

THE IMPACT ON STUDENT ACHIEVEMENT OF THE
PENNSYLVANIA SYSTEM OF SCHOOL ASSESSMENT (PSSA) PREP PROGRAM

by

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Submitted in Partial Fulfillment of the Requirements

For the Degree of

Doctor of Education

in the

Educational Leadership Program

YOUNGSTOWN STATE UNIVERSITY

December, 2008

The Impact on Student Achievement of the
Pennsylvania System of School Assessment (PSSA) Prep Program

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ABSTRACT

As public school accountability for student achievement has continued to increase, prior to and as a result of the No Child Left Behind Act of 2001, schools have sought ways of bringing new instructional services to their students to raise their levels of achievement. This doctoral study investigated the effects of one such attempt in a large school district in Western Pennsylvania, the PSSA Prep Program.

Data were collected on one class of students who participated for one year in the program as juniors and compared with students who were not participants. Similar comparisons between participants and non-participants were made within the economically disadvantaged subgroup. Comparisons were also made between economically disadvantaged and non-disadvantaged participants. Two-way Analyses of Variance (ANOVAs) were conducted on both the eleventh-grade reading and mathematics PSSA assessments to make these comparisons. Interviews were conducted to determine participants' perceptions regarding specific components of the PSSA Prep Program.

Based on the results of the study, participation in the PSSA Prep Program provided positive effects for both reading and mathematics when accounting for the total sample studied. When considering only economically disadvantaged students, participation provided positive results in mathematics, but not in reading. Overall, improved achievement for participants in both reading and mathematics was not influenced by economic status. Participants' interview responses indicated that providing additional time for study of reading and mathematics during the school day, small group size, and instruction targeted to deficits identified through assessment all provided positive benefits in raising their achievement. Computer-aided instruction was identified as a component that did not have a positive impact.

DEDICATION

I dedicate this dissertation to my family, without whose support and understanding, this final piece of the doctoral degree could not have been completed. To my wife, Melissa, whose drive and dedication to perform all things at the highest level are inspirations to me and to all those who know her, I simply would not have done this without your constant help and love. Grow old along with me; the best is yet to be.

To my children, Jake and Jordyn, you both have gifts that are only beginning to come to light. Let this dissertation and the degree be reminders that there are no limits to what you can accomplish, and that sometimes it takes a great deal of perseverance to get a job done, but if it's worth doing, it's worth the time and work. I look forward to seeing how high you fly. Never believe you can't.

ACKNOWLEDGEMENTS

I wish to extend my sincere appreciation to the prestigious members of my dissertation committee, Dr. Jeffrey Buchanan, Dr. Gunapala Edirisooriya, and Dr. Howard Pullman. They have gone beyond their expected duties, waiting through periods of seeming inactivity and then responding to my work quickly and with expertise, helping to guide my efforts. I have benefited greatly from their input. I wish to extend a special note of gratitude to my advisor and doctoral dissertation chair, Dr. Robert Beebe. In addition to providing the same kind of help as the rest of the committee, he has provided a constant source of process knowledge, of motivation, of willingness to work through early drafts, and of well-timed praise and reassurance. A dissertation candidate could not ask for more.

I am grateful to Dr. Daniel Matsook for sharing his resources and time, and to several other doctoral students in various stages of the program with whom I have struggled and searched for understanding, helping to make sense of our individual pursuits. I want to thank my professional colleagues who have given me encouragement along the way. Finally, I want to thank my grandfather, Arthur J. Fugh, who, although he passed some years ago, taught me the value of learning something new everyday and has often been my inspiration to continue to pursue higher levels of education.

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CHAPTER I

INTRODUCTION

Accountability for the performance of public school students in the United States has undergone dramatic changes, especially over the course of the last few decades. While students are still recognized as the final point of accountability by many in and outside of education, a shift to placing more accountability on school districts, single schools and individual teachers has altered the landscape of public education, often making educators more resistant to change and suspicious of new ideas (Reeves, 2002). Yet, in the pursuit of higher student achievement, as measured by high-stakes test scores, schools are searching for programs and methods that will bring students to ever higher levels of accomplishment. One of the most dramatic recent influences in the sweeping change to standards-based accountability has been the 2002 passage of Public Law 107-110, entitled the No Child Left Behind Act (NLCB) of 2001. Part A, Section 1111(b)(2) carries the mandate that by year 2014, 100% of public school students at identified grade levels should demonstrate proficiency in reading and mathematics skills, following periodic incremental increases in the percentages of students required to be proficient (U. S. Congress, 2002). Since many states already were moving toward statewide testing programs, autonomy as to how to meet this requirement was given to each state, with the caveat that the plan to accomplish this task would be approved at the national level. This federal foray into public education created a wave of new state-level assessment programs aimed at holding schools and school districts accountable for the performance of students.

