1472

Table 18 indicates the following:

1) Participants in PAGE1 and not at an economic disadvantage in 2004 had a lower mean (*M* = 1441.93, *SD* = 226.10) on mathematics composite scores compared to those who were not economically disadvantaged participants in PAGE1 in 2005 (*M* = 1463.16, *SD* = 202.10).

2) Participants not in PAGE1 and not at an economic disadvantage in 2004 had a lower mean (*M* = 1404.83, *SD* = 229.19) on mathematics composite score as compared to non-economically disadvantaged non-participants in 2005 (*M* = 1484.10, *SD* = 180.25).

3) Participants at an economic disadvantage and not in PAGE1 in 2004 had a larger mean (*M* = 1319.09, *SD* = 230.36) on mathematics composite scores compared to those who were at an economic disadvantage not participants in PAGE1 in 2005 (*M* = 1310.35.30, *SD* = 223.92).

4) Participants in PAGE1 and at an economic disadvantage in 2004 had a lower mean (*M* = 1283.19, *SD* = 204.64) on mathematics composite scores compared to participants in PAGE1 and at an economic disadvantage in 2005 (*M* = 1377.06, *SD* = 242.50)

The ANOVA reveals no significant difference exists for mathematics composite scores by PAGE1 participation or economic disadvantaged status and year. However, the ANOVA revealed that a significant difference exists between economic disadvantage and the year (Table 19).

Table 19

ANOVA on 5th Graders Math Scores by Economically Disadvantaged, PAGE1 and Years (2004 vs. 2005)

Factors	*df*	*F*	Sig.
PAGE1	1	1.65	.199
Economically Disadvantaged	1	190.08	<.001
Year	1	25.75	<.001
PAGE1 * Economically Disadvantaged	1	0.16	.689
PAGE1 *Year	1	1.48	.223
Economically Disadvantaged* Year	1	0.18	.674
Error	3588	(48361.23)	

Note. Value in parentheses represents the mean square error.

Since F (1, 3588) = 190.08, p <.001, the results reveal that a significant difference exists between mathematics composite scores and those who are economically disadvantaged versus those who are not economically disadvantaged between years. By looking at their means, those who were economically disadvantaged in 2005 scored better on the mathematics composite scores (M = 1341.20, SD = 234.89) than those who were economically disadvantaged in 2004 (M = 1303.48, SD = 220.17). Although these means

show an increase in mean scores for this time period for economically disadvantaged students, these means are both below the state PSSA mathematics grade 5 mean for 2004 (M= 1380, SD = 239.20). Additionally, these means are also below the 2005 state PSSA mathematics mean (M = 1365.30, SD = 220.1). However, the economically disadvantaged students studied would be within the Proficient range (1312 to 1482). Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB.

A significant difference exists on mathematics composite score by the interaction between the years of participation F (1, 3588) = 25.75, p <.001, suggesting that participants in 2005 (M = 1410.43, *SD* = 224.61) had a larger mean on mathematics composite score compared to participants in 2004 (*M* = 1371.26, *SD* = 233.12). An increase is shown between 2004 and 2005. The 2005 mean is larger than the state PSSA mathematics grade 5 mean (M = 1365.30, SD = 220.1), while the 2004 mean is at about the same as the state mean. This indicates an increase in all student scores studies from 2004 to 2005. Therefore, it would be expected that economically disadvantaged student scores would have increased as stated above. Additionally, these means are also above the 2004 state PSSA mathematics mean (M = 1303.48, SD = 220.17). For the years compared, student scores studied would also be within the Proficient range (1312 to 1482). Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB.

Interestingly, PAGE1 participation had no effect on student scores, although student scores regardless of status or PAGE1 participation increased between 2004 and 2005.

Grade 5 2005-2006

Table 20

Means and Standard Deviations for 5th Graders Math Scores by Economically Disadvantaged, PAGE1 and Years (2005 vs. 2006)

Year	PAGE1	Economically Disadvantaged								
		No			Yes			Total		
		M	SD	N	M	SD	N	M	SD	N
2005	No	1484.10	180.25	96	1310.35	223.92	351	1347.67	226.65	447
	Yes	1463.16	202.10	723	1377.06	242.50	302	1437.80	218.24	1025
	Total	1465.62	199.68	819	1341.20	234.89	653	1410.43	224.61	1472
2006	No	1470.25	184.10	91	1275.94	192.00	339	1317.07	206.08	430
	Yes	1446.84	221.28	691	1367.89	228.80	305	1422.66	226.44	996
	Total	1449.56	217.30	782	1319.49	215.03	644	1390.82	225.69	1426

Table 20 indicates the following:

1) Participants in PAGE1 and not at an economic disadvantage in 2005 had a larger mean (*M* = 1463.16, *SD* = 202.10) on mathematics composite scores compared to those who were not economically disadvantaged participants in PAGE1 in 2006 (*M* = 1446.84, *SD* = 221.28).

2) Participants not in PAGE1 and not at an economic disadvantage in 2005 had a larger mean (*M* = 1484.10, *SD* = 180.25) on mathematics composite score as compared to non-economically disadvantaged non-participants in 2006 (*M* = 1470.25, *SD* = 221.28).

3) Participants at an economic disadvantage and not in PAGE1 in 2005 had a larger mean (*M* = 1310.35, *SD* = 223.92) on mathematics composite scores compared to those who were at an economic disadvantage not participants in PAGE1 in 2006 (*M* = 1275.94, *SD* = 192.00).

4) Participants in PAGE1 and at an economic disadvantage in 2005 had a larger mean (M = 1377.06, SD = 242.50) on mathematics composite scores compared to participants in PAGE1 and at an economic disadvantage in 2006 (M = 1367.89, SD = 228.80)

The ANOVA reveals no significant difference exists for mathematics composite scores by year of participation. However, the ANOVA revealed that a significant difference exists between economic disadvantage and PAGE1 participation (Table 21).

Table 21

ANOVA on 5th Graders Math Scores by Economically Disadvantaged, PAGE1 and Years (2005 vs. 2006)

Factors	*df*	*F*	Sig.
PAGE1	1	7.74	.005
Economically Disadvantaged	1	168.57	<.001
Year	1	3.22	.073
PAGE1 * Economically Disadvantaged	1	24.44	<.001
PAGE1 *Year	1	0.31	.579
Economically Disadvantaged* Year	1	0.11	.744
Error	2890	(46033.13)	

Note. Value in parentheses represents the mean square error.

Since F (1, 2890) = 168.57, p <.001, the results reveal a significant difference exists between mathematics composite scores and those who are economically disadvantaged versus those who are not economically disadvantaged. By looking at their means, those who were economically disadvantaged in 2005 scored better on the mathematics composite scores (M = 1341.20, SD = 234.89) than those who were economically disadvantaged in 2006 (M = 1319.49, SD = 215.03). These means show a decrease in mean scores for this time period for economically disadvantaged students, the

means for economically disadvantaged students for both years are below the state PSSA mathematics grade 5 mean for 2005 (M= 1420, SD = 223.80). Additionally, these means are also below the 2006 state PSSA mathematics mean (M = 1420.00, SD = 238.10). However, the economically disadvantaged students studied would be within the Proficient range (1312 to 1482). Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB.

A significant difference exists on mathematics composite score by the interaction between PAGE1 participation and economic disadvantage status F (1, 2890) = 24.44, p <.001, suggesting that participants that were not at an economic disadvantage and did not participate in PAGE1 in 2005 (*M* = 1484.10, *SD* = 180.25) had a larger mean on mathematics composite score compared to participants that were at an economic disadvantage and did participate in PAGE1 in 2006 (*M* = 1367.89, *SD* = 228.80). Student scores declined between 2005 and 2006, regardless of economic status or PAGE1 participation. The 2005 mean for non-economically disadvantaged and non-PAGE1 students is larger than the state PSSA mathematics grade 5 mean (M= 1420, SD = 223.80), while the mean for PAGE1 and economically disadvantaged students is below the state mean in 2005. Additionally, the means for PAGE1 and economically disadvantaged students are also below the 2006 state PSSA mathematics mean (M = 1420.00, SD = 238.10). For the years compared, student scores studied would also be within the Proficient range (1312 to 1482). Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB.

The combination of PAGE1 participation and economic disadvantage did not improve student scores.

A significant difference also exists on mathematics composite score by PAGE1 participation, since F (1, 2890) = 7.74, p = .005, suggesting that participants that did not participate in PAGE1 in 2005 (*M* = 1347.67, *SD* = 226.65) had a lower mean on mathematics composite scores compared to participants that did participate in PAGE1 in 2006 (*M* = 1422.66, *SD* = 226.44). The 2005 mean for non-PAGE1 students is lower than the state PSSA mathematics grade 5 mean (M= 1420, SD = 223.80), while the mean for PAGE1 students in 2006 is above the state mean in 2005. Additionally, the mean for PAGE1 students is also above the 2006 state PSSA mathematics mean (M = 1420.00, SD = 238.10). For the years compared, student scores studied would also be within the Proficient range (1312 to 1482). Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB.

The results when analyzing PAGE1 participation alone, regardless of economic status, also did not improve student scores between 2005 and 2006.

Grade 5 2006-2007

Table 22

Means and Standard Deviations for 5th Graders Math Scores by Economically Disadvantaged, PAGE1 and Years (2006 vs. 2007)

Year	PAGE1	Economically Disadvantaged								
		No			Yes			Total		
		M	SD	N	M	SD	N	M	SD	N
	No	1470.25	184.10	91	1275.94	192.00	339	1317.07	206.08	430
2006	Yes	1446.84	221.28	691	1367.89	228.80	305	1422.66	226.44	996
	Total	1449.56	217.30	782	1319.49	215.03	644	1390.82	225.69	1426
	No	1430.37	197.20	251	1242.56	182.85	472	1307.76	208.04	723
2007	Yes	1430.57	198.01	336	1254.68	191.11	522	1323.56	211.92	858
	Total	1430.49	197.50	587	1248.92	187.24	994	1316.33	210.24	1581

Table 22 indicates the following:

1) Participants in PAGE1 and not at an economic disadvantage in 2006 had a larger mean (*M* = 1446.84, *SD* = 221.28) on mathematics composite scores compared to those who were not economically disadvantaged participants in PAGE1 in 2007 (*M* = 1430.57, *SD* = 198.01).

2) Participants not in PAGE1 and not at an economic disadvantage in 2006 had a larger mean (*M* = 1470.25, *SD* = 184.10) on mathematics composite score as compared to non-economically disadvantaged non-participants in 2007 (*M* = 1430.37, *SD* = 197.20).

3) Participants at an economic disadvantage and not in PAGE1 in 2006 had a larger mean (*M* = 1275.94, *SD* = 192.00) on mathematics composite scores compared to those who were at an economic disadvantage not participants in PAGE1 in 2007 (*M* = 1242.56, *SD* = 182.85).

4) Participants in PAGE1 and at an economic disadvantage in 2006 had a larger mean (*M* = 1367.89, *SD* = 228.80) on mathematics composite scores compared to participants in PAGE1 and at an economic disadvantage in 2007 (*M* = 1254.68, *SD* = 191.11)

The ANOVA reveals no significant difference exists for mathematics composite scores by PAGE1 participation and year. However, the ANOVA revealed that a significant difference exists between economic disadvantage, year and PAGE1 participation (Table 23) as follows:

Table 23

ANOVA on 5th Graders Math Scores by Economically Disadvantaged, PAGE1 and Years (2006 vs. 2007)

Factors	*df*	*F*	Sig.
PAGE1	1	5.38	.020
Economically Disadvantaged	1	333.97	<.001
Year	1	33.83	<.001
PAGE1 * Economically Disadvantaged	1	13.34	<.001
PAGE1 *Year	1	2.60	.107
Economically Disadvantaged* Year	1	6.73	.010
Error	2999	(40960.96)	

Note. Value in parentheses represents the mean square error.

Since F (1, 2999) = 24.44, p <.001, the results reveal the following a significant difference exists between mathematics composite scores and those who are economically disadvantaged versus those who are not economically disadvantaged. By looking at their means, those who were not economically disadvantaged in 2006 scored better on the mathematics composite scores (M = 1449.56, SD = 217.30) than those who were economically disadvantaged in 2007 (M = 1248.92, SD = 187.24). These means show a

decrease in mean scores for this time period for economically disadvantaged students, the means for economically disadvantaged students for both years are below the state PSSA mathematics grade 5 mean for 2006 (M = 1420.00, SD = 238.10). Additionally, these means are also below the 2007 state PSSA mathematics mean (M = 1430.00, SD = 226.70). However, the economically disadvantaged students studied would be within the Proficient range (1312 to 1482) for 2006 but not for 2007. For 2007, economically disadvantaged students would be in the Basic range (1158 to 1311). Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB. Basic scores would not qualify to meet annual yearly progress under NCLB.

A significant difference exists on mathematics composite score by the interaction between PAGE1 participation and economic disadvantage status since $F(1, 2999) = 13.34$, $p < .001$, suggesting that participants that were not at an economic disadvantage in 2006 and did not participate in PAGE1 ($M = 1470.25$, $SD = 184.10$) had a larger mean on mathematics composite score compared to participants that were at an economic disadvantage and did participate in PAGE1 in 2007 (M = 1254.68, SD = 191.11). The 2006 mean for non-economically disadvantaged and non-PAGE1 students is larger than the state PSSA mathematics grade 5 mean (M = 1420.00, SD = 238.10), while the mean for PAGE1 and economically disadvantaged students for 2006 is below the state mean in 2006. Additionally, the mean for PAGE1 and economically disadvantaged students for 2007 is below the 2007 state PSSA mathematics mean (M = 1430.00, SD = 226.70). For the years compared, student scores studied for PAGE1 and economically disadvantaged would not be within the Proficient range (1312 to 1482) but in the Basic range (1158 to 1311). Schools scoring in the Proficient range would have made annual yearly progress

as required under NCLB and those in the Basic range would not have made annual yearly progress. Thus, the economically disadvantaged PAGE1 scores would not meet NCLB requirements.

With F (1, 2999) = 5.38, p = .020, a significant difference exists on mathematics composite score by PAGE1 participation, suggesting that participants that did not participate in PAGE1 in 2006 (*M* = 1317.07, *SD* = 206.08) had a lower mean on mathematics composite scores compared to participants that did participate in PAGE1 in 2007 (*M* = 1323.56, *SD* = 211.92). The 2006 mean for non-PAGE1 students is below the state PSSA mathematics grade 5 mean (M = 1420.00, SD = 238.10), while the mean for PAGE1students for 2006 is above the state mean in 2006. Additionally, the mean for PAGE1 students for 2007 is below the 2007 state PSSA mathematics mean (M = 1430.00, SD = 226.70). For the years compared, student scores studied for PAGE1 in 2007 would be within the Proficient range (1312 to 1482). Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB.

Since F (1, 2999) = 33.83, p<.001, A significant difference exists on mathematics composite score by the interaction between years suggesting that participants that in 2006 (*M* = 1390.82, *SD* = 225.69) had a larger mean on mathematics composite score compared to participants in 2007 (*M* = 1316.33, *SD* = 210.24). These scores are below the 2006 state PSSA mathematics grade 5 mean (M = 1420.00, SD = 238.10) and the 2007 state PSSA mathematics mean (M = 1430.00, SD = 226.70). However, both are within the Proficient range (1312 to 1482) meeting NCLB requirements. Thus, grade 5 Pennsylvania students made annual yearly progress.

Lastly, a significant difference exists on mathematics composite scores by the interaction between economic disadvantage and year, F (1, 2999) = 6.73, p = .010, suggesting that participants that were not at an economic disadvantage in 2006 (*M* = 1449.56, *SD* = 217.30) had a larger mean on mathematics composite score compared to participants that were at an economic disadvantage in 2007 (*M* = 1248.92, *SD* = 187.24). Students at an economic disadvantage regardless of year, scored below the 2006 state PSSA mathematics grade 5 mean (M = 1420.00, SD = 238.10) and the 2007 state PSSA mathematics mean (M = 1430.00, SD = 226.70). Conversely, students not at an economic disadvantage scored above the state mean regardless of year. Therefore, economically disadvantaged students did not meet NCLB requirements and non-economically disadvantaged students did score within the Proficient range (1312 to 1482) meeting NCLB requirements.

Grade 8 2004-2005

Table 24

Means and Standard Deviations for 8th Graders Math Scores by Economically Disadvantaged, PAGE1 and Years (2004 vs. 2005)

Year	PAGE1	Economically Disadvantaged								
		No			Yes			Total		
		M	SD	N	M	SD	N	M	SD	N
2004	No	1396.48	203.71	576	1328.15	171.86	372	1369.67	194.63	948
	Yes	1391.45	210.51	403	1201.55	173.41	410	1295.68	214.74	813
	Total	1394.41	206.44	979	1261.77	183.80	782	1335.51	207.41	1761
2005	No	1417.86	206.64	585	1363.45	195.50	340	1397.86	204.21	925
	Yes	1413.39	234.36	412	1256.49	206.17	425	1333.72	233.92	837
	Total	1416.01	218.42	997	1304.03	208.27	765	1367.39	221.10	1762

Table 24 indicates the following:

1) Participants in PAGE1 and not at an economic disadvantage in 2004 had a lower mean (*M* = 1391.45, *SD* = 210.51) on mathematics composite scores compared to those who were not economically disadvantaged participants in PAGE1 in 2005 (*M* = 1413.39, *SD* = 234.36).

2) Participants not in PAGE1 and not at an economic disadvantage in 2004 had a lower mean (*M* = 1396.48, *SD* = 203.71) on mathematics composite score as compared to non-economically disadvantaged non-participants in 2005 (*M* = 1417.86, *SD* = 206.64).

3) Participants at an economic disadvantage and not in PAGE1 in 2004 had a lower mean (*M* = 1328.15, *SD* = 171.86) on mathematics composite scores compared to those who were at an economic disadvantage not participants in PAGE1 in 2005 (*M* = 1363.45, *SD* = 195.50).

4) Participants in PAGE1 and at an economic disadvantage in 2004 had a lower mean (*M* = 1201.55, *SD* = 173.41) on mathematics composite scores compared to participants in PAGE1 and at an economic disadvantage in 2005 (*M* = 1256.49, *SD* = 206.17)

The ANOVA reveals no significant difference exists for mathematics composite scores by year and PAGE1 participation or economic disadvantage. However, the ANOVA revealed that a significant difference exists between economic disadvantage and PAGE1 participation and for PAGE1 participation, year and economic status (Table 25).

Table 25

ANOVA on 8th Graders Math Scores by Economically Disadvantaged, PAGE1 and Years (2004 vs. 2005)

Factors	*df*	*F*	Sig.
PAGE1*	1	77.12	<.001
Economically Disadvantaged*	1	287.79	<.001
Year	1	23.28	<.001
PAGE1 * Economically Disadvantaged*	1	65.53	<.001
PAGE1 *Year	1	0.53	.465
Economically Disadvantaged* Year	1	2.87	.090
Error	3515	(40803.29)	

Note. Value in parentheses represents the mean square error.

Since F (1, 3515) = 287.79, p < .001, the results reveal the following a significant difference exists between mathematics composite scores and those who are economically disadvantaged versus those who are not economically disadvantaged. By looking at their means, those who were not economically disadvantaged in 2004 scored better on the mathematics composite scores (M = 1394.41, SD = 206.44) than those who were economically disadvantaged in 2005 (M = 1304.03, SD = 208.27). These means show a increase in mean scores for this time period for economically disadvantaged students; the means for economically disadvantaged students for both years are below the state PSSA mathematics grade 8 mean for 2004 (M = 1350.00, SD = 208.10). Additionally, these means are also below the 2005 state PSSA mathematics mean (M = 1370.00, SD = 222.22). Additionally, the economically disadvantaged students studied would not be within the Proficient range (1312 to 1482) for 2004 or 2005. For 2004 and 2005, economically disadvantaged students would be in the Basic range (1158 to 1311). Schools scoring in the Proficient range would have made annual yearly progress as

required under NCLB. Basic scores would not qualify to meet annual yearly progress under NCLB.