Within the overarching requirement to make all students proficient, incremental steps were identified as benchmarks for specified years, raising the percentage of students expected to be proficient along the way, to try to ensure progress toward the final goal. Part A, Section

1116(b)(5) of NCLB identifies these annual targets as Adequate Yearly Progress (AYP). The requirements necessary to reach AYP are demarcated by the percentages of students required to show proficiency in reading and mathematics skills for each year. In Pennsylvania, the Department of Education set the initial target percentages to reach AYP for 2003 at 35 percent of students required to be proficient in mathematics and 45 percent of students required to be proficient in reading, using the Pennsylvania System of School Assessment tests as the measuring instrument. The subsequent nine years have been divided into three segments of three years each. At each three-year segment, the required percentage of students to reach proficiency must rise to 46 percent, 62 percent, and 78 percent in math and to 54 percent, 68 percent, and 82 percent in reading respectively. In 2013, mathematics proficiency is required of 95 percent of students and reading proficiency of 94 percent, before both reach the 100 percent mark for 2014 (Pennsylvania Department of Education, 2002).

Schools and school districts failing to meet the prescribed benchmarks face a set of increasingly negative consequences. Part A, Section 1116(b)(5) of NCLB outlines the progressively punitive measures that befall a school or school district continually failing to meet AYP. Initially, these responses include placement on a school improvement list and the requirement of developing improvement plans. School choice and mandatory changes in school personnel may follow continued failure to meet benchmarks. After multiple consecutive years of lack of improvement, the potential exists for the administration and governance of schools to be taken over by the state.

Additionally, the legislation identified student subgroups to be specifically tracked as well, including members of a variety of minority groups, special education students, and those recognized as living within a low socioeconomic range. The negative consequences that apply to

failure to meet the prescribed benchmarks for the total student body are also employed for failure of any of these specific subgroups to reach the stated incremental targets. The basis for selecting these subgroups lies in a large achievement gap that often exists for each of these groups when compared to overall student achievement (Kafer 2004). Public awareness of and demands for responses to close the achievement gaps between minorities and their peers, as well as between the economically disadvantaged and the advantaged, have resulted from the implementation of statewide testing programs (Reed et al, 2000).

In an effort to respond to these increased student achievement demands, many schools have made significant changes in providing services to students, ranging from modifying curricula and instructional strategies to developing new courses, changing student groupings, adding instructional staff, and a host of other ideas. One method employed in many schools has been to add tutorial sessions or classes specifically aimed at helping students perform well on state assessments (Zuelke & Nelson 2001). Such an approach incorporates the extra intensive time devoted to specific study that has been recognized as a benefit to students for some time (Sanderson, 2003). When such additional time is coupled with instruction targeted on specific skills identified by assessment, the benefits of the time increase significantly (McIntire, 2003).

Additionally, many schools have implemented small group sizes to take advantage of the many benefits attributed to smaller settings by a number of researchers (Finn, 2002). The use of software-based instructional tools has been one aspect of some programs, as well, an instructional approach that has a well-documented history in education (Pisapia, Knutson & Coukos, 1999). The variations of its usage are as numerous as the settings in which it has been applied. Sometimes, such instruction is the sole basis for individually paced instruction. In other

cases, it serves as one of several integrated instructional tools; and in still others it is incorporated as an enrichment or remediation method only during selected time frames.

Statement of the Problem

The large Increasing Diversity School District in western Pennsylvania implemented a program aimed at improving the scores on the Pennsylvania System of School Assessment (PSSA) tests of one particular subgroup, its economically disadvantaged population. Called the PSSA Prep Program, it included four key components that were specifically incorporated to improve student achievement. These consisted of: (1) additional time during the normal school day dedicated to skill building, (2) small group settings, (3) targeted instruction in specific skill areas identified by assessment as in need of remediation, and (4) the addition of computer-aided instruction as a component of the overall instructional approach. These four primary components were identified by a committee of district personnel that included secondary principals, mathematics and English departmental chairs, the Assistant Superintendent for Secondary Education, and the Assistant Superintendent Personnel, Technology and State and Federal Programs. While no specific research or consultants were directly referenced, members of the group represented extensive years of educational practice and several advanced degrees. Additionally, members generally remained current with professional publications and attended workshops and conferences. Therefore, a generally high level of knowledge and awareness benefited the discussions leading to the implementation of the program.

The purpose of this study is to determine the impact of the PSSA Prep Program on student achievement in reading and mathematics. The study used a primarily quantitative approach using data from one graduating class in the Increasing Diversity School District. The secondary program within the district is divided into three separate buildings, housing grades

seven and eight, nine and ten, and eleven and twelve, respectively. During the 2004-05 school year, the three secondary schools of the Increasing Diversity School District implemented the skills remediation program, known as the PSSA Prep Program, aimed at students who had demonstrated limited success on previous administrations of the Pennsylvania System of School Assessment, other standardized tests, and/or district level comprehensive examinations, with the intent of raising their achievement levels on subsequent tests, especially the PSSA reading and mathematics assessments. Students in the program at the junior high school experienced alternating instruction in math and reading for a nine-week period as part of the rotation of special classes including shop, music, computers, and family and consumer science classes. Ninth and tenth grade students participated in separate semester courses of mathematics and reading remediation. Senior high school participants alternated reading and mathematics instruction on a weekly basis for the duration of the school year.

The instructional approaches and focus on the four components identified by the district remained consistent across the buildings. The program at the junior high school, housing the seventh and eighth grades, was aimed at strengthening identified skills from earlier PSSA assessments and getting students prepared for the PSSA assessment conducted in the spring of the eighth grade year. Students not proficient at this level were entered into the PSSA Prep program at the schools serving students in grades nine and ten or eleven and twelve. The program in these schools was designed for the remediation of skills assessed as being below the proficient level and the teaching of additional skills needed for the eleventh grade assessment. Skills requiring mediation were identified from both PSSA testing results and additional diagnostic testing available through computer software implemented in the PSSA Prep Program.

The efficacy of the program at the ninth and tenth grade level is difficult to ascertain as there is no standardized assessment administered at those levels to determine growth. For this reason, and because the policy governing graduation requirements only addresses results on the eleventh grade test, those results alone provided the foundation for this study. The research questions addressed in this study were:

1. What impact did the Increasing Diversity School District's PSSA Prep program have on student performance on the PSSA reading and mathematics assessments in grade 11 as measured by comparing the results of students participating in the PSSA Prep program with the results of comparable non-participants? This question was answered by testing hypotheses of the form H_0 : Students participating in the Increasing Diversity School District's PSSA Prep program will not score higher on the PSSA reading and math assessments in grade 11 than similar students not participating in the Program.
2. What impact did the Increasing Diversity School District's PSSA Prep program have on student performance on the PSSA reading and mathematics assessments in grade 11 as measured by comparing the results of economically disadvantaged students participating in the PSSA Prep program with the results of similar nonparticipants? This question was answered by testing hypotheses of the form H_0 : Economically disadvantaged students participating in the Increasing Diversity School District's PSSA Prep program will not score higher on the PSSA reading and mathematics assessments in grade 11 than economically disadvantaged students not participating in the program.
3. What impact did the Increasing Diversity School District's PSSA Prep program have on student performance on the PSSA reading and mathematics assessments in grade 11 as measured by comparing the results of economically disadvantaged students participating

in the PSSA Prep program with the results of non-disadvantaged participants? This question was answered by testing hypotheses of the form H_0 : Economically disadvantaged students participating in the Increasing Diversity School District's PSSA Prep program will not score higher on the PSSA reading and mathematics assessments in grade 11 than non-disadvantaged students participating in the program.

Within each of these primary research questions, the effect of gender was also explored to determine whether the interventions comprising the PSSA Prep program were more effective for males or females within each of the identified groups.