Also, a significant difference exists on mathematics composite score by the interaction between PAGE1 participation and economic disadvantage status $F (1, 3515) = 65.53$, $p < .001$, suggesting that participants that were not at an economic disadvantage and did not participate in PAGE1 in 2004 ($M = 1396.48$, $SD = 203.71$) had a larger mean on mathematics composite score compared to participants that were at an economic disadvantage and did participate in PAGE1 in 2005 ($M = 1256.49$, $SD = 206.17$). The 2004 mean for non-economically disadvantaged and non-PAGE1 students is larger than the 2004 state PSSA mathematics grade 8 mean ($M = 1350.00$, $SD = 208.10$), while the mean for PAGE1 and economically disadvantaged students for 2005 is below the state mean for 2004. Additionally, the mean for PAGE1 and economically disadvantaged students for 2005 is also below the 2005 state grade 8 PSSA mathematics mean ($M = 1370.00$, $SD = 222.22$). For the years compared, student scores studied for PAGE1 and economically disadvantaged would not be within the Proficient range (1312 to 1482) but in the Basic range (1158 to 1311). Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB and those in the Basic range would not have made annual yearly progress. Thus, the economically disadvantaged PAGE1 scores would not meet NCLB requirements.

With $F (1, 3515) = 77.12$, $p < .001$, a significant difference exists on mathematics composite score by the interaction for PAGE1 participation, suggesting that participants that did not participate in PAGE1 in 2004 ($M = 1369.67$, $SD = 194.63$) had a larger mean on mathematics composite score compared to participants that did participate in PAGE1

in 2005 (*M* = 1333.72, *SD* = 233.92). The 2004 mean for non-PAGE1 students is above the 2004 state PSSA mathematics grade 8 mean (M = 1350.00, SD = 208.10), while the mean for PAGE1students for 2005 is below the state mean in 2004. Additionally, the mean for PAGE1 students for 2005 is below the 2005 state PSSA mathematics mean (M = 1370.00, SD = 222.22). For the years compared, student scores studied for PAGE1 in 2005 would be within the Proficient range (1312 to 1482) but 2004 scores would be in the Basic range (1158 to 1311). Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB.

A significant difference exists on mathematics composite score by year, F (1, 3515) = 23.28, p <.001, suggesting that participants in 2004 (*M* = 1335.51, *SD* = 207.41) had a lower mean on mathematics composite score compared to participants in 2005 (*M* = 1367.39, *SD* = 221.10). In respective years, although scores increased from 2004 to 2005, these scores are below the 2004 state PSSA mathematics grade 8 mean (M = 1350.00, SD = 208.10) and the 2005 state PSSA mathematics mean (M = 1370.00, SD = 222.22). However, both are within the Proficient range (1312 to 1482) meeting NCLB requirements. Thus, grade 8 Pennsylvania students made annual yearly progress.

Grade 8 2005-2006

Table 26

Means and Standard Deviations for 8th Graders Math Scores by Economically Disadvantaged, PAGE1 and Years (2005 vs. 2006)

Year	PAGE1	Economically Disadvantaged								
		No			Yes			Total		
		M	SD	N	M	SD	N	M	SD	N
	No	1417.86	206.64	585	1363.45	195.50	340	1397.86	204.21	925
2005	Yes	1413.39	234.36	412	1256.49	206.17	425	1333.72	233.92	837
	Total	1416.01	218.42	997	1304.03	208.27	765	1367.39	221.10	1762
	No	1448.45	219.43	625	1382.26	187.63	364	1424.09	210.63	989
2006	Yes	1475.89	223.12	370	1277.56	199.06	428	1369.52	232.53	798
	Total	1458.66	221.10	995	1325.68	200.68	792	1399.72	222.28	1787

Table 26 indicates the following:

1) Participants in PAGE1 and not at an economic disadvantage in 2005 had a lower mean (*M* = 1413.39, *SD* = 234.36) on mathematics composite scores compared to those who were not economically disadvantaged participants in PAGE1 in 2006 (*M* = 1475.89, *SD* = 223.12).

2) Participants not in PAGE1 and not at an economic disadvantage in 2005 had a lower mean (*M* = 1417.86, *SD* = 206.64) on mathematics composite score as compared to non-economically disadvantaged non-participants in 2006 (*M* = 1448.45, *SD* = 219.43).

3) Participants at an economic disadvantage and not in PAGE1 in 2005 had a lower mean (*M* = 1363.45, *SD* = 195.50) on mathematics composite scores compared to those who were at an economic disadvantage not participants in PAGE1 in 2006 (*M* = 1382.26, *SD* = 187.63).

4) Participants in PAGE1 and at an economic disadvantage in 2005 had a larger mean (M = 1256.49, SD = 206.17) on mathematics composite scores compared to participants in PAGE1 and at an economic disadvantage in 2006 (M = 1277.56, SD = 199.06)

The ANOVA reveals no significant difference exists for mathematics composite scores by PAGE1 participation. However, the ANOVA revealed that a significant difference exists between economic disadvantage and PAGE1 participation (Table 27).

Table 27

ANOVA on 8th Graders Math Scores by Economically Disadvantaged, PAGE1 and Years (2005 vs. 2006)

Factors	*df*	*F*	Sig.
PAGE1	1	42.78	<.001
Economically Disadvantaged*	1	272.08	<.001
Year	1	21.25	<.001
PAGE1 * Economically Disadvantaged*	1	66.14	<.001
PAGE1 *Year	1	1.40	.236
Economically Disadvantaged* Year	1	3.40	.065
Error	3541	(44226.32)	

Note. Value in parentheses represents the mean square error.

Since F (1, 3541) = 272.08, p < .001, the results reveal a significant difference exists between mathematics composite scores and those who are economically disadvantaged versus those who are not economically disadvantaged. By looking at their means, those who were not economically disadvantaged in 2005 scored better on the mathematics composite scores (M = 1416.01, SD = 218.42) than those who were economically disadvantaged in 2006 (M = 1325.68, SD = 200.68). The means show a increase in mean scores for this time period for economically disadvantaged students,

however, the means for economically disadvantaged students for both years are below the state PSSA mathematics grade 8 mean for 2005 (M = 1370.00, SD = 222.22). Additionally, these means are also below the 2006 state PSSA mathematics mean (M = 1370.00, SD = 222.50). The economically disadvantaged students studied would be within the Proficient range (1312 to 1482) for 2006. For 2005, economically disadvantaged students would be in the Basic range (1158 to 1311). Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB. Basic scores would not qualify to meet annual yearly progress under NCLB.

A significant difference exists on mathematics composite score by the interaction between PAGE1 participation and economic disadvantage status since F (1, 3515) = 66.14, p <.001, suggesting that participants that were not at an economic disadvantage and did not participate in PAGE1 in 2005 (*M* = 1417.86, *SD* = 206.64) had a larger mean on mathematics composite score compared to participants that were at an economic disadvantage and did participate in PAGE1 in 2006 (*M* = 1277.56, *SD* = 199.06). The 2005 mean for non-economically disadvantaged and non-PAGE1 students is larger than the 2006 state PSSA mathematics grade 8 mean (M = 1370.00, SD = 222.50), while the mean for PAGE1 and economically disadvantaged students for 2006 is below the state mean for 2005. Additionally, the mean for PAGE1 and economically disadvantaged students for 2005 is also below the 2005 state grade 8 PSSA mathematics mean (M = 1370.00, SD = 222.22). For the years compared, student scores studied for PAGE1 and economically disadvantaged would not be within the Proficient range (1312 to 1482) but in the Basic range (1158 to 1311). Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB and those in the Basic range would

not have made annual yearly progress. Thus, the economically disadvantaged PAGE1 scores would not meet NCLB requirements for 2005 or 2006.

With $F (1, 3515) = 42.78$, $p < .001$, a significant difference exists on mathematics composite score by the interaction of PAGE1 participation, suggesting that participants that did not participate in PAGE1 in 2005 ($M = 1397.86$, $SD = 204.21$) had a larger mean on mathematics composite score compared to participants that did participate in PAGE1 in 2006 ($M = 1369.52$, $SD = 232.53$). The 2005 mean for non-PAGE1 students is above the 2006 state PSSA mathematics grade 8 mean (M = 1370.00, SD = 222.50), while the mean for PAGE1students for 2006 is below the state mean in 2005 (M = 1370.00, SD = 222.22). Additionally, the mean for PAGE1 students for 2005 is below the 2005 state PSSA mathematics mean (M = 1370.00, SD = 222.22). For the years compared, student scores studied for PAGE1 in 2006 and 2005 would be within the Proficient range (1312 to 1482). Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB.

Also, a significant difference exists on mathematics composite score by the interaction of the year with $F (1, 3515) = 21.25$, $p < .001$, suggesting that participants in 2005 ($M = 1367.39$, $SD = 221.10$) had a lower mean on mathematics composite score compared to participants in 2006 ($M = 1399.72$, $SD = 222.28$). In respective years, although scores increased from 2005 to 2006, these scores are below the 2005 state PSSA mathematics grade 8 mean (M = 1370.00, SD = 222.22) and above the 2006 state PSSA mathematics mean (M = 1370.00, SD = 222.50). However, both are within the Proficient range (1312 to 1482) meeting NCLB requirements. Thus, grade 8 Pennsylvania students made annual yearly progress.

Grade 8 2006-2007

Table 28

Means and Standard Deviations for 8th Graders Math Scores by Economically Disadvantaged, PAGE1 and Years (2006 vs. 2007)

Year	PAGE1	Economically Disadvantaged								
		No			Yes			Total		
		M	SD	N	M	SD	N	M	SD	N
2006	No	1448.45	219.43	625	1382.26	187.63	364	1424.09	210.63	989
	Yes	1475.89	223.12	370	1277.56	199.06	428	1369.52	232.53	798
	Total	1458.66	221.10	995	1325.68	200.68	792	1399.72	222.28	1787
2007	No	1430.57	198.16	224	1232.27	184.80	425	1300.71	211.57	649
	Yes	1445.96	206.73	295	1257.92	193.56	404	1337.28	219.70	699
	Total	1439.32	203.03	519	1244.77	189.44	829	1319.67	216.52	1348

Table 28 indicates the following:

1) Participants in PAGE1 and not at an economic disadvantage in 2006 had a larger mean (*M* = 1475.89, *SD* = 223.12) on mathematics composite scores compared to those who were not economically disadvantaged participants in PAGE1 in 2007 (*M* = 1445.96, *SD* = 206.73).

2) Participants not in PAGE1 and not at an economic disadvantage in 2006 had a larger mean (*M* = 1448.45, *SD* = 219.43) on mathematics composite score as compared to non-economically disadvantaged non-participants in 2007 (*M* = 1430.57, *SD* = 198.16).

3) Participants at an economic disadvantage and not in PAGE1 in 2006 had a larger mean (*M* = 1382.26, *SD* = 187.63) on mathematics composite scores compared to those who were at an economic disadvantage not participants in PAGE1 in 2007 (*M* = 1232.27, *SD* = 184.80).

4) Participants in PAGE1 and at an economic disadvantage in 2006 had a larger mean (*M* = 1277.56, *SD* = 199.06) on mathematics composite scores compared to participants in PAGE1 and at an economic disadvantage in 2007 (*M* = 1257.92, *SD* = 189.44)

The ANOVA reveals no significant difference exists for mathematics composite scores by PAGE1 participation. However, the ANOVA revealed that a significant difference exists between economic disadvantage and PAGE1 participation and year (Table 29).

Table 29

ANOVA on 8th Graders Math Scores by Economically Disadvantaged, PAGE1 and Years (2006 vs. 2007)

Factors	*df*	*F*	Sig.
PAGE1	1	1.44	.230
Economically Disadvantaged*	1	465.26	<.001
Year	1	51.93	<.001
PAGE1 * Economically Disadvantaged*	1	16.31	<.001
PAGE1 *Year*	1	15.37	<.001
Economically Disadvantaged* Year*	1	16.30	<.001
Error	3127	(41258.33)	

Note. Value in parentheses represents the mean square error.

Since F (1, 3127) = 465.26, p < .001, the results reveal a significant difference exists between mathematics composite scores and those who are economically disadvantaged versus those who are not economically disadvantaged since p <.001. By looking at their means, those who were not economically disadvantaged in 2006 scored better on the mathematics composite scores (M = 1458.66, SD = 221.10) than those who were economically disadvantaged in 2007 (M = 1244.77, SD = 189.44). The means show a decrease in mean scores for this time period for economically disadvantaged students

and the means for economically disadvantaged students for both years are below the state PSSA mathematics grade 8 mean for 2006 (M = 1370.00, SD = 222.50). Additionally, these means are also below the 2007 state PSSA mathematics mean (M = 1390.00, SD = 222.30). The economically disadvantaged students studied would be within the Proficient range (1312 to 1482) for 2006. For 2007, economically disadvantaged students would be in the Basic range (1158 to 1311). Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB. Basic scores would not qualify to meet annual yearly progress under NCLB.

A significant difference exists on mathematics composite score by the interaction between PAGE1 participation and economic disadvantage status, since $F(1, 3127) = 16.31$, $p < .001$, suggesting that participants that were not at an economic disadvantage and did not participate in PAGE1 in 2006 ($M = 1448.45$, $SD = 219.43$) had a larger mean on mathematics composite score compared to participants that were at an economic disadvantage and did participate in PAGE1 in 2007 ($M = 1257.92$, $SD = 193.56$). The 2006 mean for non-economically disadvantaged and non-PAGE1 students is larger than the 2007 state PSSA mathematics grade 8 mean (M = 1390.00, SD = 222.30), while the mean for PAGE1 and economically disadvantaged students for 2007 is below the state mean for 2006 (M = 1370.00, SD = 222.50). Additionally, the mean for PAGE1 and economically disadvantaged students for 2006 is also below the 2006 state grade 8 PSSA mathematics mean (M = 1370.00, SD = 222.50). For the years compared, student scores studied for PAGE1 and economically disadvantaged would not be within the Proficient range (1312 to 1482) but in the Basic range (1158 to 1311). Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB and

those in the Basic range would not have made annual yearly progress. Thus, the economically disadvantaged PAGE1 scores would not meet NCLB requirements for 2006 or 2007.

Also, a significant difference exists between mathematics composite scores and those who participated in PAGE1 versus those who did not participate in PAGE1, with $F(1, 3127) = 1.44$, $p < .001$. By looking at their means, those who were not in PAGE1 2006 scored better on the mathematics composite scores ($M = 1424.09$, $SD = 210.63$) than those who were in PAGE1 in 2007 ($M = 1337.28$, $SD = 219.70$). The 2006 mean for non-PAGE1 students is above the 2007 state PSSA mathematics grade 8 mean ($M = 1390.00$, $SD = 222.30$), while the mean for PAGE1students for 2007 is below the state mean in 2006 ($M = 1370.00$, $SD = 222.50$). Additionally, the mean for PAGE1 students for 2006 is below the 2006 state PSSA mathematics mean ($M = 1370.00$, $SD = 222.50$). For the years compared, student scores studied for PAGE1 in 2006 and 2007 would be within the Proficient range (1312 to 1482). Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB.

Since $F(1, 3127) = 51.93$, $p < .001$, a significant difference exists between mathematics composite scores and the year of participation. By looking at their means, those who participated in 2006 scored better on the mathematics composite scores ($M = 1399.72$, $SD = 222.28$) than those who were participated in 2007 ($M = 1319.67$, $SD = 216.52$). In respective years, scores decreased from 2006 to 2007, also the 2007 scores are below the 2006 state PSSA mathematics grade 8 mean ($M = 1370.00$, $SD = 222.50$) and below the 2007 state PSSA mathematics mean ($M = 1390.00$, $SD = 222.30$).

However, both are within the Proficient range (1312 to 1482) meeting NCLB requirements. Thus, grade 8 Pennsylvania students made annual yearly progress.

Lastly, a significant difference exists by year of participation and economic disadvantage since $F(1, 3127) = 16.30$, $p < .001$. By looking at their means, those who were economically disadvantaged participants in 2006 ($M = 1325.68$, $SD = 200.68$) had a higher mean than those participants in 2007 ($M = 1244.77$, $SD = 189.44$). The 2006 scores are below the 2006 state PSSA mathematics grade 8 mean ($M = 1370.00$, $SD = 222.50$) and the 2007 scores are below the 2007 state PSSA mathematics mean ($M = 1390.00$, $SD = 222.30$). The 2006 economic disadvantaged scores are within the Proficient range (1312 to 1482) meeting NCLB requirements. However, the 2007 economic disadvantaged scores are in the Basic range (1171 to 1283) and do not meet NCLB requirements. The grade 11 2004-2005 results follow in Table 30.

Grade 11 2004-2005

Table 30

Means and Standard Deviations for 11th Graders Math Scores by Economically Disadvantaged, PAGE1 and Years (2004 vs. 2005)

Year	Page	Economically Disadvantaged								
		No			Yes			Total		
		M	SD	N	M	SD	N	M	SD	N
2004	No	1319.76	244.45	1147	1194.68	188.31	357	1290.07	238.32	1504
	Yes	1326.96	254.42	1037	1242.16	187.97	275	1309.19	244.39	1312
	Total	1323.18	249.20	2184	1215.34	189.48	632	1298.98	241.31	2816
2005	No	1385.24	291.50	1187	1213.04	234.25	400	1341.84	288.00	1587
	Yes	1345.07	285.15	1007	1249.39	250.96	326	1321.67	280.13	1333
	Total	1366.80	289.24	2194	1229.36	242.41	726	1332.63	284.56	2920

Table 30 indicates the following:

1) Participants in PAGE1 and not at an economic disadvantage in 2004 had a lower mean (*M* = 1326.96, *SD* = 254.42) on mathematics composite scores compared to those who were not economically disadvantaged participants in PAGE1 in 2005 (*M* = 1345.07, *SD* = 285.15).

2) Participants not in PAGE1 and not at an economic disadvantage in 2004 had a lower mean (*M* = 1319.76, *SD* = 244.45) on mathematics composite score as compared to non-economically disadvantaged non-participants in 2005 (*M* = 1385.24, *SD* = 291.50).

3) Participants at an economic disadvantage and not in PAGE1 in 2004 had a lower mean (*M* = 1194.68, *SD* = 188.31) on mathematics composite scores compared to those who were at an economic disadvantage not participants in PAGE1 in 2005 (*M* = 1213.04, *SD* = 234.25).

4) Participants in PAGE1 and at an economic disadvantage in 2004 had a larger mean (M = 1242.16, SD = 187.97) on mathematics composite scores compared to participants in PAGE1 and at an economic disadvantage in 2005 (M = 1249.39, SD = 250.96)

The ANOVA reveals no significant difference exists for mathematics composite scores by PAGE1, year and economic status participation. However, the ANOVA revealed that a significant difference exists between economic disadvantage and PAGE1 participation (Table 31).

Table 31

ANOVA on 11th Graders Math Scores by Economically Disadvantaged, PAGE1 and Years (2004 vs. 2005)

Factors	*df*	*F*	Sig.
PAGE1	1	2.47	.116
Economically Disadvantaged	1	217.88	<.001
Year	1	11.38	<.001
PAGE1 * Economically Disadvantaged	1	13.02	<.001
PAGE1 *Year	1	3.27	.071
Economically Disadvantaged* Year	1	3.21	.073
Error	5728	(66827.47)	

Note. Value in parentheses represents the mean square error.

Since F (1, 5728) = 217.88, p < .001, the results reveal a significant difference exists between mathematics composite scores and those who are economically disadvantaged versus those who are not economically disadvantaged since p <.001. By looking at their means, those who were not economically disadvantaged in 2004 scored better on the mathematics composite scores (M = 1323.18, SD = 249.20) than those who were economically disadvantaged in 2005 (M = 1249.39, SD = 250.96). The means show

an increase in mean scores for this time period for economically disadvantaged students but the means for economically disadvantaged students for both years are below the state PSSA mathematics grade 11 mean for 2004 (M = 1320.00, SD = 237.30). Additionally, these means are also below the 2005 state PSSA mathematics mean (M = 1340.00, SD = 288.30). For 2004 and 2005, economically disadvantaged students would be in the Basic range (1158 to 1311). Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB. Basic scores would not qualify to meet annual yearly progress under NCLB.

A significant difference exists on mathematics composite score by the interaction between PAGE1 participation and economic disadvantage status, with $F(1, 5728) = 13.02$, $p < .001$, suggesting that participants that were not at an economic disadvantage and did not participate in PAGE1 in 2004 ($M = 1319.76$, $SD = 244.45$) had a larger mean on mathematics composite score compared to participants that were at an economic disadvantage and did participate in PAGE1 in 2005 ($M = 1249.39$, $SD = 250.96$). The 2004 mean for non-economically disadvantaged and non-PAGE1 students is below the 2005 state PSSA mathematics grade 11 mean (M = 1340.00, SD = 288.30), while the mean for PAGE1 and economically disadvantaged students for 2005 is also below the state mean for 2004 (M = 1320.00, SD = 237.30). Additionally, the mean for PAGE1 and economically disadvantaged students for 2004 is also below the 2005 state grade 11 PSSA mathematics mean (M = 1340.00, SD = 288.30). For the years compared, student scores studied for PAGE1 and economically disadvantaged would not be within the Proficient range (1312 to 1482) but in the Basic range (1158 to 1311). Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB

and those in the Basic range would not have made annual yearly progress. Thus, the economically disadvantaged PAGE1 scores would not meet NCLB requirements for 2004 or 2005.