Additionally, some limited qualitative work accompanied the quantitative analysis in the form of sixteen student interviews. Eight of the interviews were conducted with students whose performance on the eleventh grade PSSA mathematics and reading assessments showed improvement over their previous test scores. The students consisted of two males and two females each, representing both economically disadvantaged and non-disadvantaged students, resulting in a total of eight interviews. The interviews were directed toward discovering which aspects of the program (extra time, small group, targeted instruction or computer-aided instruction) they believed most beneficial to them in raising their levels of achievement on the state assessments. The other eight interviews were conducted with a similar cross-section of participating students whose achievement levels did not reflect improvement. In addition to providing a comparison set of answers to those garnered from the students raising their proficiency levels, these interviews provided a basis from the Increasing Diversity School District could identify changes or improvements to the PSSA Prep Program that these students felt may have provided them with the necessary instruction to reach proficiency.

Purpose of the Study

This study will serve as an evaluation of Increasing Diversity's PSSA Prep Program for eleventh graders, which was implemented specifically to address weaknesses in knowledge and, more predominantly, skills that students need to succeed on Pennsylvania's reading and mathematics assessments. Students participated in targeted instruction in both reading and mathematics on an alternating schedule in small groups that included the use of computer software during one period of the regular school day.

The program was designed to target economically disadvantaged students first, as a defined subgroup of No Child Left Behind. As the scope of the program was sufficiently large to include additional students who were not identified as economically disadvantaged, the study allowed for comparisons among members of those groups. Additionally, because parents could waive their students' participation in the program, comparisons were possible between groups of students in each category who did and who did not participate.

A lesser focus of the study is to attempt to disaggregate the components of the study through brief interviews with participants whose scores improved. This was an effort to identify those aspects of the program that students believed to be the most critical in raising their achievement.

Significance of the Study

In March 2004, the Board of School Directors from Increasing Diversity School District approved an amendment to the district's graduation policy requiring proficiency on the reading and math portions of the Pennsylvania System of School Assessment in order to earn a diploma, beginning with the class of 2006, who would be sitting for the tests as juniors in April of 2005. This action followed several steps undertaken by the schools in the district to align curricula and

instruction with the state standards and to present students with opportunities to engage with questions formatted to follow PSSA items. The final piece needed to raise student assessment scores in reading and mathematics appeared to be adding personal incentive for students to perform at their best. Every January, district administrators invite representatives from the last four graduating classes to a dinner at which many aspects of the district's educational program are discussed to try to help guide improvement of the total educational experience students undergo within the secondary program. Over the course of three consecutive years, participants in these discussions voiced a lack of serious student effort on the PSSA assessments because the results had no direct impact on their futures. Students expressed much greater concern over tests like the SAT and ACT, because of their potential influence on college admissions. These comments weighed heavily on the Board's decision to implement assessment proficiency as a graduation requirement. At the same time, it became clear that it was incumbent on the district to make every attempt to help those students who were not meeting proficiency standards build their skills in order to meet the new graduation requirement. These events laid the foundation for the implementation of the PSSA Prep program.

Six teaching positions, three each in mathematics and reading, were added to the secondary program. This provided each building with a mathematics teacher and a reading teacher whose responsibility would be to design instruction in the PSSA Prep program aimed at building tested skills. The district purchased printed materials related to improving math and reading skills for use in the program. Computers and software to supplement direct small-group and one-on-one instruction were also purchased. Including salaries and benefit packages, the Increasing Diversity School District spent close to \$400,000 to get the PSSA Prep program running. This commitment by the school district provides strong impetus to determine if the

program is making an impact. However, every school district in Pennsylvania, and across the nation, is facing the daunting task laid before them by the No Child Left Behind legislation. If the PSSA Prep program shows promise in helping students become proficient in the target areas, the program could provide other schools with a model to follow, as the diversity and size of the Increasing Diversity School District may make results accrued there applicable to many other locales.

Limitations and Delimitations

Three limitations in particular may have had impact on the results of this study. First, students in the comparison group did not have quite the same degree of academic need as those participating in the program. Part of the program selection process involved the effort to provide additional assistance to the most academically needy students. Nevertheless, both those in the participating and in the comparison group demonstrated overall achievement at less than proficient levels, and these differences were taken into account during data analysis. The second limitation relates to student attendance at school. The students involved in the PSSA Prep program fall into a larger general group of students whose attendance can often be described as spotty or worse. Although both participants and the comparison group of non-participants fall into this category, non-participants are essentially a control group. Therefore, while both groups of students may be missing only their usual course instruction, participants are also missing designated time for involvement with the program under study, which could reduce the effect level. The third limitation affects the comparisons being made related to economically disadvantaged students. Because these students are essentially self-reported through participation in the free and reduced lunch program, the distinction between those who are and those who are not economically disadvantaged is not necessarily accurate. At the age level

studied, students are often less likely to participate in the lunch program in order to avoid any economic stigma.