Additionally, a significant difference exists on mathematics composite score by the interaction by year of participation, since $F(1, 5728) = 11.38$, $p < .001$, suggesting that participants in 2004 ($M = 1298.98$, $SD = 241.31$) had a lower mean on mathematics composite score compared to participants in 2005 ($M = 1321.67$, $SD = 280.13$). The 2004 mean for PAGE1 students is below the 2005 state PSSA mathematics grade 11 mean (M = 1340.00, SD = 288.30), while the mean for PAGE1students for 2005 is above the state mean in 2004 (M = 1320.00, SD = 237.30) and 2005. For the years compared, student scores studied for PAGE1 in 2005 would be within the Proficient range (1312 to 1482). Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB.

However, PAGE1 scores from 2004 would have been in the Basic range (1158 to 1311). Therefore, PAGE1 students moved from Basic to Proficient in mathematics between 2004 and 2005. The grade 11 2005-2006 comparisons follow in Table 32.

Grade 11 2005-2006

Table 32

Means and Standard Deviations for 11th Graders Math Scores by Economically Disadvantaged, PAGE1 and Years (2005 vs. 2006)

Year	PAGE1	Economically Disadvantaged								
		No			Yes			Total		
		M	SD	N	M	SD	N	M	SD	N
2005	No	1385.24	291.50	1187	1213.04	234.25	400	1341.84	288.00	1587
	Yes	1345.07	285.15	1007	1249.39	250.96	326	1321.67	280.13	1333
	Total	1366.80	289.24	2194	1229.36	242.41	726	1332.63	284.56	2920
2006	No	1388.96	287.05	1077	1207.17	239.06	455	1334.97	285.94	1532
	Yes	1384.16	294.87	1067	1264.84	239.84	411	1350.98	285.62	1478
	Total	1386.57	290.91	2144	1234.54	241.02	866	1342.83	285.85	3010

Table 32 indicates the following:

1) Participants in PAGE1 and not at an economic disadvantage in 2005 had a lower mean (*M* = 1345.07, *SD* = 285.15) on mathematics composite scores compared to those who were not economically disadvantaged participants in PAGE1 in 2006 (*M* = 1384.16, *SD* = 294.87).

2) Participants not in PAGE1 and not at an economic disadvantage in 2005 had a lower mean (*M* = 1385.24, *SD* = 291.50) on mathematics composite score as compared to non-economically disadvantaged non-participants in 2006 (*M* = 1388.96, *SD* = 287.05).

3) Participants at an economic disadvantage and not in PAGE1 in 2005 had a larger mean (*M* = 1213.04, *SD* = 234.25) on mathematics composite scores compared to those who were at an economic disadvantage not participants in PAGE1 in 2006 (*M* = 1264.84, *SD* = 239.06).

4) Participants in PAGE1 and at an economic disadvantage in 2005 had a lower mean (*M* = 1249.39, *SD* = 250.96) on mathematics composite scores compared to participants in PAGE1 and not at an economic disadvantage in 2006 (*M* = 1367.89, *SD* = 239.84)

The ANOVA reveals no significant difference exists for mathematics composite scores by PAGE1 participation. However, the ANOVA revealed that a significant difference exists between economic disadvantage and PAGE1 participation (Table 33).

Table 33

ANOVA 11th Graders Math Scores by Economically Disadvantaged, PAGE1 and Years (2005 vs. 2006)

Factors	*df*	*F*	Sig.
PAGE1	1	2.25	.134
Economically Disadvantaged	1	302.61	<.001
Year	1	2.57	.109
PAGE1 * Economically Disadvantaged	1	18.06	<.001
PAGE1 *Year	1	3.00	.083
Economically Disadvantaged* Year	1	1.03	.310
Error	5922	(76970.25)	

Note. Value in parentheses represents the mean square error.

Since F (1, 5922) = 302.61, p < .001, the results reveal a significant difference exists between mathematics composite scores and those who are economically disadvantages versus those who are not economically disadvantaged since p <.001. By looking at their means, those who were not economically disadvantaged in 2005 scored better on the mathematics composite scores (M = 1366.80, SD = 289.24) than those who were economically disadvantaged in 2006 (M = 1234.54, SD = 241.02). Even though there was an increase in mean scores for this time period for economically disadvantaged

students, the means for economically disadvantaged students for both years are below the state PSSA mathematics grade 11 mean for 2005 (M = 1340.00, SD = 288.30). Additionally, these means are also below the 2006 state PSSA mathematics mean (M = 1340.00, SD = 292.50). For 2005 and 2006, economically disadvantaged students would be in the Basic range (1158 to 1311). Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB. Basic scores would not qualify to meet annual yearly progress under NCLB.

A significant difference exists on mathematics composite score by the interaction between PAGE1 participation and economic disadvantage status, with $F(1, 5922) = 18.06$, $p < .001$, suggesting that participants that were not at an economic disadvantage and did not participate in PAGE1 in 2005 ($M = 1385.24$, $SD = 291.50$) had a larger mean on mathematics composite score compared to participants that were at an economic disadvantage and did participate in PAGE1 in 2006 ($M = 1264.84$, $SD = 239.84$). The 2005 mean for non-economically disadvantaged and non-PAGE1 students is above the 2006 state PSSA mathematics grade 11 mean (M = 1340.00, SD = 292.50), while the mean for PAGE1 and economically disadvantaged students for 2006 is also below the state mean for 2005 (M = 1340.00, SD = 288.30). Additionally, the mean for PAGE1 and economically disadvantaged students for 2006 is also below the 2005 state grade 11 PSSA mathematics mean (M = 1340.00, SD = 288.30). For the years compared, student scores studied for PAGE1 and economically disadvantaged would not be within the Proficient range (1312 to 1482) but in the Basic range (1158 to 1311). Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB and those in the Basic range would not have made annual yearly progress. Thus, the

economically disadvantaged PAGE1 scores would not meet NCLB requirements for 2005 or 2006.

Grade 11 2006-2007

Table 34

Means and Standard Deviations for 11th Graders Math Scores by Economically Disadvantaged, PAGE1 and Years (2006 vs. 2007)

Year	PAGE1	Economically Disadvantaged								
		No			Yes			Total		
		M	SD	N	M	SD	N	M	SD	N
2006	No	1388.96	287.05	1077	1207.17	239.06	455	1334.97	285.94	1532
	Yes	1384.16	294.87	1067	1264.84	239.84	411	1350.98	285.62	1478
	Total	1386.57	290.91	2144	1234.54	241.02	866	1342.83	285.85	3010
2007	No	1430.17	197.39	284	1244.04	184.11	558	1306.82	208.12	842
	Yes	1430.57	198.01	336	1254.25	191.58	517	1323.70	212.31	853
	Total	1430.39	197.57	620	1248.95	187.72	1075	1315.32	210.35	1695

Table 34 indicates the following:

1) Participants in PAGE1 and not at an economic disadvantage in 2006 had a lower mean (*M* = 1384.16, *SD* = 294.87) on mathematics composite scores compared to those who were not economically disadvantaged participants in PAGE1 in 2007 (*M* = 1430.57, *SD* = 198.01).

2) Participants not in PAGE1 and not at an economic disadvantage in 2006 had a lower mean (*M* = 1388.96, *SD* = 287.05) on mathematics composite score as compared to non-economically disadvantaged non-participants in 2007 (*M* = 1430.17, *SD* = 197.39).

3) Participants at an economic disadvantage and not in PAGE1 in 2006 had a lower mean (*M* = 1207.17, *SD* = 239.06) on mathematics composite scores compared to

those who were at an economic disadvantage not participants in PAGE1 in 2007 (*M* = 1244.04, *SD* = 184.11).

4) Participants in PAGE1 and at an economic disadvantage in 2006 had a larger mean (*M* = 1264.84, *SD* = 239.84) on mathematics composite scores compared to participants in PAGE1 and not at an economic disadvantage in 2007 (*M* = 1254.25, *SD* = 191.58)

The ANOVA reveals no significant difference exists for mathematics composite scores by PAGE1 participation. However, the ANOVA revealed that a significant difference exists between economic disadvantage and PAGE1 participation (Table 35).

Table 35

ANOVA on 11th Graders Math Scores by Economically Disadvantaged, PAGE1 and Years (2006 vs. 2007)

Factors	*df*	*F*	Sig.
PAGE1	1	3.87	.049
Economically Disadvantaged	1	422.36	<.001
Year	1	12.45	<.001
PAGE1 * Economically Disadvantaged	1	5.01	.025
PAGE1 *Year	1	1.71	.191
Economically Disadvantaged* Year	1	3.61	.058
Error	4697	(62349.19)	

Note. Value in parentheses represents the mean square error.

Since F (1, 4697) = 422.36, p < .001, the results reveal a significant difference exists between mathematics composite scores and those who are economically disadvantaged versus those who are not economically disadvantaged since p <.001. By looking at their means, those who were not economically disadvantaged in 2006 scored better on the mathematics composite scores (M = 1386.57, SD = 290.91) than those who

were economically disadvantaged in 2007 (M = 1248.95, SD = 187.72). Even though there was an increase in mean scores for this time period for economically disadvantaged students, the means for economically disadvantaged students for both years are below the state PSSA mathematics grade 11 mean for 2006 (M = 1340.00, SD = 292.50). Additionally, these means are also below the 2007 state PSSA mathematics mean (M = 1330.00, SD = 253.30). For 2006 and 2007, economically disadvantaged students would be in the Basic range (1158 to 1311). Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB. Basic scores would not qualify to meet annual yearly progress under NCLB.

A significant difference exists on mathematics composite score by the interaction between PAGE1 participation and economic disadvantage status, with F (1, 4697) = 5.01, p = .025, suggesting that participants that were not at an economic disadvantage and did not participate in PAGE1 in 2006 (*M* = 1388.96, *SD* = 287.05) had a larger mean on mathematics composite score compared to participants that were at an economic disadvantage and did participate in PAGE1 in 2007 (*M* = 1254.25, *SD* = 191.58). The 2006 mean for non-economically disadvantaged and non-PAGE1 students is above the 2007 state PSSA mathematics grade 11 mean (M = 1330.00, SD = 253.30), while the mean for PAGE1 and economically disadvantaged students for 2007 is below the state mean for 2006 (M = 1340.00, SD = 292.50). Additionally, the mean for PAGE1 and economically disadvantaged students for 2007 is also below the 2007 state grade 11 PSSA mathematics mean (M = 1330.00, SD = 253.30). For the years compared, student scores studied for PAGE1 and economically disadvantaged would not be within the Proficient range (1312 to 1482) but in the Basic range (1158 to 1311). Schools scoring in

the Proficient range would have made annual yearly progress as required under NCLB and those in the Basic range would not have made annual yearly progress. Thus, the economically disadvantaged PAGE1 scores would not meet NCLB requirements for 2006 or 2007.

Also, a significant difference exists between mathematics composite scores depending on the year since $F(1, 4697) = 12.45$, $p < .001$. By looking at their means, those who participated in 2006 scored better on the mathematics composite scores ($M = 1342.83$, $SD = 285.85$) than those who those who participated in 2007 ($M = 1315.32$, $SD = 210.35$). The 2006 mean for PAGE1 students is above the 2006 state PSSA mathematics grade 11 mean ($M = 1340.00$, $SD = 292.50$), while the mean for PAGE1 students for 2007 is below the state mean in 2007 ($M = 1330.00$, $SD = 253.30$). For the years compared, student scores studied for PAGE1 in 2006 and 2007 would be within the Proficient range (1312 to 1482). Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB.

Lastly, a significant difference exists between mathematics composite scores depending on PAGE1 participation since $F(1, 4697) = 3.87$, $p = .049$. By looking at their means, those who participated in 2006 scored better on the mathematics composite scores ($M = 1350.98$, $SD = 285.62$) than those who those who participated in 2007 ($M = 1323.70$, $SD = 212.31$). The 2006 mean for PAGE1 students is above the 2006 state PSSA mathematics grade 11 mean ($M = 1340.00$, $SD = 292.50$), while the mean for PAGE1 students for 2007 is below the state mean in 2007 ($M = 1330.00$, $SD = 253.30$). For the years compared, student scores studied for PAGE1 in 2006 and 2007 would be

within the Proficient range (1312 to 1482). Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB.

However, PAGE1 scores declined from 2006 to 2007 but all student scores declined from 2006 to 2007.

Question 5 Analysis

Is there any a significant difference in overall reading achievement from year to year (grades 5, 8, 11) for economically disadvantaged students of the PAGE1 project for the PAGE1 schools as compared to non-PAGE1 schools of similar student population size, grade level school structure, demographic setting and free and reduced lunch percentage?

Null hypothesis: No significant overall reading achievement differences between schools for economically disadvantaged students and non-economically disadvantaged students. Comparison of schools is at the 0.05 a significant difference level.

To analyze question 5, a analysis of variance (ANOVA) was conducted for each grade level and each of the years of the study to determine if mean differences exist on reading composite scores (dependant variable) by economic disadvantage and PAGE1 participation (independent variables).

The analysis is presented by grade level and year for reading composite scores. Grade 5 2004-2005 results follow in Table 36.

Grade 5 2004-2005

Table 36

Means and Standard Deviations for 5th Graders Reading Scores by Economically Disadvantaged, PAGE1 and Years (2004 vs. 2005)

Year	PAGE1	Economically Disadvantaged								
		No			Yes			Total		
		M	SD	N	M	SD	N	M	SD	N
2004	No	1405.15	206.14	220	1282.62	235.38	585	1316.10	234.10	805
	Yes	1440.27	210.28	880	1265.74	216.47	443	1381.83	227.72	1323
	Total	1433.25	209.84	1100	1275.34	227.47	1028	1356.97	232.30	2128
2005	No	1336.92	178.20	96	1174.93	230.67	351	1209.72	230.12	447
	Yes	1404.41	210.40	722	1252.05	240.85	299	1359.79	230.33	1021
	Total	1396.49	207.92	818	1210.40	238.35	650	1314.09	240.33	1468

Table 36 indicates the following:

1) Participants in PAGE1 and not at an economic disadvantage in 2004 had a larger mean (*M* = 1440.27, *SD* = 210.28) on reading composite scores compared to those who were not economically disadvantaged participants in PAGE1 in 2005 (*M* = 1404.41, *SD* = 210.40).

2) Participants not in PAGE1 and not at an economic disadvantage in 2004 had a larger mean (*M* = 1405.15, *SD* = 206.14) on reading composite score as compared to non-economically disadvantaged non-participants in 2005 (*M* = 1336.92, *SD* = 178.20).

3) Participants at an economic disadvantage and not in PAGE1 in 2004 had a larger mean (*M* = 1282.62, *SD* = 235.38) on reading composite scores compared to those who were at an economic disadvantage not participants in PAGE1 in 2005 (*M* = 1174.93, *SD* = 230.67).

4) Participants in PAGE1 and at an economic disadvantage in 2004 had a larger mean (*M* = 1265.74, *SD* = 216.47) on reading composite scores compared to participants in PAGE1 and not at an economic disadvantage in 2005 (*M* = 1252.05, *SD* = 240.85)

The ANOVA reveals no significant difference exists for reading composite scores by PAGE1 participation. However, the ANOVA revealed that a significant difference exists between economic disadvantage and PAGE1 participation (Table 37).

Table 37

ANOVA on 5th Graders Reading Scores by Economically Disadvantaged, PAGE1 and Years (2004 vs. 2005)

Factors	*df*	*F*	Sig.
PAGE1	1	20.00	<.001
Economically Disadvantaged	1	281.96	<.001
Year*	1	38.35	<.001
PAGE1 * Economically Disadvantaged	1	1.35	.245
PAGE1 *Year	1	12.05	<.001
Economically Disadvantaged* Year	1	0.23	.635
Error	3588	(47960.90)	

Note. Value in parentheses represents the mean square error.

Since F (1, 3588) = 281.96, p <.001, the results reveal a significant difference exists between reading composite scores and those who are economically disadvantaged versus those who are not economically disadvantaged since p <.001. By looking at their means, those who were not economically disadvantaged in 2004 scored better on the reading composite scores (M = 1433.25, SD = 209.84) than those who were economically disadvantaged in 2005 (M = 1210.40, SD = 238.55). These means show a decrease in mean scores for this time period for economically disadvantaged students, the means for economically disadvantaged students for 2004 and 2005 are below the state PSSA

reading grade 5 mean for 2004 (M = 1370.00, SD = 242.50). Additionally, these means are also below the 2005 state PSSA reading mean (M = 1330.00, SD = 235.10). However, the economically disadvantaged students studied would be within the Proficient range (1275 to 1496) for 2004 but not for 2005. For 2005, economically disadvantaged students would be in the Basic range (1137 to 1274). Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB. Basic scores would not qualify to meet annual yearly progress under NCLB.

A significant difference exists on reading composite score by the interaction between PAGE1 participation and year, with F (1, 3588) = 12.05, p <.001, suggesting that participants in 2004 and did not participate in PAGE1 (*M* = 1316.10, *SD* = 234.10) had a lower mean on reading composite score compared to participants in 2005 and did participate in PAGE1 (*M* = 1359.79, *SD* = 230.33). The 2004 mean for non-PAGE1 students is below the state PSSA reading grade 5 2004 mean (M = 1370.00, SD = 242.50), while the mean for PAGE1students for 2005 is above the state mean in 2005 (M = 1330.00, SD = 235.10). For the years compared, student scores studied for PAGE1 in 2004 and 2005 would be within the Proficient range (1275 to 1496). Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB.

Also, a significant difference exists on reading composite score by year, since F (1, 3588) = 38.35, p <.001, suggesting that participants in 2004 (*M* = 1356.97, *SD* = 232.30) had a larger mean on reading composite score compared to participants in 2005 (*M* = 1314.09, *SD* = 240.33). The 2004 scores are below the 2004 state PSSA reading grade 5 mean (M = 1370.00, SD = 242.50) and the 2005 scores are below the 2005 state PSSA reading mean (M = 1330.00, SD = 235.10). However, both years scores are within

the Proficient range (1275 to 1496) meeting NCLB requirements. Thus, grade 5 Pennsylvania students made annual yearly progress.

Lastly, since F (1, 3588) = 20.00, p <.001, a significant difference exists on reading composite score by PAGE1 participation, suggesting that participants in 2004 (*M* = 1381.83, *SD* = 227.72) had a larger mean on reading composite score compared to participants in 2005 (*M* = 1359.79, *SD* = 230.33). The 2004 scores are above the 2004 state PSSA reading grade 5 mean (M = 1370.00, SD = 242.50) and the 2005 scores are above the 2005 state PSSA reading mean (M = 1330.00, SD = 235.10). However, both years scores are within the Proficient range (1275 to 1496) meeting NCLB requirements. Thus, grade 5 PAGE1 Pennsylvania students made annual yearly progress in reading.

Grade 5 2005-2006

Table 38

Means and Standard Deviations for 5th Graders Reading Scores by Economically Disadvantaged, PAGE1 and Years (2005 vs. 2006)

Year	Page	Economically Disadvantaged								
		No			Yes			Total		
		M	SD	N	M	SD	N	M	SD	N
2005	No	1336.92	178.20	96	1174.93	230.67	351	1209.72	230.12	447
	Yes	1404.41	210.40	722	1252.05	240.85	299	1359.79	230.33	1021
	Total	1396.49	207.92	818	1210.40	238.35	650	1314.09	240.33	1468
2006	No	1367.24	192.10	91	1158.27	223.77	339	1202.49	233.44	430
	Yes	1368.99	204.02	690	1209.34	230.63	304	1320.16	224.79	994
	Total	1368.78	202.55	781	1182.41	228.29	643	1284.63	233.69	1424

Table 38 indicates the following:

1) Participants in PAGE1 and not at an economic disadvantage in 2005 had a larger mean (*M* = 1404.41, *SD* = 210.40) on reading composite scores compared to those who were not economically disadvantaged participants in PAGE1 in 2006 (*M* = 1368.99, *SD* = 204.02).

2) Participants not in PAGE1 and not at an economic disadvantage in 2005 had a lower mean (*M* = 1336.92, *SD* = 178.20) on reading composite score as compared to non-economically disadvantaged non-participants in 2006 (*M* = 1367.24, *SD* = 192.10).

3) Participants at an economic disadvantage and not in PAGE1 in 2005 had a larger mean (*M* = 1174.93, *SD* = 230.67) on reading composite scores compared to those who were at an economic disadvantage not participants in PAGE1 in 2006 (*M* = 1158.27, *SD* = 223.77).

4) Participants in PAGE1 and at an economic disadvantage in 2005 had a larger mean (*M* = 1252.05, *SD* = 240.85) on reading composite scores compared to participants in PAGE1 and not at an economic disadvantage in 2006 (*M* = 1209.34, *SD* = 230.63)

The ANOVA reveals no significant difference exists for reading composite scores by year of participation. However, the ANOVA revealed that a significant difference exists between economic disadvantage and PAGE1 and PAGE1 by year of participation (Table 39) as follows:

Table 39

ANOVA on 5th Graders Reading Scores by Economically Disadvantaged, PAGE1 and Years (2005 vs. 2006)

Factors	*df*	*F*	Sig.
PAGE1	1	22.56	<.001
Economically Disadvantaged	1	269.95	<.001
Year	1	2.41	.121
PAGE1 * Economically Disadvantaged	1	2.01	.156
PAGE1 *Year	1	4.88	.027
Economically Disadvantaged* Year	1	1.71	.192
Error	2884	(47117.15)	

Note. Value in parentheses represents the mean square error.

Since F (1, 2884) = 269.95, p <.001, the results reveal a significant difference exists between reading composite scores and those who are economically disadvantaged versus those who are not economically disadvantaged since p <.001. By looking at their means, those who were not economically disadvantaged in 2005 scored better on the reading composite scores (M = 1396.49, SD = 207.92) than those who were economically disadvantaged in 2006 (M = 1182.41, SD = 228.29). These means show a decrease in mean scores for this time period for economically disadvantaged students, the means for economically disadvantaged students for 2005 and 2006 are below the state PSSA reading grade 5 mean for 2005 (M = 1330.00, SD = 235.10). Additionally, these means are also below the 2006 state PSSA reading mean (M = 1310.00, SD = 232.90). However, the economically disadvantaged students studied would be within the Basic range (1137 to 1274) for 2005 and for 2006. Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB. Basic scores would not qualify to meet annual yearly progress under NCLB.

A significant difference exists on reading composite score by the interaction of PAGE1 participation, with F (1, 2884) = 22.56, p <.001, suggesting that participants that did not participate in PAGE1 in 2005 (*M* = 1209.72, *SD* = 230.12) had a lower mean on reading composite score compared to participants that did participate in PAGE1 in 2006 (*M* = 1320.16, *SD* = 224.79). The 2005 PAGE1 scores (M= 1359.79, SD = 230.33) are above the 2005 state PSSA reading grade 5 mean (M = 1330.00, SD = 235.10) and the 2006 scores are above the 2006 state PSSA reading mean (M = 1310.00, SD = 232.90). However, both years PAGE1 scores are within the Proficient range (1275 to 1496) meeting NCLB requirements.

Also a significant difference exists on reading composite score by the interaction of PAGE1 participation and year, with F (1, 2884) = 4.88, p = .027, suggesting that participants that participate in PAGE1 in 2005 (*M* = 1359.79, *SD* = 230.33) had a higher mean on reading composite score compared to participants that did participate in PAGE1 in 2006 (*M* = 1320.16, *SD* = 224.79). The 2005 PAGE1 scores (M= 1359.79, SD = 230.33) are above the 2005 state PSSA reading grade 5 mean (M = 1330.00, SD = 235.10) and the 2006 scores are above the 2006 state PSSA reading mean (M = 1310.00, SD = 232.90). Both years scores are within the Proficient range (1275 to 1496) meeting NCLB requirements. Thus, grade 5 PAGE1 Pennsylvania students made annual yearly progress in reading. Grade 5 2006-2007 results follow in Table 40.

Grade 5 2006-2007

Table 40

Means and Standard Deviations for 5th Graders Reading Scores by Economically Disadvantaged, PAGE1 and Years (2006 vs. 2007)

Year	PAGE1	Economically Disadvantaged								
		No			Yes			Total		
		M	SD	N	M	SD	N	M	SD	N
2006	No	1367.24	192.10	91	1158.27	223.77	339	1202.49	233.44	430
	Yes	1368.99	204.02	690	1209.34	230.63	304	1320.16	224.79	994
	Total	1368.78	202.55	781	1182.41	228.29	643	1284.63	233.69	1424
2007	No	1442.09	201.12	251	1251.77	220.31	464	1318.58	232.17	715
	Yes	1459.18	198.86	336	1262.18	243.18	510	1340.42	246.18	846
	Total	1451.87	199.84	587	1257.22	232.51	974	1330.42	240.03	1561

Table 40 indicates the following:

1) Participants in PAGE1 and not at an economic disadvantage in 2006 had a lower mean (*M* = 1368.99, *SD* = 204.02) on reading composite scores compared to those who were not economically disadvantaged participants in PAGE1 in 2007 (*M* = 1459.18, *SD* = 198.86).

2) Participants not in PAGE1 and not at an economic disadvantage in 2006 had a lower mean (*M* = 1367.24, *SD* = 192.10) on reading composite score as compared to non-economically disadvantaged non-participants in 2007 (*M* = 1442.09, *SD* = 201.12).

3) Participants at an economic disadvantage and not in PAGE1 in 2006 had a lower mean (*M* = 1158.27, *SD* = 223.77) on reading composite scores compared to those who were at an economic disadvantage not participants in PAGE1 in 2007 (*M* = 1251.77, *SD* = 220.31).

4) Participants in PAGE1 and at an economic disadvantage in 2006 had a lower mean (*M* = 1209.34, *SD* = 230.63) on reading composite scores compared to participants in PAGE1 and not at an economic disadvantage in 2007 (*M* = 1262.18, *SD* = 243.18).

The ANOVA reveals no significant difference exists for reading composite scores by PAGE1 participation and economic status. However, the ANOVA revealed that a significant difference exists between economic disadvantage and PAGE1 and year (Table 41).

Table 41

ANOVA on 5th Graders Reading Scores by Economically Disadvantaged, PAGE1 and Years (2006 vs. 2007)

Factors	*df*	*F*	Sig.
PAGE1	1	4.58	.032
Economically Disadvantaged	1	405.57	<.001
Year	1	68.81	<.001
PAGE1 * Economically Disadvantaged	1	1.29	.256
PAGE1 *Year	1	0.46	.500
Economically Disadvantaged* Year	1	0.25	.618
Error	2977	(47355.48)	

Note. Value in parentheses represents the mean square error.

Since F (1, 2977) = 405.57, p < .001, the results reveal a significant difference exists between reading composite scores and those who are economically disadvantaged versus those who are not economically disadvantaged. By looking at their means, those who were not economically disadvantaged in 2006 scored better on the reading composite scores (M = 1368.78, SD = 202.55) than those who were economically disadvantaged in 2007 (M = 1257.22, SD = 232.51). These means show an increase in mean scores for this time period for economically disadvantaged students, however, the

means for economically disadvantaged students for 2006 and 2007 are below the state PSSA reading grade 5 mean for 2006 (M = 1310.00, SD = 232.90). Additionally, these means are also below the 2007 state PSSA reading mean (M = 1320.00, SD = 221.90). However, the economically disadvantaged students studied would be within the Basic range (1137 to 1274) for 2006 and for 2007. Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB. Basic scores would not qualify to meet annual yearly progress under NCLB.

A significant difference exists on reading composite score by PAGE1 participation, with $F(1, 2977) = 4.58$, $p = .032$, suggesting that participants did not participate in PAGE1 in 2006 (M = 1202.49, SD = 233.44) had a lower mean on reading composite score compared to participants that did participate in PAGE1 in 2007 (M = 1340.42, SD = 246.18). The 2006 PAGE1 scores (M= 1320.16, SD = 224.79) are above the 2006 state PSSA reading grade 5 mean (M = 1310.00, SD = 232.90) and the 2007 scores are above the 2007 state PSSA reading mean (M = 1320.00, SD = 221.90). However, both years scores are within the Proficient range (1275 to 1496) meeting NCLB requirements. Thus, grade 5 PAGE1 Pennsylvania students made annual yearly progress in reading.

Also, a significant difference exists between reading composite scores by year of participation since $F(1, 2977) = 68.81$, $p < .001$. By looking at their means, those in 2006 scored lower on the reading composite scores (M = 1284.63, SD = 233.69) than those in 2007 (M = 1330.42, SD = 240.03). The 2006 scores are below the 2006 state PSSA reading grade 5 mean (M = M = 1310.00, SD = 232.90) and the 2007 scores are above the 2007 state PSSA reading mean (M = 1320.00, SD = 221.90). However, both

years' scores are within the Proficient range (1275 to 1496) meeting NCLB requirements. Thus, grade 5 Pennsylvania students made annual yearly progress in reading for 2006 and 2007.

Grade 8 2004-2005

Table 42

Means and Standard Deviations for 8th Graders Reading Scores by Economically Disadvantaged, PAGE1 and Years (2004 vs. 2005)

Year	PAGE1	Economically Disadvantaged								
		No			Yes			Total		
		M	SD	N	M	SD	N	M	SD	N
2004	No	1387.47	224.43	576	1327.66	226.32	377	1363.81	226.96	953
	Yes	1411.59	220.92	402	1197.56	229.62	414	1303.00	249.39	816
	Total	1397.39	223.19	978	1259.56	237.00	791	1335.76	239.43	1769
2005	No	1455.96	261.85	583	1356.00	236.86	337	1419.35	257.40	920
	Yes	1404.26	281.21	412	1185.64	260.61	431	1292.49	291.96	843
	Total	1434.55	271.10	995	1260.39	264.22	768	1358.69	281.62	1763

Table 42 indicates the following:

1) Participants in PAGE1 and not at an economic disadvantage in 2004 had a larger mean (*M* = 1411.59, *SD* = 220.92) on reading composite scores compared to those who were not economically disadvantaged participants in PAGE1 in 2005 (*M* = 1404.26, *SD* = 281.21).

2) Participants not in PAGE1 and not at an economic disadvantage in 2004 had a lower mean (*M* = 1387.47, *SD* = 224.43) on reading composite score as compared to non-economically disadvantaged non-participants in 2005 (*M* = 1455.96, *SD* = 261.85).

3) Participants at an economic disadvantage and not in PAGE1 in 2004 had a lower mean (*M* = 1327.66, *SD* = 226.32) on reading composite scores compared to those

who were at an economic disadvantage and not participants in PAGE1 in 2005 (*M* = 1356.00, *SD* = 236.86).

4) Participants in PAGE1 and at an economic disadvantage in 2004 had a larger mean (*M* = 1197.56, *SD* = 229.62) on reading composite scores compared to participants in PAGE1 and not at an economic disadvantage in 2005 (*M* = 1185.64, *SD* = 260.61)

The ANOVA reveals no significant difference exists for reading composite scores by economic status and year. However, the ANOVA revealed that a significant difference exists between economic status, PAGE1 participation and year (Table 43).

Table 43

ANOVA on 8th Graders Reading Scores by Economically Disadvantaged, PAGE1 and Years (2004 vs. 2005)

Factors	*df*	*F*	Sig.
PAGE1*	1	96.44	<.001
Economically Disadvantaged*	1	314.56	<.001
Year*	1	5.39	.020
PAGE1 * Economically Disadvantaged*	1	66.73	<.001
PAGE1 *Year	1	12.08	<.001
Economically Disadvantaged* Year	1	1.79	.181
Error	3524	(59599.72)	

Note. Value in parentheses represents the mean square error.

Since F (1, 3524) = 315.56, p < .001, the results reveal a significant difference exists between reading composite scores and those who are economically disadvantaged versus those who are not economically disadvantaged since p <.001. By looking at their means, those who were not economically disadvantaged scored better on the reading composite scores in 2004 (M = 1397.39, SD = 223.19) than those who were economically disadvantaged in 2005 (M = 1260.39, SD = 264.22). These means show a increase in

mean scores for this time period for economically disadvantaged students, the means for economically disadvantaged students for 2004 and 2005 are below the state PSSA reading grade 8 mean for 2004 (M = 1370.00, SD = 239.70). Additionally, these means are also below the 2005 state PSSA grade 8 reading mean (M = 1360.00, SD = 274.30). For 2004 and 2005, grade 8 economically disadvantaged students would be in the Basic range (1146 to 1279). Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB. Basic scores would not qualify to meet annual yearly progress under NCLB.

A significant difference exists on reading composite score by the interaction between PAGE1 participation and economic disadvantage status, with $F(1, 3524) = 66.73$, $p < .001$, suggesting that participants that were not at an economic disadvantage and did not participate in PAGE1 in 2004 ($M = 1387.47$, $SD = 224.43$) had a larger mean on reading composite score compared to participants that were at an economic disadvantage and did participate in PAGE1 in 2005 ($M = 1185.64$, $SD = 260.61$). The 2004 mean for non-economically disadvantaged and non-PAGE1 students is larger than the 2004 state PSSA reading grade 8 mean (M = 1370.00, SD = 239.70), while the mean for PAGE1 and economically disadvantaged students for 2005 is below the grade 8 state mean in 2005 (M = 1360.00, SD = 274.30). Additionally, the mean for PAGE1 and economically disadvantaged students for 2005 is below the 2005 state PSSA reading mean (M = 1360.00, SD = 274.30). For the years compared, student scores studied for PAGE1 and economically disadvantaged students would not be within the proficient range (1280 to 1472) but in the Basic range (1146 to 1279). Schools scoring in the proficient range would have made annual yearly progress as required under NCLB and

those in the basic range would not have made annual yearly progress. Thus, the economically disadvantaged PAGE1 scores would not meet NCLB requirements.

Since $F(1, 3524) = 96.44$, $p < .001$, a significant difference exists on reading composite score by PAGE1 participation, suggesting that participants that did not participate in PAGE1 in 2004 ($M = 1363.81$, $SD = 226.96$) had a larger mean on reading composite score compared to participants that did participate in PAGE1 in 2005 ($M = 1292.49$, $SD = 291.96$). The 2004 PAGE1 scores (M= 1303.00, SD = 249.39) are below the 2004 state PSSA reading grade 8 mean (M = 1370.00, SD = 239.70) and the 2005 scores are below the 2005 state PSSA reading mean (M = 1360.00, SD = 274.30). However, both years scores are within the Proficient range (1280 to 1472) meeting NCLB requirements. Thus, grade 8 PAGE1 Pennsylvania students made annual yearly progress in reading.

Also, a significant difference exists by year of participation since $F(1, 3524) = 5.39$, $p = .020$. By looking at their means, those who were participants in 2004 (M = 1335.76, SD = 239.43) had a lower mean than those participants in 2005 (M = 1358.69, SD = 281.62). The 2004 scores are below the 2004 state PSSA reading grade 8 mean (M = 1370.00, SD = 239.70) and the 2005 scores are below the 2005 state PSSA reading mean (M = 1360.00, SD = 274.30). However, both years scores are within the Proficient range (1280 to 1472) meeting NCLB requirements. Thus, grade 8 Pennsylvania students made annual yearly progress.

Lastly, a significant difference exists by year and PAGE1 participation since $F(1, 3524) = 12.08$, $p < .001$. By looking at their means, those who were PAGE1 participants in 2004 (M = 1303.00, SD = 249.39) had a larger mean than the PAGE1 participants in

2005 (M = 1292.49, SD = 291.96). The 2004 mean for non-PAGE1 students is below the state PSSA reading grade 8 2004 mean (M = 1370.00, SD = 239.70), while the mean for PAGE1students for 2005 is also below the state mean in 2005 (M = 1360.00, SD = 274.30). For the years compared, student scores studied for PAGE1 in 2004 and 2005 would be within the Proficient range (1280 to 1472). Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB.

Grade 8 2005-2006

Table 44

Means and Standard Deviations for 8th Graders Reading Scores by Economically Disadvantaged, PAGE1 and Years (2005 vs. 2006)

Year	PAGE1	Economically Disadvantaged								
		No			Yes			Total		
		M	SD	N	M	SD	N	M	SD	N
2005	No	1455.96	261.85	583	1356.00	236.86	337	1419.35	257.40	920
	Yes	1404.26	281.21	412	1185.64	260.61	431	1292.49	291.96	843
	Total	1434.55	271.10	995	1260.39	264.22	768	1358.69	281.62	1763
2006	No	1537.20	270.46	623	1407.17	239.92	364	1489.25	266.98	987
	Yes	1490.28	242.98	370	1226.43	252.43	429	1348.61	280.73	799
	Total	1519.72	261.43	993	1309.39	262.56	793	1426.33	281.95	1786

Table 44 indicates the following:

1) Participants in PAGE1 and not at an economic disadvantage in 2005 had a lower mean (*M* = 1404.26, *SD* = 281.21) on reading composite scores compared to those who were not economically disadvantaged participants in PAGE1 in 2006 (*M* = 1490.28, *SD* = 242.98).

2) Participants not in PAGE1 and not at an economic disadvantage in 2005 had a lower mean (*M* = 1455.96, *SD* = 261.85) on reading composite score as compared to non-economically disadvantaged non-participants in 2006 (*M* = 1537.20, *SD* = 270.46).

3) Participants at an economic disadvantage and not in PAGE1 in 2005 had a lower mean (*M* = 1356.00, *SD* = 236.86) on reading composite scores compared to those who were at an economic disadvantage not participants in PAGE1 in 2006 (*M* = 1407.17, *SD* = 239.92).

4) Participants in PAGE1 and at an economic disadvantage in 2005 had a lower mean (*M* = 1185.64, *SD* = 260.61) on reading composite scores compared to participants in PAGE1 and not at an economic disadvantage in 2006 (*M* = 1226.43, *SD* = 252.43)

The ANOVA reveals no significant difference exists for reading composite scores by PAGE1 participation and year. However, the ANOVA revealed that a significant difference exists between economic disadvantage and PAGE1 participation (Table 45).

Table 45

ANOVA on 8th Graders Reading Scores by Economically Disadvantaged, PAGE1 and Years (2005 vs. 2006)

Factors	*df*	*F*	Sig.
PAGE1*	1	161.34	<.001
Economically Disadvantaged*	1	404.92	<.001
Year*	1	53.60	<.001
PAGE1 * Economically Disadvantaged*	1	50.85	<.001
PAGE1 *Year	1	0.03	.874
Economically Disadvantaged* Year*	1	4.52	.034
Error	3541	(66623.68)	

Note. Value in parentheses represents the mean square error.

Since F (1, 3541) = 404.92, p < .001, the results reveal a significant difference exists between reading composite scores and those who are economically disadvantaged

versus those who are not economically disadvantaged since p <.001. By looking at their means, those who were not economically disadvantaged in 2005 scored better on the reading composite scores (M = 1434.55, SD = 271.10) than those who were economically disadvantaged in 2006 (M = 1309.39, SD = 262.56). These means show a increase in mean scores for this time period for economically disadvantaged students, however, the means for economically disadvantaged students for 2005 and 2006 are below the state PSSA reading grade 8 mean for 2005 (M = 1360.00, SD = 274.30). Additionally, these means are also below the 2006 state PSSA grade 8 reading mean (M = 1420.00, SD = 284.70). For 2005, grade 8 economically disadvantaged students would be in the Basic range (1146 to 1279). For 2006, economically disadvantaged students would be in the Proficient range (1280 to 1472). Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB. Basic scores would not qualify to meet annual yearly progress under NCLB.

A significant difference exists on reading composite score by the interaction between PAGE1 participation and economic disadvantage status F (1, 3541) = 50.85, p < .001, suggesting that participants that were not at an economic disadvantage and did not participate in PAGE1 in 2005 (*M* = 1455.96, *SD* = 261.85) had a larger mean on reading composite score compared to participants that were at an economic disadvantage and did participate in PAGE1 in 2006 (*M* = 1226.43, *SD* = 252.43). The 2005 mean for non-economically disadvantaged and non-PAGE1 students is larger than the 2005 state PSSA reading grade 8 mean (M = 1360.00, SD = 274.30), while the mean for PAGE1 and economically disadvantaged students for 2005 is below the grade 8 state mean in 2005 (M = 1360.00, SD = 274.30). Additionally, the mean for PAGE1 and economically

disadvantaged students for 2006 is below the 2006 state PSSA reading mean (M = 1420.00, SD = 284.70). For the years compared, student scores studied for PAGE1 and economically disadvantaged students would not be within the proficient range (1280 to 1472) but in the Basic range (1146 to 1279). Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB and those in the Basic range would not have made annual yearly progress. Thus, the economically disadvantaged PAGE1 scores would not meet NCLB requirements.

Also, a significant difference exists on reading composite score by PAGE1 participation since $F(1, 3541) = 161.34$, $p < .001$, suggesting that participants that did not participate in PAGE1 in 2005 ($M = 1419.35$, $SD = 257.40$) had a larger mean on reading composite score compared to participants that did participate in PAGE1 in 2006 ($M = 1348.61$, $SD = 280.73$). The 2005 PAGE1 scores (M= 1303.00, SD = 249.39) are above the 2005 state PSSA reading grade 8 mean (M = 1360.00, SD = 274.30) and the 2006 scores are below the 2006 state PSSA reading mean (M = 1420.00, SD = 284.70). However, both years scores are within the Proficient range (1280 to 1472) meeting NCLB requirements. Thus, grade 8 PAGE1 Pennsylvania students made annual yearly progress in reading.

A significant difference exists by year of participation since $F(1, 3541) = 53.60$, $p < .001$. By looking at their means, those who were participants in 2005 (M = 1358.69, SD = 281.62) had a lower mean than those participants in 2006 (M = 1426.33, SD = 281.95). The 2005 scores are below the 2005 state PSSA reading grade 8 mean (M = 1360.00, SD = 274.30) and the 2006 scores are above the 2006 state PSSA reading mean (M = 1420.00, SD = 284.70). However, both years scores are within the Proficient range

(1280 to 1472) meeting NCLB requirements. Thus, grade 8 Pennsylvania students made annual yearly progress.

Lastly, a significant difference exists by year and economic disadvantage since F (1, 3541) = 4.52, p = .034. By looking at their means, those who were economically disadvantaged in 2005 (M = 1260.39, SD = 264.22) had a lower mean than the economically disadvantaged participants in 2006 (M = 1309.39, SD = 262.56). The 2005 scores are below the 2005 state PSSA reading grade 8 mean (M = 1360.00, SD = 274.30) and the 2006 scores are below the 2006 state PSSA reading mean (M = 1420.00, SD = 284.70). However, 2005 scores are within the Proficient range (1280 to 1472) meeting NCLB requirements for economically disadvantaged students, while 2006 scores are in the Basic range (1146 to 1279) and do not meet NCLB requirements.

Grade 8 2006-2007

Table 46

Means and Standard Deviations for 8th Graders Reading Scores by Economically Disadvantaged, PAGE1 and Years (2006 vs. 2007)

Year	PAGE1	Economically Disadvantaged								
		No			Yes			Total		
		M	SD	N	M	SD	N	M	SD	N
2006	No	1537.20	270.46	623	1407.17	239.92	364	1489.25	266.98	987
	Yes	1490.28	242.98	370	1226.43	252.43	429	1348.61	280.73	799
	Total	1519.72	261.43	993	1309.39	262.56	793	1426.33	281.95	1786
2007	No	1459.18	199.01	224	1230.87	248.60	417	1310.65	256.59	641
	Yes	1491.55	203.84	295	1268.59	240.93	396	1363.78	251.22	691
	Total	1477.58	202.21	519	1249.24	245.47	813	1338.21	255.11	1332

Table 46 indicates the following:

1) Participants in PAGE1 and not at an economic disadvantage in 2006 had a lower mean (*M* = 1490.28, *SD* = 242.98) on reading composite scores compared to those who were not economically disadvantaged participants in PAGE1 in 2007 (*M* = 1491.55, *SD* = 203.84).

2) Participants not in PAGE1 and not at an economic disadvantage in 2006 had a larger mean (*M* = 1537.20, *SD* = 270.46) on reading composite score as compared to non-economically disadvantaged non-participants in 2007 (*M* = 1459.18, *SD* = 199.01).

3) Participants at an economic disadvantage and not in PAGE1 in 2006 had a larger mean (*M* = 1407.17, *SD* = 239.92) on reading composite scores compared to those who were at an economic disadvantage not participants in PAGE1 in 2007 (*M* = 1230.87, *SD* = 248.60).

4) Participants in PAGE1 and at an economic disadvantage in 2006 had a lower mean (*M* = 1226.43, *SD* = 252.43) on reading composite scores compared to participants in PAGE1 and not at an economic disadvantage in 2007 (*M* = 1268.59, *SD* = 240.93)

The ANOVA reveals no significant difference exists for reading composite scores by economic status and year. However, the ANOVA revealed that a significant difference exists between economic disadvantage and PAGE1 participation (Table 47) as follows:

Table 47

ANOVA on 8th Graders Reading Scores by Economically Disadvantaged, PAGE1 and Years (2006 vs. 2007)

Factors	*df*	*F*	Sig.
PAGE1*	1	18.82	<.001
Economically Disadvantaged*	1	541.35	<.001
Year*	1	33.71	<.001
PAGE1 * Economically Disadvantaged*	1	12.51	<.001
PAGE1 *Year	1	67.20	<.001
Economically Disadvantaged* Year	1	2.50	.114
Error	3110	(59530.16)	

Note. Value in parentheses represents the mean square error.

Since F (1, 3110) = 541.35, p < .001, the results reveal a significant difference exists between reading composite scores and those who are economically disadvantaged versus those who are not economically disadvantaged since p <.001. By looking at their means, those who were not economically disadvantaged in 2006 scored better on the reading composite scores (M = 1519.72, SD = 261.43) than those who were economically disadvantaged in 2007 (M = 1249.24, SD = 245.47). These means show a increase in mean scores for this time period for economically disadvantaged students, however, the means for economically disadvantaged students for 2006 and 2007 are below the state PSSA reading grade 8 mean for 2006 (M = 1420.00, SD = 284.70). Additionally, these means are also below the 2007 state PSSA grade 8 reading mean (M = 1440.00, SD = 249.20). For 2006, grade 8 economically disadvantaged students would be in the Proficient range (1280 to 1472). For 2007, economically disadvantaged students would be in the Basic range (1146 to 1279). Schools scoring in the Proficient range would have

made annual yearly progress as required under NCLB. Basic scores would not qualify to meet annual yearly progress under NCLB.

A significant difference exists on reading composite score by the interaction between PAGE1 participation and economic disadvantage status since $F(1, 3110) = 12.51$, $p < .001$, suggesting that participants that were not at an economic disadvantage and did not participate in PAGE1 in 2006 ($M = 1537.20$, $SD = 270.46$) had a larger mean on reading composite score compared to participants that were at an economic disadvantage and did participate in PAGE1 in 2007 ($M = 1268.59$, $SD = 240.93$). The 2006 mean for non-economically disadvantaged and non-PAGE1 students is larger than the 2006 state PSSA reading grade 8 mean ($M = 1420.00$, $SD = 284.70$), while the mean for PAGE1 and economically disadvantaged students for 2007 is below the grade 8 state mean in 2006 ($M = 1420.00$, $SD = 284.70$). Additionally, the mean for PAGE1 and economically disadvantaged students for 2007 is below the 2007 state PSSA reading mean ($M = 1440.00$, $SD = 249.20$). For the years compared, student scores studied for PAGE1 and economically disadvantaged students would not be within the Proficient range (1280 to 1472) but in the Basic range (1146 to 1279). Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB and those in the Basic range would not have made annual yearly progress. Thus, the economically disadvantaged PAGE1 scores would not meet NCLB requirements.

Also, a significant difference exists on reading composite score by PAGE1 participation with $F(1, 3110) = 18.82$, $p < .001$, suggesting that participants that did not participate in PAGE1 in 2006 ($M = 1489.25$, $SD = 266.98$) had a larger mean on reading composite score compared to participants that did participate in PAGE1 in 2007 ($M =$

1363.78, *SD* = 251.22). The 2006 PAGE1 scores (M = 1348.61, SD = 280.73) are below the 2006 state PSSA reading grade 8 mean (M = 1420.00, SD = 284.70) and the 2007 scores are below the 2007 state PSSA reading mean (M = 1440.00, SD = 249.20). However, both years scores are within the Proficient range (1280 to 1472) meeting NCLB requirements. Thus, grade 8 PAGE1 Pennsylvania students made annual yearly progress in reading.

Since $F(1, 3110) = 33.71$, $p < .001$, a significant difference exists by year of participation since $p < .001$. By looking at their means, those who were participants in 2006 (M = 1426.33, SD = 281.95) had a larger mean than those participants in 2007 (M = 1338.21, SD = 255.11). The 2006 scores are below the 2006 state PSSA reading grade 8 mean (M = 1420.00, SD = 284.70) and the 2007 scores are below the 2007 state PSSA reading mean (M = 1440.00, SD = 249.20). However, both years scores are within the Proficient range (1280 to 1472) meeting NCLB requirements. Thus, grade 8 Pennsylvania students made annual yearly progress.

Lastly, a significant difference exists by year and PAGE1 participation since $F(1, 3110) = 67.20$, $p < .001$. By looking at their means, those who were PAGE1 participants in 2006 (M = 1348.61, SD = 280.73) had a lower mean than the PAGE1 participants in 2007 (M = 1363.78, SD = 251.22). The 2006 scores are below the 2006 state PSSA reading grade 8 mean (M = 1420.00, SD = 284.70) and the 2007 scores are above the 2007 state PSSA reading mean (M = 1440.00, SD = 249.20). However, both years scores are within the Proficient range (1280 to 1472) meeting NCLB requirements. Thus, regardless of year, grade 8 Pennsylvania students in PAGE1 made annual yearly progress.

Grade 11 2004-2005

Table 48

Means and Standard Deviations for 11th Graders Reading Scores by Economically Disadvantaged, PAGE1 and Years (2004 vs. 2005)

Year	PAGE1	Economically Disadvantaged								
		No			Yes			Total		
		M	SD	N	M	SD	N	M	SD	N
2004	No	1337.37	266.30	1149	1205.18	226.49	359	1305.90	263.40	1508
	Yes	1344.41	278.22	1044	1258.45	232.02	275	1326.49	271.42	1319
	Total	1340.72	272.00	2193	1228.29	230.24	634	1315.51	267.32	2827
2005	No	1407.30	296.12	1186	1234.65	267.55	400	1363.75	298.67	1586
	Yes	1389.27	320.18	1011	1249.44	286.28	327	1355.09	317.86	1338
	Total	1399.00	307.48	2197	1241.30	276.04	727	1359.79	307.58	2924

Table 48 indicates the following:

1) Participants in PAGE1 and not at an economic disadvantage in 2004 had a lower mean (*M* = 1344.41, *SD* = 278.22) on reading composite scores compared to those who were not economically disadvantaged participants in PAGE1 in 2005 (*M* = 1389.27, *SD* = 320.18).

2) Participants not in PAGE1 and not at an economic disadvantage in 2004 had a larger mean (*M* = 1337.37, *SD* = 266.30) on reading composite score as compared to non-economically disadvantaged non-participants in 2005 (*M* = 1407.30, *SD* = 296.12).

3) Participants at an economic disadvantage and not in PAGE1 in 2004 had a lower mean (*M* = 1205.18, *SD* = 226.49) on reading composite scores compared to those who were at an economic disadvantage not participants in PAGE1 in 2005 (*M* = 1234.65, *SD* = 267.55).

4) Participants in PAGE1 and at an economic disadvantage in 2004 had a larger mean (M = 1258.45, SD = 232.02) on reading composite scores compared to participants in PAGE1 and not at an economic disadvantage in 2005 (M = 1249.44, SD = 286.28)

The ANOVA reveals no significant difference exists for reading composite scores by PAGE1 participation. However, the ANOVA revealed that a significant difference exists between economic disadvantage and PAGE1 participation (Table 49).

Table 49

ANOVA on 11th Graders Reading Scores by Economically Disadvantaged, PAGE1 and Years (2004 vs. 2005)

Factors	*df*	*F*	Sig.
PAGE1	1	2.61	.106
Economically Disadvantaged*	1	225.73	<.001
Year*	1	14.66	<.001
PAGE1 * Economically Disadvantaged*	1	5.01	.025
PAGE1 *Year	1	3.24	.072
Economically Disadvantaged* Year	1	7.13	.008
Error	5743	(79746.65)	

Note. Value in parentheses represents the mean square error.

Since F (1, 5743) = 225.73, p < .001, the results reveal a significant difference exists between reading composite scores and those who are economically disadvantaged versus those who are not economically disadvantaged since p <.001. By looking at their means, those who were not economically disadvantaged in 2004 scored better on the reading composite scores (M = 1340.72, SD = 272.00) than those who were economically disadvantaged in 2005 (M = 1241.30, SD = 276.04). There are an increase in mean scores for this time period for economically disadvantaged students, however, the means for economically disadvantaged students for 2004 and 2005 are below the state PSSA

reading grade 11 mean for 2004 (M = 1340.00, SD = 272.40). Additionally, these means are also below the 2005 state PSSA grade 11 reading mean (M = 1360.00, SD = 316.50). For 2004 and 2005, economically disadvantaged grade 11 students would be in the Basic range (1112 to 1256). Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB. Basic scores would not qualify to meet annual yearly progress under NCLB.

A significant difference exists on reading composite score by the interaction between PAGE1 participation and economic disadvantage status since F (1, 5743) = 5.01, p = .025, suggesting that participants that were not at an economic disadvantage and did not participate in PAGE1 in 2004 (*M* = 1337.37, *SD* = 266.30) had a larger mean on reading composite score compared to participants that were at an economic disadvantage and did participate in PAGE1 in 2005 (*M* = 1249.44, *SD* = 286.28). The 2004 mean for non-economically disadvantaged and non-PAGE1 students is smaller than the 2004 state PSSA reading grade 11 mean (M = 1340.00, SD = 272.40), while the mean for PAGE1 and economically disadvantaged students for 2005 is below the grade 11 state mean in 2005 (M = 1360.00, SD = 316.50). Additionally, the mean for PAGE1 and economically disadvantaged students for 2005 is below the 2004 state PSSA reading mean (M = 1340.00, SD = 272.40). For the years compared, student scores studied for PAGE1 and economically disadvantaged students would be slightly within the Proficient range (1257 to 1491) for 2004 but in the Basic range (1112 to 1256) for 2005. Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB and those in the Basic range would not have made annual yearly progress. Thus, the economically disadvantaged PAGE1 scores would not meet NCLB requirements in 2005.

Also, a significant difference exists by year of participation since $F(1, 5743) = 14.66$, $p < .001$. By looking at their means, those who were participants in 2004 ($M = 1315.51$, $SD = 267.32$) had a lower mean than those participants in 2005 ($M = 1359.79$, $SD = 307.58$). The 2004 scores are below the 2004 state PSSA reading grade 8 mean ($M = 1340.00$, $SD = 272.40$) and the 2005 scores are below the 2005 state PSSA reading mean ($M = 1360.00$, $SD = 316.50$). However, both years scores are within the Proficient range (1257 to 1491) meeting NCLB requirements. Thus, grade 8 Pennsylvania students made annual yearly progress.

Lastly, a significant difference exists by year of participation and economic disadvantage since $F(1, 5743) = 7.13$, $p = .008$. By looking at their means, those who were economically disadvantaged participants in 2004 ($M = 1228.29$, $SD = 230.24$) had a lower mean than those participants in 2005 ($M = 1241.30$, $SD = 276.04$). The 2004 scores are below the 2004 state PSSA reading grade 8 mean ($M = 1340.00$, $SD = 272.40$) and the 2005 scores are below the 2005 state PSSA reading mean ($M = 1360.00$, $SD = 316.50$). However, both years scores for economically disadvantaged students are within the Basic range (1112 to 1256) not meeting NCLB requirements. Grade 11 results for 2005 to 2006 are as follows in Table 50:

Grade 11 2005 to 2006

Table 50

Means and Standard Deviations for 11th Graders Reading Scores by Economically Disadvantaged, PAGE1 and Years (2005 vs. 2006)

Year	PAGE1	Economically Disadvantaged								
		No			Yes			Total		
		M	SD	N	M	SD	N	M	SD	N
2005	No	1407.30	296.12	1186	1234.65	267.55	400	1363.75	298.67	1586
	Yes	1389.27	320.18	1011	1249.44	286.28	327	1355.09	317.86	1338
	Total	1399.00	307.48	2197	1241.30	276.04	727	1359.79	307.58	2924
2006	No	1391.44	257.34	1076	1230.34	235.94	454	1343.64	261.67	1530
	Yes	1396.48	269.73	1063	1286.93	217.95	411	1365.93	260.94	1474
	Total	1393.94	263.52	2139	1257.23	229.19	865	1354.58	261.51	3004

Table 50 indicates the following:

1) Participants in PAGE1 and not at an economic disadvantage in 2005 had a lower mean (*M* = 1389.27, *SD* = 320.18) on reading composite scores compared to those who were not economically disadvantaged participants in PAGE1 in 2006 (*M* = 1396.48, *SD* = 269.73).

2) Participants not in PAGE1 and not at an economic disadvantage in 2005 had a larger mean (*M* = 1407.30, *SD* = 296.12) on reading composite score as compared to non-economically disadvantaged non-participants in 2006 (*M* = 1391.44, *SD* = 257.34).

3) Participants at an economic disadvantage and not in PAGE1 in 2005 had a larger mean (*M* = 1234.65, *SD* = 267.55) on reading composite scores compared to those who were at an economic disadvantage not participants in PAGE1 in 2006 (*M* = 1230.34, *SD* = 235.94).

4) Participants in PAGE1 and at an economic disadvantage in 2005 had a lower mean (*M* = 1249.44, *SD* = 286.28) on reading composite scores compared to participants in PAGE1 and not at an economic disadvantage in 2006 (*M* = 1286.93, *SD* = 217.95)

The ANOVA reveals no significant difference exists for reading composite scores by PAGE1 participation. However, the ANOVA revealed that a significant difference exists between economic disadvantage and PAGE1 participation (Table 51).

Table 51

ANOVA on 11th Graders Reading Scores by Economically Disadvantaged, PAGE1 and Years (2005 vs. 2006)

Factors	*df*	*F*	Sig.
PAGE1	1	3.19	.074
Economically Disadvantaged*	1	317.75	<.001
Year	1	0.56	.453
PAGE1 * Economically Disadvantaged	1	6.65	.010
PAGE1 *Year	1	3.93	.047
Economically Disadvantaged* Year	1	1.64	.201
Error	5920	(77005.40)	

Note. Value in parentheses represents the mean square error.

Since F (1, 5920) = 317.75, p < .001, the results reveal a significant difference exists between reading composite scores and those who are economically disadvantaged versus those who are not economically disadvantaged. By looking at their means, those who were not economically disadvantaged in 2005 scored better on the reading composite scores (M = 1399.00, SD = 307.48) than those who were economically disadvantaged in 2006 (M = 1257.23, SD = 229.19). There are an increase in mean scores for this time period for economically disadvantaged students, however, the means for economically disadvantaged students for 2005 and 2006 are below the state PSSA

reading grade 11 mean for 2005 (M = 1360.00, SD = 316.50). Additionally, these means are also below the 2006 state PSSA grade 11 reading mean (M = 1370.00, SD = 278.50). For 2005, economically disadvantaged grade 11 students would be in the Basic range (1112 to 1256). Basic scores would not qualify to meet annual yearly progress under NCLB. For 2006, economically disadvantaged grade 11 students were slightly in the Proficient range (1257 to 1491) meeting NCLB requirements.

A significant difference exists on reading composite score by the interaction between PAGE1 participation and economic disadvantage status F (1, 5743) = 5.01, p = .010, suggesting that participants that were not at an economic disadvantage and did not participate in PAGE1 in 2005 (*M* = 1407.30, *SD* = 296.12) had a larger mean on reading composite score compared to participants that were at an economic disadvantage and did participate in PAGE1 in 2006 (*M* = 1286.93, *SD* = 217.95). The 2005 mean for non-economically disadvantaged and non-PAGE1 students is above the 2005 state PSSA reading grade 11 mean (M = 1360.00, SD = 316.50), while the mean for PAGE1 and economically disadvantaged students for 2006 is below the grade 11 state mean in 2006 (M = 1370.00, SD = 278.50). Additionally, the mean for PAGE1 and economically disadvantaged students for 2006 is below the 2005 state PSSA reading mean (M = 1360.00, SD = 316.50). For the years compared, student scores studied for PAGE1 and economically disadvantaged students would be within the Proficient range (1257 to 1491) for 2006. Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB. Thus, the economically disadvantaged PAGE1 scores would meet NCLB requirements in 2006.

Also, a significant difference exists by year of participation and PAGE1 participation since F (1, 5743) = 3.93, p = .047. By looking at their means, those who were not PAGE1 participants in 2005 (M = 1363.75, SD = 298.67) had a lower mean than those PAGE1 participants in 2006 (M = 1365.93, SD = 260.94). The 2005 scores are above the 2005 state PSSA reading grade 11 mean (M = 1360.00, SD = 316.50) and the 2006 scores are below the 2006 state PSSA reading mean (M = 1370.00, SD = 278.50). However, both years scores are within the Proficient range (1257 to 1491) meeting NCLB requirements. Thus, grade 11 Pennsylvania PAGE1 students made annual yearly progress.

Grade 11 2006-2007

Table 52

Means and Standard Deviations for 11th Graders Reading Scores by Economically Disadvantaged, PAGE1 and Years (2006 vs. 2007)

Year	PAGE1	Economically Disadvantaged								
		No			Yes			Total		
		M	SD	N	M	SD	N	M	SD	N
2006	No	1391.44	257.34	1076	1230.34	235.94	454	1343.64	261.67	1530
	Yes	1396.48	269.73	1063	1286.93	217.95	411	1365.93	260.94	1474
	Total	1393.94	263.52	2139	1257.23	229.19	865	1354.58	261.51	3004
2007	No	1457.79	198.27	284	1253.11	224.12	548	1322.98	236.39	832
	Yes	1459.18	198.86	336	1263.44	243.06	505	1341.64	245.81	841
	Total	1458.54	198.44	620	1258.06	233.34	1053	1332.36	241.28	1673

Table 52 indicates the following:

1) Participants in PAGE1 and not at an economic disadvantage in 2006 had a lower mean (*M* = 1396.48, *SD* = 269.73) on reading composite scores compared to those

who were not economically disadvantaged participants in PAGE1 in 2007 (*M* = 1459.18, *SD* = 198.86).

2) Participants not in PAGE1 and not at an economic disadvantage in 2006 had a lower mean (*M* = 1391.44, *SD* = 257.34) on reading composite score as compared to non-economically disadvantaged non-participants in 2007 (*M* = 1457.79, *SD* = 198.27).

3) Participants at an economic disadvantage and not in PAGE1 in 2006 had a lower mean (*M* = 1230.34, *SD* = 235.94) on reading composite scores compared to those who were at an economic disadvantage not participants in PAGE1 in 2007 (*M* = 1253.11, *SD* = 224.12).

4) Participants in PAGE1 and at an economic disadvantage in 2006 had a larger mean (*M* = 1286.93, *SD* = 217.95) on reading composite scores compared to participants in PAGE1 and not at an economic disadvantage in 2007 (*M* = 1263.44, *SD* = 243.06)

The ANOVA reveals no significant difference exists for reading composite scores by PAGE1 participation and economic status. However, the ANOVA revealed that a significant difference exists between economic disadvantage and year of participation (Table 53) as follows:

Table 53

ANOVA on 11th Graders Reading Scores by Economically Disadvantaged, PAGE1 and Years (2006 vs. 2007)

Factors	*df*	*F*	Sig.
PAGE1*	1	5.44	.020
Economically Disadvantaged*	1	455.27	<.001
Year*	1	16.65	<.001
PAGE1 * Economically Disadvantaged	1	3.70	.055
PAGE1 *Year	1	2.52	.113
Economically Disadvantaged* Year*	1	17.03	<.001
Error	4669	(58850.11)	

Note. Value in parentheses represents the mean square error.

Since F (1, 4669) = 455.27, p < .001, the results reveal a significant difference exists between reading composite scores and those who are economically disadvantaged versus those who are not economically disadvantaged. By looking at their means, those who were not economically disadvantaged in 2006 scored better on the reading composite scores (M = 1393.94, SD = 263.52) than those who were economically disadvantaged in 2007 (M = 1258.06, SD = 233.34). There are an increase in mean scores for this time period for economically disadvantaged students, however, the means for economically disadvantaged students for 2006 and 2007 are below the state PSSA reading grade 11 mean for 2006 (M = 1370.00, SD = 278.50). Additionally, these means are also below the 2007 state PSSA grade 11 reading mean (M = 1350.00, SD = 266.90). For 2006 and 2007, economically disadvantaged grade 11 students would be in the Proficient range (1257 to 1491) meeting NCLB requirements.

A significant difference exists on reading composite score by PAGE1 participation F (1, 4669) = 5.44, p = .020, suggesting that participants that did not

participate in PAGE1 in 2006 (*M* = 1343.64, *SD* = 245.81) had a larger mean on reading composite score compared to participants that did participate in PAGE1 in 2007 (*M* = 1341.64, *SD* = 245.81). The 2006 PAGE1 scores (M = 1365.93, SD = 260.94) are below the 2006 state PSSA reading grade 11 mean (M = 1370.00, SD = 278.50) and the 2007 scores are below the 2007 state PSSA reading mean (M = 1350.00, SD = 266.90). However, both years scores are within the Proficient range (1257 to 1491) meeting NCLB requirements. Thus, grade 11 PAGE1 Pennsylvania students made annual yearly progress in reading.

Also, a significant difference exists by year of participation since F (1, 4669) = 16.65, $p < .001$. By looking at their means, those who were participants in 2006 (M = 1354.58, SD = 261.51) had a larger mean than those participants in 2007 (M = 1332.36, SD = 241.28). The 2005 scores are above the 2006 state PSSA reading grade 11 mean (M = 1370.00, SD = 278.50) and the 2007 scores are below the 2007 state PSSA reading mean (M = 1350.00, SD = 266.90). However, both years scores are within the Proficient range (1257 to 1491) meeting NCLB requirements. Thus, grade 11 Pennsylvania students made annual yearly progress.

Lastly, a significant difference exists by year of participation and economic disadvantage since F (1, 4669) = 17.03, $p < .001$. By looking at their means, those who were economically disadvantaged participants in 2006 (M = 1257.23, SD = 229.19) had a lower mean than those participants in 2007 (M = 1258.06, SD = 233.34). The 2006 scores are below the 2006 state PSSA reading grade 11 mean (M = 1370.00, SD = 278.50) and the 2007 scores are below the 2007 state PSSA reading mean (M = 1350.00, SD =

266.90). However, both years scores for economically disadvantaged students are within the Proficient range (1257 to 1491) meeting NCLB requirements.

Question 6 Analysis

Is there any significant difference in overall student achievement between grades 5 and 8 and grades 8 and 11 in PAGE1 schools with grade 5 students moving to only one grade 8 school and grade 8 students moving to only one grade 11 school?

Null Hypothesis: No significant difference between grade levels.

Comparison of schools is at the 0.05 significance level.

To analyze question 6, an analysis of variance (ANOVA) was conducted to determine if mean differences exist on math/reading composite scores (dependant variable) by economic disadvantage and PAGE1 participation (independent variables).

Means and standard deviations for math/reading composite by PAGE1 and economic disadvantage are presented in Table 54 as follows:

Table 54

Means and Standard Deviations for Math/Reading Composite Scores for Participants Vertically Aligned by Grades in Years 2004 and 2007 by Economically Disadvantaged and PAGE1

PAGE1	Economically Disadvantaged								
	No			Yes			Total		
	M	SD	N	M	SD	N	M	SD	N
No	1398.25	185.64	391	1278.36	203.16	860	1315.83	205.44	1251
Yes	1436.73	196.13	706	1238.41	202.98	979	1321.51	222.74	1685
Total	1423.02	193.25	1097	1257.09	203.99	1839	1319.09	215.52	2936

Table 54 indicates the following:

1) Participants in PAGE1 and not at an economical disadvantage had a larger mean (*M* = 1436.73, *SD* = 196.13) on math/reading composite scores compared to those who were economically disadvantaged participants in PAGE1 (*M* = 1238.41, *SD* = 202.98).

2) Participants not in PAGE1 and not at an economic disadvantage had a larger mean (*M* = 1398.25, *SD* = 185.64) on math/reading composite score as compared to economically disadvantaged non-participants (*M* = 1278.36, *SD* = 203.16).

3) Participants at an economic disadvantage and not in PAGE1 had a larger mean (*M* = 1278.36, *SD* = 203.16) on math/reading composite scores compared to those who were economic disadvantaged participants in PAGE1 (*M* = 1238.41, *SD* = 202.98).

4) Participants in PAGE1 and not at an economic disadvantage had a larger mean (*M* = 1436.73, *SD* = 196.13) on math/reading composite scores compared to participants not in PAGE1 and not at an economic disadvantage had a larger mean (*M* = 1398.25, *SD* = 185.64).

The results of the ANOVA revealed that a significant difference exists for math/reading composite scores for PAGE1 participation and by economic disadvantage. Independent t-tests revealed the following significant findings: 1) For participants in PAGE1, those not at an economic disadvantage, *t* (1683) = 20.07, *p* <.001 had a larger mean (*M* = 1436.73, *SD* = 196.13) on math/reading composite scores compared to the economically disadvantaged participants (*M* = 1238.41, *SD* = 202.98). 2) For participants not in PAGE1, those not at an economic disadvantage, *t* (1249) = 9.94, *p* <.001 had a larger mean (*M* = 1398.25, *SD* = 185.64) on math/reading composite scores compared to

the economically disadvantaged (*M* = 1278.36, *SD* = 203.16). 3) For those participants not at an economic disadvantage, that were in PAGE1, *t* (1095) = 3.17, *p* =.002 had a larger mean (*M* = 1436.73, *SD* = 196.13) on math/reading composite scores compared to participants that were not in PAGE1 (*M* = 1398.25, *SD* = 185.64). 4) For those participants at an economic disadvantage, that were not in PAGE1, *t* (1837) = 4.21, *p* <.001 had a larger mean (*M* = 1278.36, *SD* = 203.16) on math/reading composite scores compared to participants in PAGE1 (*M* = 1238.41, *SD* = 202.98).

The ANOVA reveals no significance exists for math/reading composite scores by PAGE1 participation. However, the ANOVA revealed that significance exists between economic disadvantage and PAGE1 participation (Table 55).

Table 55

ANOVA on Math/Reading Composite Scores for Participants Vertically Aligned by Grades in Years 2004 and 2007 by Factors of Economic Disadvantage and PAGE1

Factors	*df*	*F*	Sig.
PAGE1	1	0.01	.925
Economically Disadvantaged	1	414.52	<.001
PAGE1 * Economically Disadvantaged	1	25.18	<.001
Error	2932	(39668.57)	

Note. Value in parentheses represents the mean square error.

Since F (1, 2932) = 414.52, p < .001, the results reveal that a significant difference exists between math/reading composite scores and those who are economically disadvantaged versus those who are not economically disadvantaged. By looking at their means, those who were not economically disadvantaged scored better on the

math/reading composite scores (M = 1423.02, SD = 193.25) than those who were economically disadvantaged (M = 1257.09, SD = 203.99).

The mean for economically disadvantaged students is below the state PSSA composite math/reading mean (M = 1378.13, SD = 234.27). However, the economically disadvantaged students studied would be within the composite math/reading Proficient range (1175 to 1496) for grades 5 and 8. Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB. Basic scores would not qualify to meet annual yearly progress under NCLB. Economically disadvantaged student scores would meet NCLB requirements.

The results also reveal that a significant difference exists on math/reading composite score by the interaction between PAGE1 participation and economic disadvantage status since $F(1, 2932) = 25.18$, $p < .001$, suggesting that participants that were not at an economic disadvantage and did not participate in PAGE1 (M = 1398.25, SD = 185.64) had a larger mean on math/reading composite score compared to participants that were at an economic disadvantage and did participate in PAGE1 (M = 1238.41, SD = 202.98).

The mean for non-economically disadvantaged and non-PAGE1 students is below the state PSSA composite math/reading mean (M = 1423.02, SD = 193.25), while the mean for PAGE1 and economically disadvantaged students is also below state composite mean. Additionally, the mean for PAGE1 and economically disadvantaged students for the years compared would be within the composite math/reading Basic range (1158 to 1311) for grades 5 and 8. Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB and those in the Basic range would not

have made annual yearly progress. Thus, the economically disadvantaged PAGE1 scores would not meet NCLB requirements.

Summary

The purpose of this multi-year, quantitative study is to determine if the Pennsylvania Achievement Gap Effort (PAGE1) was significantly effective or not in increasing student achievement in mathematics and literacy for economically disadvantaged students for the 16 PAGE1 schools as compared to 16 significantly similar selected schools with similar socioeconomic status, school structure, demographic setting and student population size to be studied over a three year time period.

In overall reading and math achievement, the economically disadvantaged PAGE1 scores would meet NCLB requirements but scored below the non-PAGE1 and non-economically disadvantaged students. However, the means for economically disadvantaged students are consistently below the state PSSA means regardless of subject or combined subjects. The mean for non-economically disadvantaged and non-PAGE1 students is larger than the state PSSA composite math/reading mean (M = 1366.67, SD = 249.54), while the mean for PAGE1 and economically disadvantaged students is below state composite mean. Additionally, the mean for PAGE1 and economically disadvantaged students for the years compared would be within the composite math/reading Proficient range (1257 to 1508).

In mathematics, the mean for economically disadvantaged students is below the state PSSA composite math mean (M = 1371.67, SD = 239.43). However, the economically disadvantaged students studied would be within the composite math Basic range (1158 to 1311) for grades 5, 8 and 11. Additionally, the mean for PAGE1 and

economically disadvantaged students for the years compared would not be within the composite math Proficient range (1284 to 1508) for grades 5, 8 and 11.

For reading, the mean for economically disadvantaged students is below the state PSSA composite reading mean (M = 1361.67, SD = 259.55). Additionally, the economically disadvantaged students studied would be within the composite reading Basic range (1112 to 1279) for grades 5, 8 and 11. Additionally, the mean for PAGE1 students for the years compared would be within the composite reading Proficient range (1257 to 1496) for grades 5, 8 and 11, thus meeting NCLB requirements.

CHAPTER V

CONCLUSIONS

Introduction

The purpose of this quantitative study was to determine if the Pennsylvania Achievement Gap Effort (PAGE1) was significantly effective or not in increasing student achievement in mathematics and literacy for economically disadvantaged students for the 16 PAGE1 schools as compared to 16 similarly selected schools with similar socioeconomic status, school structure, demographic setting and student population size over a three year time period. Mosteller (1995) states three years of multi-year data are needed when comparing student achievement growth to determine a sustained increase in achievement. Coleman et. al. (1966) and Jencks et. al. (1972) have indicated that external factors make an impact on student achievement. However, Brophy and Good (1986), Sanders (1997) and Wright et. al. (1997) have indicated that the quality of the teacher makes the difference in student achievement. Yet, Edmonds (1982), Rutter (2001), Barton (2003), Parrett (2005) and Fullan (2006) have identified a plethora of factors that influence the achievement of students and are linked to a school which is effective with students.

The Elementary and Secondary Education Act (ESEA) is the main federal education law and was first passed by congress in 1965. Most of the nation's schools receive some form of financial aid under the law. The ESEA is revised every 5 to 7 years. The overall purpose of the law was to improve education for economically disadvantaged children. Funding through the ESEA is channeled through the states and proportioned to local education agencies based on their proportion of impoverished children (USDOE,

2007). Singham (1998) and Carter (2001) discuss several factors impacting the achievement of students but include lack of funding to schools and socioeconomic status of students as direct hindrances to the achievement of students. The Education Trust (2007) also cites poverty as a direct cause for lack of student achievement but also has researched schools in which the poverty issue has become a non-issue. Robinson (2004) has found the same successes with impoverished students as the Education Trust because of parent involvement and highly skilled teachers.

Accountability for public schools followed the federal funds of the ESEA. In 1969 the National Assessment of Educational Progress (NAEP) began reporting achievement scores in reading, mathematics, science, writing, U.S. history, civics, geography and the arts (NCES, 2003). The NAEP, the nation's report card, supplies data for national and state informational needs. Educational policy makers have used this objective measurement to evaluate the progress of our nation's schools. The NAEP offers results regarding subject-matter achievement, instructional experiences and school environment for overall populations of grade level students and subgroups of those populations. The NAEP has become a reflection of the success or lack thereof of education in America. Molen (2005) has found support that these programmatic changes geared to low income students are the manner in which to increase student achievement. Miller (2004) and McCaffery et. al. (2001) the instructional strategies used by teachers as the foremost influence on student achievement.

The No Child Left Behind Act (NCLB) of 2001, signed into law on January 8, 2002, has taken accountability to the level of a national commitment to eliminate the achievement gap shown to exist through the results of the NAEP. This major federal

education reform amended and reauthorized the Elementary and Secondary Education Act (ESEA), which provides most federal K-12 support and regulations and accounts for about 40% of school technology resources (USDOE, 2004). Thus, the status of judging of the success or failure of American schools has been reduced to looking at data alone not the human factors, nor the external influences nor the effect of instructional practices. All of these play an important role in the shaping of the American education system.

Under the NCLB Act, school districts and each school within the districts must use federally approved assessment instrument to measure the achievement of students in grades 3 through 8 and one grade level between 10^{th} and 12^{th} grades by 2005-2006. Districts must assess these students in reading and math and break the data into subgroups based on ethnicity, minority status, economic background, gender, proficiency in English and students with disabilities. The subgroup students have academic and external factors that influence their performance but this is not considered in the reporting of their scores. In Pennsylvania, the approved assessment is the Pennsylvania System of School Assessment (PSSA). Using disaggregated data from the PSSA, the high achievement of the majority of students cannot skew the low achievement of other groups of students in the schools. In order to meet the law's requirement of adequate yearly progress, the state establishes benchmarks for proficiency in math and reading, which must be federally approved.

Attempting to meet Federal challenges, the Pennsylvania Achievement Gap Effort (PAGE1) was a statewide initiative with the purpose of to responding to closing the achievement gap between groups of students. The Pennsylvania Department of Education, the Pennsylvania State Board of Education, the Education Trust and the

Pennsylvania Association of Intermediate Units combined efforts to identify 16 schools in Pennsylvania with achievement gaps and to work with these schools to close the achievement gap. Pennsylvania has one of the largest achievement gaps in the country as per NAEP 2003 results (Education Trust, 2004). The Education Trust reports that in grade 4 reading Pennsylvania poor students have 14% proficiency on the NAEP as compared to 44% of students who are not poor. In mathematics for Pennsylvania grade 8 students, the NAEP proficiency is 10% for economically disadvantaged students and 38% for non-economically disadvantaged students. Additional information compiled by the Education Trust (2004), indicated that by the end of 11th grade in Pennsylvania not even half of economically disadvantaged students reach even basic levels in reading and mathematics.

This study determined the degree of success of Pennsylvania's PAGE1 project in reference to increasing the achievement of economically disadvantaged students in reading and mathematics. Provided in this chapter are the conclusions as to the success of the PAGE1 project, especially in regards to economically disadvantaged participants. Using the individual, PSSA, scaled scores of the economically disadvantaged subgroup for all PAGE1 schools and the comparison schools, as provided by the Pennsylvania Department of Education on a secure eMetric site, statistical analyses were conducted to compare all PAGE1 and comparison schools with overall data, mathematics data and reading data for economically disadvantaged students in grades 5, 8 and 11. The time frame most important was between 2004, the baseline year, and 2007, the final year, of the three year project. Regardless of this effort and any others to increase student

achievement, the challenge issued to all schools, districts and states from the federal government is to have all students be proficient in math and reading by 2014.

Summary of Findings

Economically disadvantaged is defined by the United States Department of Education and the Pennsylvania Department of Education (PDE), as those students qualifying for free and reduced lunches. Family income guidelines are set and used by both the federal and state government to determine eligibility for the program on an annual basis. Eligibility for free and reduced-price lunches is determined by students' household income in relation to the federally established poverty level. This poverty level is set by the Federal Government and varies from year to year. Free lunch qualification is set at 130 percent of the poverty level and reduced price lunch qualification is set at between 130 and 185 percent of the poverty level (USDOE, 2004). This economic determination is used by all schools in the United States to determine the socioeconomic status of the students they serve. These low-income students have less access to high quality teachers they need to succeed in school (Education Trust, 2008).

Poverty is a major component of the PAGE1 study and has impacted the PSSA results' of the participant and comparison schools in a manner consistent with previous research. Research has shown that poverty adversely impacts student achievement more than any other identifiable student subgroup characteristic (Education Trust, 2007). Free/Reduced lunch percentages were the first school characteristic used to identify comparison schools in this study because of the importance of the impact of poverty on students, families and schools. Poverty was the only common identifiable subgroup that was consistently present for all PAGE1 schools, comparison schools and all other schools

that exist. The PAGE1 and comparison schools studied fell between 22% and 72% for free/reduced lunches. The average free and reduced lunch percentage for the PAGE1 schools (48.12%) is comparable to the comparison schools (48.25%). Therefore, there is no significant difference between the PAGE1 schools and comparison schools in terms of their poverty levels. Almost half of the students studied live in poverty, as defined by our federal government. Matched by their poverty levels, any effects of the PAGE1 program could be identified by examining the differences in achievement performance between PAGE1 schools and the comparison schools.

Table 56 shows the comparison of overall results based on PAGE1 participation, and economic status. The results are broken down into composite math/reading, composite math, composite reading and the comparison of vertically aligned schools. The table also shows the comparison of scaled score results and acceptance of the null hypothesis. Table 56 follows on the next page.

Table 56

Overall Comparison of Scaled Scores, Proficiency and Null Hypothesis by Economic Disadvantage and PAGE1 Participation

Overall	Years Studied	Achievement Comparison of Means	Proficient for AYP Yes/No		Accept Null Hypothesis Yes/No	
		ED/P1 v.ED/NP1	ED/P1	ED/NP1	Y	N
Math/ Reading	2004-2007	<	N	N	Y	
Math	2004-2007	<	N	N	Y	
Reading	2004-2007	<	N	N	Y	
Vertically Aligned Schools	2004-2007	<	N	N	Y	

*ED = Economically Disadvantaged NED = non-Economically Disadvantaged
P1 = PAGE1 NP1 = non-PAGE1 AYP = Annual Yearly Progress

The results of this study support the Education Trust research that economically disadvantaged students still do not do as well academically as non-economically disadvantaged students. Any addition of economically disadvantaged student scores into the mix of PAGE1 participants adversely impacted student scores. Once economically disadvantaged student scores were combined with other PAGE1 students there was there no significance of the impact of PAGE1. Additionally, all of the composite math, reading and vertical aligned situations scores were not proficient on the PSSA and thereby did not meet NCLB requirements. Since scores would not meet the law, there would be probable cause to further look at the student results. Schools not meeting AYP would have sanctions placed on them by the state. Also, in reviewing the composite scores for math, reading and the vertically aligned schools, the PAGE1 economically disadvantaged

students had scores below the non-economically disadvantaged students for each of the years of this study (Table 56).

Overall Math/Reading

Research question 1 asked if there was any significant difference in the overall achievement for economically disadvantaged students for the PAGE1 schools as compared to non-PAGE1 schools of similar student population size, school grade level structure, demographic setting and free and reduced lunch percentage. For research questions 1, the null hypothesis held true that PAGE1 did not make a significant difference for schools as compared to similar counterparts.

Overall scores indicate the mean for economically disadvantaged students and the mean for PAGE1/economically disadvantaged students is below the non-economically disadvantaged/non-PAGE1 scores. Interestingly, the PAGE1 project alone did not have any significance on increasing economically disadvantaged student scores. The economically disadvantaged and economically disadvantaged/PAGE1 scores did not have a significant increase as compared to non-economically disadvantaged students and non-PAGE1 schools. However, these scores would not be within the composite math/reading Proficient range for grades 5, 8 and 11. Overall, economically disadvantaged and PAGE1/economically disadvantaged students scores would not meet NCLB requirements. Importantly, when NCLB requirements are continually met by groups/subgroups of students, it tends to go unnoticed that these student scores are still behind other groups of students. Therefore, the economically disadvantaged students never have the support to get to the same academic level as their non-economically disadvantaged counterparts.

Overall Math

Research question 2 asked if there was any significant difference in overall mathematics achievement for economically disadvantaged for the PAGE1 schools compared to non-PAGE1 schools of similar student population size, school grade level structure, demographic setting and free and reduced lunch percentage. Overall, the mean for PAGE1/economically disadvantaged students is below the composite math mean of similar students in similar schools. Most importantly, the economically disadvantaged students and the PAGE1/economically disadvantaged students studied would be within the composite math Basic range for grades 5, 8 and 11 for Annual Yearly Progress (AYP) purposes. Basic scores would not qualify to meet annual yearly progress under NCLB. Since this violates the NCLB law, if this were a school or a district, sanctions would be placed on that school and district by the Pennsylvania Department of Education. If the school has 40 or more students in the economically disadvantaged subgroup, the sanctions would also begin, even if combined with non-economically disadvantaged scores, the school and district would make AYP.

Once again with mathematics, PAGE1 participation had no significant impact on increasing student scores regardless of economic status. Therefore, the null hypothesis also holds true for mathematics. Economic status and the combination of economic status/PAGE1 participation also had no significant impact on increasing student scores. However, the students at an economic disadvantage and the economically disadvantaged PAGE1 students did not make annual yearly progress as required under NCLB.

Overall Reading

Research question 3 asked if there was any significant difference in the overall reading achievement for economically disadvantaged students for the PAGE1 schools as compared to non-PAGE1 schools of similar student population size, school grade level structure, demographic setting and free and reduced lunch percentage.

The means for economically disadvantaged and PAGE1 students are below the composite reading mean. Additionally, the economically disadvantaged students studied would be within the composite reading Basic range for grades 5, 8 and 11. Additionally, the mean for PAGE1 students for the years compared would be within the composite reading Proficient range for grades 5, 8 and 11. Thus, the PAGE1 scores would meet NCLB requirements but economically disadvantaged scores would not meet NCLB requirements.

Once again with reading, PAGE1 participation had no significant impact on increasing student scores regardless of economic status. Therefore, the null hypothesis also holds true for reading because the combination of PAGE1/economic disadvantage had no impact on student scores.

Economic status and the combination of economic status/PAGE1 participation also had no significant impact on increasing student scores and scores remained in the Basic range not making AYP (Table 56). The students at an economic disadvantage also did not make annual yearly progress as required under NCLB. Yet, PAGE1 students did make annual yearly progress.

Vertically Aligned by Grade 5 to 8

The last question to answer was to determine if there was any significant difference in overall student achievement between grades 5 and 8 and grades 8 and 11 in PAGE1 schools with grade 5 students moving to only one grade 8 school and grade 8 students moving to only one grade 11 school (vertically aligned). This anomaly only occurred from grade 5 to grade 8 with a select group of schools and again the focus is on PAGE1 and economic disadvantage students.

The mean for economically disadvantaged students is below the PSSA composite math/reading means but the mean for economically disadvantaged students did increase. The economically disadvantaged students studied would not be within the composite math/reading Proficient range for grades 5 and 8. Schools scoring in the Proficient range would have made annual yearly progress as required under NCLB.

The mean for PAGE1 and economically disadvantaged students is also below the composite mean and did not increase. Additionally, the mean for PAGE1 and economically disadvantaged students for the years compared would be within the composite math/reading Basic range for grades 5 and 8. Schools scoring in the Basic range would not have made annual yearly progress. Thus, the economically disadvantaged PAGE1 scores would not meet NCLB requirements (Table 56).

PAGE1 had no significance on increasing scores for economically disadvantaged students. PAGE1/economically disadvantaged students still scored significantly lower than the comparison students. The null hypothesis that PAGE1 had no significant effect on economically disadvantaged scores again holds true.

In the four areas discussed, the null hypothesis was accepted each time. Therefore, the non-economically disadvantaged, non-PAGE1 students outperformed the PAGE1 economically disadvantaged students. There could be several reasons for this. Foremost, would be how far behind the economically disadvantaged students started out compared to the non-economically disadvantaged students. The PAGE1 project was studied for the three year period for which it officially was underway. As recommended by all PAGE1 teams to the Pennsylvania Department of Education and the Pennsylvania State Board, the three years was a good start but the support efforts of PDE, the assistance from the Education Trust and the sharing and studying of best practices as discovered by the PAGE1 schools need to be extended and continued past the original three years. Unfortunately, the PAGE1 project ended without any further extension.

The PSSA scaled scores can provide indicators as to areas of academic need for the students but does not identify the community, family, school, teacher and classroom needs that students may also have nor how the school may or may not address these factors. Teachers may have restructured curriculum to meet state standards but there would be no evidence to support this with data if it was done (Marzano,1998; Singham, 1998). Teachers may have revamped the curriculum but their instructional strategies are not appropriate to promote student engagement and foster student success (Parrett, 2005; Barton, 2003). Parent involvement may not be present in the PAGE1 schools or with economically disadvantaged students (Miller, 2004). The data would not reflect this either. The data also would not indicate if the community, parents and schools place an emphasis on the need for education and therefore student experiences for the

impoverished students are lacking and achievement remains behind (Carter, 2001; Robinson, 2004).

Math: Between Years 2004 to 2007 and by Grades 5,8,11

Table 57 shows the results of the math comparison between years by PAGE1 participation and economic status. The table also shows the comparison of scaled score results and acceptance of the null hypothesis.

Table 57

Math Comparison of Scaled Scores, Proficiency and Null Hypothesis by Economic Disadvantage and PAGE1 Participation Between Years 2004 to 2007

Math	Between Years	Increase in Mean Scaled Scores Yes/No		Proficient for AYP Yes/No		Accept Null Hypothesis Yes/No	
		ED/P1	ED/NP1	ED/P1	ED/NP1	Y	N
Grade 5							
	2004-2005	Y	Y	Y	Y	Y	
	2005-2006	N	N	Y	Y	Y	
	2006-2007	N	N	N	N	Y	
Grade 8							
	2004-2005	Y	Y	N	Y	Y	
	2005-2006	Y	Y	N	Y	Y	
	2006-2007	N	N	N	N	Y	
Grade 11							
	2004-2005	Y	Y	N	N	Y	
	2005-2006	Y	Y	N	N	Y	
	2006-2007	N	Y	N	N	Y	

*ED = Economically Disadvantaged NED = non-Economically Disadvantaged
P1 = PAGE1 NP1 = non-PAGE1 AYP = Annual Yearly Progress

Research question 4 asked if there was any a significant difference in overall mathematics achievement from year to year (by grades 5, 8, 11) for economically disadvantaged students in the PAGE1 schools as compared to non-PAGE1 schools of

similar student population size, grade level school structure, demographic setting and free and reduced lunch percentage?

For fifth grade students studied, scores only increased for economically disadvantaged students during 2004-2005 but not for PAGE1 students or the combination of PAGE1 and economically disadvantaged students (Table 57). In fact, for the years 2005 to 2006 to 2007 there were no significant increases in student scores for economically disadvantaged students, PAGE1 students or the combination of PAGE1/economically disadvantaged students. Therefore, the null hypothesis is again true that PAGE1 had no effect on economically disadvantaged student scores. It is important to note that by 2007, the economically disadvantaged/PAGE1 group of students did not make annual yearly progress although they had previously made AYP from 2004 to 2006. In comparison, the PAGE1 students made AYP. It is obvious that economic status had a detrimental impact on student scores.

For eighth grade students studied, scores increased was from 2004 to 2005 and from 2005 to 2006. Additionally, scores increased for economically disadvantaged students, for PAGE1 students and the combination of PAGE1 and economically disadvantaged students. However, scores did not significantly increase from 2006 to 2007 for all three of these groups. Therefore, the null hypothesis is again true that PAGE1 ended up having had no effect on economically disadvantaged student scores. It is again important to note that by 2007 (Table 56), the economically disadvantaged/PAGE1 group of students, as well as, the economically disadvantaged students did not make annual yearly progress. Again, in comparison, the PAGE1 students made AYP. Once again, it is

obvious that economic status had a detrimental impact on student scores. The null hypothesis again holds true.

For eleventh grade students studied, scores increased was from 2004 to 2005 and from 2005 to 2006 and from 2006 to 2007 for economically disadvantaged students. The PAGE1 group had increased scores from 2006 to 2007 but the combination of economic disadvantage/PAGE1 had increases in scores until 2006-2007. Regardless of the previous increases in student scores, the PAGE1/economically disadvantaged group did not reach proficiency in any of the years studied (Table 57). Again, in comparison, the PAGE1 students made AYP. Once again, it is obvious that economic status had a detrimental impact on student scores but PAGE1 alone made an impact. The null hypothesis is again true that PAGE1 ended up having had no effect on economically disadvantaged student scores because in comparison to non-PAGE1/non-economically disadvantaged student scores were significantly lower.

Funding has been tied to student academic success (Carter, 2001) as have been teacher quality, curriculum, support time and a belief that all students can achieve (ETS, 2003). Although the state of Pennsylvania funded the PAGE1 project, at the same time as this project, federal funds to schools decreased. The PAGE1 direct funds to schools were $12,000 annually for each of the three years, thus totaling $36,000 for each participant school. However, federal funds were reduced each year totaling millions of dollars withheld from some of the lowest achieving students. The NAEP (2007) shows that impoverished students by the time they reach grade 12 are already behind other students. This correlates with the reduction in federal funding to all schools. NCES (2007) reports that student's eligible for free and reduced lunches in grades 4 and 8 from 1996 to 2003,

although their scores went up, did not improve in achievement as compared to students not living in poverty.

Teacher qualifications have surfaced and resurfaced as a factor in lack of student achievement (Glass, et. al., 1982; Mosteller, 1995; Education Trust, 2008). The Sanders Model (Sanders, 1994) has been used to determine the effectiveness of a teacher with students. Wright, Horn and Sanders (1997) have noted that the individual teacher can do more to impact student achievement in a positive manner. If the teacher is ineffective, the students will show inadequate academic progress. Miller (2004) and Carter (2001) have also linked a teacher's instruction to academic performance. Unqualified teachers, although against NCLB, are still teaching our students math and science (Education Trust, 2008). Math teachers need specialized training and a solid foundation in mathematics. If math teachers are unqualified to teach math, then students will not be have the necessary skills to succeed in math assessments.

Reading: Between Years 2004 to 2007 and Grades 5,8,11

Table 58 shows the results of the reading comparison between years by PAGE1 participation and economic status. The table also shows the comparison of scaled score results and acceptance of the null hypothesis. Table 58 follows on the next page.

Table 58

Reading Comparison of Scaled Scores, Proficiency and Null Hypothesis by Economic Disadvantage and PAGE1 Participation Between Years 2004 to 2007

Reading	Between Years	Increase in Mean Scaled Scores Yes/No		Proficient for AYP Yes/No		Accept Null Hypothesis Yes/No	
		ED/P1	ED/NP1	ED/P1	ED/NP1	Y	N
Grade 5							
	2004-2005	N	N	N	N	Y	
	2005-2006	N	Y	N	N	Y	
	2006-2007	Y	Y	N	N	Y	
Grade 8							
	2004-2005	N	Y	N	Y	Y	
	2005-2006	Y	Y	N	Y	Y	
	2006-2007	Y	N	N	N	Y	
Grade 11							
	2004-2005	N	Y	N	N	Y	
	2005-2006	Y	N	N	N	Y	
	2006-2007	N	Y	N	N	Y	

*ED = Economically Disadvantaged NED = non-Economically Disadvantaged
P1 = PAGE1 NP1 = non-PAGE1 AYP = Annual Yearly Progress

Research question 5 asked if there was any a significant difference in overall reading achievement from year to year (by grades 5, 8, 11) for economically disadvantaged students in the PAGE1 schools as compared to non-PAGE1 schools of similar student population size, grade level school structure, demographic setting and free and reduced lunch percentage.

For fifth grade students studied, scores increased for economically disadvantaged students from 2006 to 2007 and for PAGE1 students from 2005 to 2006. The combination of PAGE1 and economically disadvantaged students had no significance on scores and did not make annual yearly progress in any year studied. In fact, for economically disadvantaged students AYP was not met in reading, while for PAGE1

students AYP was met every year of this study. However, the null hypothesis is again true that PAGE1 had no significant effect on economically disadvantaged student scores as non-economically disadvantaged and non-PAGE1 comparison student scores were significantly higher. This continues to support that economic status had a detrimental impact on student scores.

For eighth grade students studied, reading scores increased from 2004 to 2005 and from 2005 to 2006 for economically disadvantaged students but did not increase from 2006 to 2007. PAGE1 scores showed an increase in scores from 2004 to 2005 and the combination of economically disadvantaged/PAGE1 increased from 2006 to 2007. When combined, scores for PAGE1/economically disadvantaged students increased from 2005 to 2007. In comparison, scores for non-economically disadvantaged students did not increase from 2006 to 2007 (Table 58).

The null hypothesis is again true that PAGE1 ended up having had no significant effect on economically disadvantaged student scores as non-PAGE1, non-economically disadvantaged scores continued to out distance PAGE1 efforts. It is again important to note that for 2005, 2006 and 2007, the economically disadvantaged/PAGE1 group of students, as well as, the economically disadvantaged students did not make annual yearly progress. Again, in comparison, the PAGE1 students made AYP for 2005, 2006 and 2007 (Table 52). Once again, it is obvious that economic status had a detrimental impact on student scores. A continuous theme emerges even for reading.

For eleventh grade students studied, reading scores increased from 2004 to 2005 and from 2005 to 2006 and from 2006 to 2007 for economically disadvantaged students. The PAGE1 group had increased scores from 2005 to 2006 and from 2006 to 2007. The

combination of economic disadvantage/PAGE1 only had a significant increase in scores from 2005 to 2006 (Table 58). The null hypothesis is again true that PAGE1 ended up having had no effect on economically disadvantaged student scores because in comparison to non-PAGE1/non-economically disadvantaged the student scores were significantly higher.

Once again, it is important to note that by 2007, PAGE1 students, as well as, the economically disadvantaged students did make annual yearly progress in any year studied. But, in comparison, the PAGE1/economically disadvantaged students did not make AYP thus failing to achieve proficiency for NCLB (Table 58). Once again, it is obvious that economic status had a detrimental impact on student scores.

An additional reason for the acceptance of the null hypotheses may be to look at school effectiveness (Edmonds, 1982). The Effective Schools movement several characteristics of effective schools. This research was also supported by Rutter (2001), Barton (2003) and Parrett (2005). Positive home-school relations were cited by both Edmonds and Rutter. The PAGE1 schools did make concerted efforts to help parents understand the data showing a lack of achievement by students. However, more training was needed to help schools to communicate the parent role in regards to their impact student learning. The home learning connection needs to grow and expand. Teachers need to then connect with parents via content that students must learn to succeed academically. Therefore, the after school/before school factors referred to by Barton (2003) that hinder student achievement can be addressed and in many cases solved.

Discussion

This study supports the findings that low income adversely impacts student achievement scores. Low income of the family has been burdened with the reason for lower achievement scores (Tables 56, 57, 58). Low income students are identified as at risk because of decreased opportunities for learning at home and lower academic backgrounds of their parents (Miller, 2004). A low socioeconomic status of the family is also linked to high absenteeism, low self-esteem and a higher propensity to drop out of school. It is evident from this study that the inability of economically disadvantaged student scores to maintain the pace with their non-economically disadvantaged counterparts may be related to these factors. In all but four instances, the addition of economically disadvantaged scores to PAGE1 scores showed a lack of proficiency on the PSSA and thus a failure to meet the NCLB requirement of annual yearly progress.

PAGE1 students mirrored this NCES data as those students eligible for free and reduced lunches were continually behind those students not receiving free or reduced lunches. Across the U.S., a gap in academic achievement persists between minority and disadvantaged students and their white counterparts (Education Trust, 2008). This is one of the most difficult educational challenges that we currently face and PAGE1 evidence exists to support this claim. Achievement results broken down by student's eligibility for free lunch and eligibility for reduced-price lunch are available on the NCES (2007) web site. The average mathematics score for students who were eligible for free/reduced price lunch was lower than the average score for students who were not eligible at both grades. The PAGE1 data resulted in lower composite scores in math and reading, as well as, lower math and reading scores from 2004 to 2007 for grades 5, 8 and 11. Likewise,

PAGE1 had no significant impact on achievement scores for economically disadvantaged students as they remained behind their wealth counterparts. Even though PAGE1 student scores climbed, these scores remained behind the non-PAGE1 students in grades 5, 8 and 11.

In addition to family economic status, districts with the highest child poverty also have fewer state and local funds to spend on education (Robinson, 2004; Carter, 2001). Robinson (2004) additionally points out that students living in poverty often have poorer nutrition and medical care, fewer educational resources in the home and are more transient. The more children are transient, the harder it is for them to keep pace educationally. Lastly, Robinson (2004) indicates that those poor students lose more academically over the summer than do wealthy or middle class students because of a lack of support at home and lack of educationally sound home experiences. Pennsylvania economically disadvantaged students are no different than others. PAGE1 schools provided the following: before school, after school and summer tutoring to those students needing additional academic support. Certainly, lower economically disadvantaged student scores in Pennsylvania (Table 56) have reflected Robinson's trend of factors, even when these scores are coupled with the state funded PAGE1 effort.

PAGE1 state funding, professional development and resources going to districts could not offset the previous years of subpar funding for economically disadvantaged students nor the poverty in which the students live from day to day. Molen (2005) indicates that lack of funding also has been refuted as a cause of the achievement gap. The impact of children living in poverty is seen in other states, such as, California and New Jersey that have equitable funding but still have achievement gaps (Education Trust,

2007). PAGE1 scores being consistently proficient may have helped with school inadequacies but gender, ethnicity and socialization have all been linked to a gap in academic achievement but the impact of the students in poverty lowered the achievement results of PAGE1 schools.

The overall, math and reading data for PAGE1/economically disadvantaged students, as to lack of proficiency of scores and remaining behind non-economically disadvantaged, supports the premise of inferior instructor ability, as well (Education Trust, 2008). If this was also true for PAGE1 schools, the achievement of the students would be hindered as evidenced by the data. Socioeconomic status correlates more strongly with academic achievement than any other variable (Singham, 1998). The educational differences are seemingly caused by economic differences. However, further research indicates that the achievement gap may really be indicating that there are problems with the way instruction is conducted (Singham, 1998). Teaching has impacted student achievement. Poor and minority students do not usually have the most experienced teachers (Miller, 2004). The least qualified teachers often teach students of poverty and minority backgrounds. These identified subgroups are not receiving an equal education. The PAGE1 study would support both Miller (2004) and Singham (1998).

Molen (2005) has found support that the achievement gap can only be closed with programmatic changes geared to low income students. The effort to close the achievement gap between economic groups has been and is one the goals of educational reform (Molen, 2005). PAGE1 was a programmatic change and was targeted to meet the needs of the economically disadvantaged and other subgroups of students. The PAGE1 effort impacted instructional structure, funding and administrative actions. However,

these changes could not overcome the impact of students living in poverty. The scores of economically disadvantaged students continued to be behind their non-economically disadvantaged counterparts regardless of school-wide attempts to increase achievement. The PAGE1 data indicates that not all programmatic changes can impact student achievement, as Molen (2005) indicated.

The achievement gap exists for a variety of reasons. The PAGE1 project had to deal with students from all NCLB subgroups, urban and rural settings and was research based with support from the Education Trust. Miller (2004) has identified research showing that subgroups can be stigmatized (Miller, 2004) into conforming to a negative stereotype such as lower ability. PAGE1 was a high profile effort to erase the achievement gap. Perhaps this effort added to the negative stereotype for schools and students involved. PAGE1 also dealt with large groups of minority students. Minority students also have a predominant incidence of economic disadvantage. Miller (2004) gives an example of lower achievement with African-American students performing lower than expected even though they were prepared as well as their Caucasian counterparts. This can also be inferred to economically disadvantaged students and non-economically disadvantaged students, as well as, PAGE1 and non-PAGE1 participants. Additionally, cultural and genetic inferiority is identified by Miller (2004) as adding to achievement gap issues and impacting many minority groups. Sometimes, intellectual deficits between whites and minorities are blamed for the lack of minority achievement. Because of these misperceptions, schools tend to ignore the ability of minority students and are not prepared to address the diverse backgrounds of students who need served (Miller, 2004). However, PAGE1 put the emphasis on minorities, economically

disadvantaged and increasing achievement. The program did not ignore but addressed academic issues that Miller recognized. Yet, the economic status of students adversely impacted the PAGE1 program because of other factors. Therefore, PAGE1 would support Miller's claim.

As experiences for students broaden, they develop a foundation upon which to connect future experiences, known as constructivism and thus provide for a basis for developing understanding to abstract or uncommon learning situations (Robinson, 2004). The students of low socioeconomic status are not able to develop these types of learning connections because of the lack of experiences. PAGE1 was able to provide new academic experiences for students but not experiences they are lacking from home. Although parents were reached out to discuss data about their child, there were no provisions to increase other social activities for any students in the PAGE1 program. There was no parental training requirement or academic support groups for parents. Thus, even if teachers used instruction that used building blocks from previous learning to reach new concepts, known as scaffolding, low socioeconomic students would not have the rung of the first scaffold to build upon because lack of prior knowledge and experiences was not addressed. Robinson's (2004) claim could also be supported by the PAGE1 data.

The Education Trust (Education Trust, 2006) summarizes NAEP data to indicate that the achievement gap remains in the United States. PAGE1 attempted to attack inadequacies in reading and mathematics. Although PAGE1 students were consistently proficient on the PSSA, the addition of the economically disadvantaged subgroup brought the consistently proficient to consistently basic. This occurred in both reading and

mathematics. Scores for the students studied climbed but the increases were not enough to overcome the existing and growing deficit because scores of non-PAGE1/non-economically disadvantaged students also increased and did so in a manner to continue to outpace their disadvantaged counterparts supporting the research of the Education Trust and NCES that achievement gaps still exist.

Implications of Findings

The PAGE1 study supports the statement that across the U.S., a gap in academic achievement persists (Education Trust, 2001). This is one of the most pressing education-policy challenges the nation currently faces. PAGE1 was a response to NCLB mandates. The results of the PAGE1 study would support that some of our students face challenges beyond the school that impact their academic achievement, including cultural and family circumstances, financial challenges, quality academic assistance and necessary materials and access to adequate nutrition and health care.

Inequalities in the educational system have also contributed to disparities between groups of students, such as a lack of high expectations for poor and minority students, cultural stereotyping, inadequate approaches to involving families in their children's educations, tracking, and the employment of unskilled teachers and lack of funding (Carter, 2001). The educational factors are those upon which schools can and should focus, as did the three year PAGE1 project attempted to do. The Federal and State governments continue to not provide adequate funding for schools and localities have been stretched by providing additional tax dollars. However, more than three years is needed to turn around educational and financial disparities that have lasted for decades.

All of the nation's schools are now charged with providing an educational program that ensures academic achievement to the level of proficiency for 'all' children in the public schools. The PAGE1 data shows that we can provide quality programs that increase student achievement but cannot erase the backgrounds of poverty that many of our students arrive at school with each day. PAGE1 is another one of those reform efforts that has tried to respond to educational criticism of not addressing education for 'all' students. However, no matter what the requirements of the law, learning for students cannot be legislated. The lawmakers cannot pass legislation that provides equal home experiences for all students and equal economic situations. Laws cannot erase the poverty in which many students live. Home experiences will not change because of a law. Yet, schools can and will always change to meet societal needs and address economic issues.

In Pennsylvania changes have occurred in academic standards, assessments and school improvement planning. The PAGE1 program was intended to address the academic needs of struggling students in schools that had a chance to improve. An emphasis on state standards to meet student needs arose from the PAGE1 project, including curricular support through the development of assessment anchors and eligible content in areas of reading and math. The curriculum, which in many districts remained on the shelf, resurfaced in PAGE1 schools to be an ever changing document that is used to meet standards and the needs of students. Teachers changed what was taught and how it was taught to meet student needs, as well as, when and how often math and reading were taught.

Data became the PAGE1 tool used to address the question of subgroup performance and accountability placing the burden on districts and schools to examine

curriculum for alignment and effectiveness, for depth and equality for all students. Many academic programs' outcomes were analyzed by PAGE1 schools, after visits to Frontier schools, to more closely determine why the achievement of subgroups, specifically among the poor and disadvantaged populations, was not keeping up with the rest of our students. Neither the school district nor the school within a district is immune from this scrutiny of the lack of students achieving. Thus, PAGE1 schools, by looking and comparing how various groups of students perform on state tests, advanced placement rates, drop-out rates, graduation rates, SAT scores and through the NAEP, identified achievement inequities and planned to correct them. Across the U.S., a gap in academic achievement persists between minority and disadvantaged students and their white counterparts. PAGE1 schools faced and attempted to meet this issue but needed to go further educationally and work for a longer period of time to address the needs of all students.

PAGE1 results broken down by student's eligibility for free lunch and eligibility for reduced-price lunch indicate that poverty remains an educational hurdle in Pennsylvania. At grades 5, 8 and 11, average mathematics and reading scores were higher for non-disadvantaged students than for students who were eligible for free/reduced-price lunch. No significant changes were detected in the math and reading compared to the scores in any of the previous assessment years based on PAGE1 participation and economic status but scores did increase for PAGE1 schools. This is certainly a start.

The PAGE1 results presented for 2004 through 2007 do not differ from those presented in earlier reports. At grades 5, 8 and 11, non-economically disadvantaged students all had higher average scores than in any of the previous assessment years. There

was no significant change detected in the average score for non-economically disadvantaged students between 2004 and 2007 at grade 5, 8 or 11 in math or reading. However, the data presents score distances. These are based on differences between averaged scaled scores. Therefore, even though there are attempts to erase these distances between groups of students, there is still a significant difference between the scores of non-economically disadvantaged students and the PAGE1/economic disadvantage group.

Schools or school district can and should learn from these findings. These 16 PAGE1 schools were to serve as models for all other schools in regards to closing the achievement gap for all students. Although the achievement differences still exist, these PAGE1 schools can model using data, changing the structure of schools and using research to address achievement issues over this three year project. These PAGE1 schools used on-line resources to access best practices of high achieving schools, review these practices with school professionals and implement what would potentially work within an agrarian school structure that still exists in Pennsylvania and in the United States. However, these activities still fall short of what schools need to do. Schools must revisit how teachers instruct. All teachers should maintain a plethora of instructional strategies upon which they can draw to attack student academic needs. Instructional strategies which are research based, engaging for students and reach to all learning styles must become part of each instructor's repertoire. Then schools can help all students reach their highest level of proficiency.

The PAGE1 growth was not significant but growth did occur looking at PAGE1 schools' data. This data provided by measurements of student achievement must also provide reliable and valid data across time. More time and support from the partner

agencies was obviously needed for PAGE1 to make an achievement significant difference. The efforts of the Pennsylvania Department of Education, the Pennsylvania State Board and the Education Trust are to be applauded but should also be continued with the PAGE1 cadre of leaders. The learning for the participant schools, in regards to meeting student achievement needs, must never end. The need for funding, assistance and direction for the state must also continue for student learning to meet the goals of NCLB.

The PAGE1 data provided gives the public a comprehensive picture of how the PAGE1 schools performed in regards to student achievement. This data comes from the PSSA. These assessments are intended to reflect the best thinking about the knowledge and skills for students to have an in-depth understanding of different subjects and at different grade levels. The PSSA is the source for information on math and reading achievement at key educational stages based on Pennsylvania benchmarks of performance. The PSSA is not a panacea of academic achievement information but is 'ground zero' for the data needed to address the ills of schools in Pennsylvania. The results of the PAGE1 schools do not paint a positive picture of Pennsylvania education. However, if the PSSA focuses on the ability of students to be successful in reading literacy and math literacy, then schools can use this as a tool to identify weaknesses, adjust instruction to meet student needs and plan to improve the achievement of all students.

The foremost lesson learned from the PAGE1 experience is that learning and change for schools will never end and there are no 'cookie cutter' approaches to instructing students and raising achievement in schools because students, families and communities come to our schools with diverse experiences, needs and backgrounds.

Suggestions for Further Study

This comparative study is limited to the 16 PAGE1 schools as compared to 16 purposely selected, non-PAGE1 schools of similar student population size and free and reduced lunch percentage. All of the schools in this study are Pennsylvania schools and not reflective of the nation. Further study may take the shape of expanding to all schools in Pennsylvania or collapse to a smaller cohort of schools. Economic status is just one subgroup. Other subgroups to be studied would be ethnicity, English as a second language and special needs students. The subgroup studied was economically disadvantaged students. This subgroup is not necessarily reflective of all other subgroups. However, all students from other subgroups are placed in the categories of economically disadvantaged or non-economically disadvantaged. Although free and reduced lunch guidelines are federally determined, participation for families eligible for free and reduced lunch is optional and the percentages indicate actual participation not actual poverty. Therefore, families not participating but qualifying as economically disadvantaged may be counted as non-economically disadvantaged. However, other subgroups are more easily identifiable, such as ethnic background or ESL status, and may be more reflective of the success or failure of that subgroup. Many other subgroups can and should be studied.

The time frame of the PAGE1 project is from June 2004 through the fall of 2007. The data from this time frame may not be evidence for sustained change in these schools but rather a snapshot of improving achievement for the schools studied during that time period. With the advent of the Pennsylvania Information Management System (PIMS), studies will be able to look at much longer periods of time for any and all students and

subgroups of students. Additionally, students will be able to be traced from school to school with a unique identification number allowing for a more accurate analysis of individual student data. The PIMS database will be able to provide an individual accounting of subgroup status for each student. These factors will be able to be used to chart and synthesize the information available into personal student achievement reports from grade K to 12.

On the other hand, the federal and state governments use the percent of students eligible for free and reduced lunches to determine school funding and school eligibility to participate in restricted programs. Funding levels will dictate the types and frequency of special programs that schools can offer. These types of programs include after and before school tutorial services, special health related services and summer academic assistance. Most schools are not permitted to even apply for funds for these programs because of strict Federal regulations tied to free and reduced lunch percentages and academic success of schools. Therefore, PAGE1 schools may have been shut out of other valuable academic assistance programs. PAGE1 is only one initiative. Other state and federal initiatives may have had positive impacts on student achievement but due to lack of funding and federal and state restrictions PAGE1 schools may have been ineligible to participate. Therefore, a comparison of PAGE1 schools against non-PAGE1 schools that were permitted to participate in the selective state/federal programs when PAGE1 schools did not participate would be of value to monitor if funding is being appropriately allocated and following if student achievement follows the funding.

Have the lack of parental success and education impacted the achievement of students in this PAGE1 study? Education is a basic right to which all children are entitled

in the United States. For generations, education has been the most reliable path to a better life. The reason for this is that a solid education is the key to a better quality of life, including good jobs that pay better wages and offer opportunities for advancement. As a result of this aspect of education, families can and will provide positive real life experiences for their children. The family experiences can be used as a springboard for academic success. Success begets success and education begets education. The educational background of the family becomes important to the success of the children. The benefits of education today are more important than ever. Providing quality education to every child will go a long way toward fulfilling America's promise of equal opportunity for all.

Parrett (2005) also emphasizes the need to change instructional practices will increase academic achievement. With instructional changes, schools need to extend instructional time and begin instruction with pre-school. Instructional improvements also need coupled with alignment of curricula to state standards and assessments. However, the PAGE1 schools need to do an in depth study of instructional practices used by teachers and follow up with training on strategies that engage students and meet learning styles and needs. Use of the assessments will assist to build data and develop an understanding of how to use data at the classroom level but teachers must believe that all students will achieve, must collaborate to use data to drive instruction and create caring student-centered environments through engaging instructional practices. These are noticeably similar conclusions to what Edmonds (1982) and Rutter (2001) found for schools to be effective. Additionally, schools need to develop an understanding of the

cultural and family supports that help students succeed. Teachers need to connect content to student and family cultural and social characteristics.

PAGE1 schools need to look at the recent research and reflect upon their current practices again. Barton (2003), in *Parsing the Achievement Gap*, identified correlates of elementary and secondary school achievement. Within the teaching and learning environment (school factors), the factors impacting the achievement gap are rigor of the curriculum, teacher preparation, teacher experience and attendance, class size, and availability of appropriate technology-assisted instruction. Barton's community factor, the home school connection, is parent participation. Schools need to complete 'root cause' analyses first at the school level, then classroom level then student level to identify reasons for successes and failures. A root cause analysis of classroom practices within the PAGE1 schools would provide the detailed information of classroom practices that are working and then also identify those that do not work. Teachers then need to change the manner in which they instruct to base their work on successful teaching that which produces successful students.

In successful schools, instructional delivery is a practice that is a key as to whether the students have what they need to master the specific objective. The effective instructor must also make decisions as to what practice opportunities to employ during the delivery of the instruction and monitor the effectiveness of these strategies. Monitoring is continuous and guides future lesson planning. Guided by the information obtained through continuous monitoring and analysis, the teacher decides whether to teach a new lesson, re-teach the current objective or provide enrichment opportunities. Hence, the effective teacher is always looking for the best strategy to improve their

classroom methods and base their effectiveness on the learning of their students. In fact, effective teachers use a variety of well-researched practices and methods that have high engagement rates to ensure student learning and lead to student understanding (Marzano, 1998). Are PAGE1 teachers' effective teachers? There is a need for a school strategies case study to focus on the classroom, the teacher.

Lastly, the data in Table 51 and Table 52 show that there were years that PAGE1 did have increases in the mean achievement of students. These results need to be studied further. For example, reviewing Table 40, there is an important data happening to follow. Eighth grade reading scores for PAGE1 economically disadvantaged students increased from 2006 to 2007. However, eighth grade reading scores for non-PAGE1 economically disadvantaged students decreased from 2006 to 2007. In comparing the two groups this was not statistically significant. However, one cannot ignore this data. Also, Table 44 has another unique data result to follow. Eleventh grade reading mean scores for PAGE1 economically disadvantaged students increased from 2005 to 2006 while non-PAGE1 economically disadvantaged student scores decreased. Because of these results, a longitudinal study of the economically disadvantaged PAGE1 students in comparison to economically disadvantaged non-PAGE1 students may yield the results identifying the strengths of the PAGE1 program. In this study, statistical significance may not allow one to reveal the true successes of PAGE1 project.

Summary

The impact of the PAGE1 project on the reduction of the achievement of students can be measured through quantitative means. Therefore, this data has been used to determine that the changes of the PAGE1 project were not significantly successful,

although student scores did increase. This type of finding is the same that has been found through studies if the NAEP by NCES and the Education Trust.

Think of the theories of Collins, Fullan, Senge and PAGE1 as one would the components of an "atom." Each atom is composed of protons (Collins) that provide identity the atom; a nucleus (PAGE1) around which everything else revolves and provides stability; electrons (Fullan) that whirl around the nucleus and interact with other components both outside and within the atom; and neutrons (Senge) that give balance to the atom and counteract the electrons.

In this atomic model, the PAGE1 project is the nucleus. These schools provide the component parts of all schools just like the nucleus does for the atom and for all different elements. The Turnaround Leadership (Fullan, 2006) components are the electrons. A constant flow of items needed for growth, change and synergy. The leadership components travel in high energy levels that provide a continual barrage of different achievement characteristics to always evaluate and balance. Senge (1999) and change theory reflect the neutrons. The neutrons keep the electrons in balance in the atom. Change is what keeps the main factors impacting education in balance, as well. Education changes as our culture and times change. Change then becomes what balances education with the needs of a growing community and world. The change strategy of PAGE1, as a reform project, is always to look ahead to what students will need and plan strategies to overcome these important issues.

Lastly, organizational transformation and sustainability (Collins, 2001) are the protons of the atom. The protons give identity to the atom. The protons impact the other components of the atom. The atom stays as is unless the proton structure differs. The

same is true of organizational transformations. For example, education at the nuclear level will remain the same unless impacted by PDE or other larger educational groups or initiatives, such as NCLB. It takes the larger components to start the atom transforming. NCLB impacts PDE and PDE impacts PAGE1 schools. All of these components work in balance together and toward the growth and strength of the atom. They all work toward student achievement.

However, the nucleus, PAGE1, has been halted by the Pennsylvania Department of Education and the Pennsylvania State Board of Education. Leaders from the PAGE1 schools were still hungry to do more to enhance student achievement and encouraged these state leaders to continue to push ahead with this project. As a result of the lack of state support, the PAGE1 atom is now split and has 16 separate identities.

The future for all students is through academic achievement. Schools need to develop and implement a more universal attack on the deficiencies of student achievement. Schmoker (1999) indicates that schools need to move away from adopting innovations or the latest and greatest methods of instruction and instead together focus on goals and measure the impact of the methods to perform a more diagnostic approach to the actions of educators. If PAGE1 was continued by the Pennsylvania State Board of Education, the data analysis that has been completed could and should be used to strategically focus instructional techniques on student academic needs.

It is imperative that school leaders continue the focus on data driven results and research based decisions to solve academic dilemmas. School leaders need to become the nucleus of their schools and collect the information need for student success; principals and faculty must analyze and interpret the data to make informed decisions; and all

educators must be trained to use and analyze data. Leadership is a key to solving the achievement gap and provide for additional student achievement. This leadership must now come from local leaders, with local funds, local programs and local school and community support.

Therefore, community and family interactions, along with curriculum, is where many of our improvement efforts need to be focused. The educational answer to the problems of children today is in a stronger community of learners that include school and home. It is a strong professional learning community that is a process for turning information into knowledge. The PAGE1 schools are involved organizations and part of the large community but the local community must be involved with the schools. However, the human elements of the practice of teaching and the learning of students impact the result of student achievement gains. Instructors whose classes exhibit higher levels of student achievement involve themselves in instructional planning, instructional delivery and formative and summative assessments.

Our challenge in all change is people's behavior. People change their thinking because they are shown something that influences their feelings. Successful organizations know what to reject and recognize improvement as gradual. All individuals in an organization can learn and change. In regards to PAGE1, these leaders must continue the changes in our schools for our students to be continually successful.

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