The delimitations of the study include some of the parameters of the PSSA Prep program itself, such as the limited number of student slots available to be filled, the simultaneous instruction in both reading and math, and the efficacy of the team teaching dynamics involved.

Definition of Terms

Economically Disadvantaged Student – A student who has been on the free or reduced lunch list at the Increasing Diversity School District at some point during the school year of the study or during the previous school year.

Adequate Yearly Progress (AYP) – Accountability term used by the U.S. Department of Education to measure the expected annual progress of individual schools within the same district working toward standards of proficiency. Individual states determine how to measure AYP and set incremental goals to reach 100 percent proficiency by 2014 (U. S. Congress, 2002).

Pennsylvania's reading and mathematics target proficiency percentages were initially set at 45 percent and 35 percent, respectively for 2003. The subsequent nine years are divided into three three-year segments, during which these targets steadily increase to reach proficiency levels of 82 percent for reading and 78 percent for mathematics for the years 2010 through 2012. They jump to 95 percent for reading and 94 percent for mathematics in 2013 before matching the federal levels in 2014 (Pennsylvania Department of Education, 2002).

Computer-aided Instruction – A general term applied to instructional procedures in which computer software is used either to augment or, in some cases, to replace more traditional forms of instruction (Moore, 1993).

Targeted Instruction – An approach to planning and delivering instruction based on accurate identification of specific deficits through assessment, then focusing instruction on promising practices to promote student learning (Johnston & Lawrence, 2004).

Summary

The primary purpose of the study is to determine the effects of the Increasing Diversity School District's PSSA Prep Program on eleventh-grade student achievement in reading and mathematics, as measured by the PSSA assessment scores. Chapter two will provide a review of the related literature on educational accountability, the identification of economically disadvantaged students as unique learners, and the four identifiable components of the PSSA Prep Program: additional time devoted to basic skill development, small class size, integration of computer software into the learning program, and targeting instruction on academic weaknesses as determined through assessment. These topics lay the foundation for the argument to implement creative learning environments and opportunities for academically at-risk students and for composing a program in the mold of the Increasing Diversity School District's PSSA Prep Program.

CHAPTER II

LITERATURE REVIEW

Educational reform has often been referred to as a pendulum that swings back and forth between different names for old theories and practices, making it common for veteran educators to resist getting too excited or too agitated with the latest “new thing.” However, the number and rate of reform movements in education has increased dramatically. Combined with a political will to make education a national focus, these reforms have led to an increase in public awareness of student achievement and, thus, to a demand for a higher level of accountability for schools and educators. The culmination of these forces was the passage of Public Law 107-110, entitled the No Child Left Behind Act of 2001. Because it represents a reform that is rooted in law with specifically defined timeframes for improving student achievement – and penalties for failing to meet those deadlines - it is a reform that has forced even the most jaded educator to take notice. Schools and school districts throughout the nation have begun searching for those remedies that will bring them in compliance with the requirements contained in the legislation.

This chapter will review current educational literature related to three areas that lay a foundation for the study undertaken. First, an historical description illustrating how reform has brought public education to the present level of accountability will be pursued. This discussion will culminate with a particular focus on the emergence of standards-based reform and high-stakes testing that serve as the foundation for the recent No Child Left Behind Act of 2001.

Because there are a number of subgroups for which research has determined that achievement gaps exist compared to their counterparts, the disaggregated scores of these groups are considered when the determination is made as to whether a school has met required levels of proficiency. One of these subgroups consists of those students who are recognized as

economically disadvantaged. Therefore, a second focus of this chapter will be to discuss the historical achievement gap that exists as related to this subgroup and to investigate any educational structures or instructional strategies that have been shown to be beneficial to students belonging to this group.

Finally, the program serving as the subject study incorporates four identified components that are believed to be beneficial in helping students raise their levels of achievement on reading and math assessments. The literature supporting the selection of these components will be reviewed to establish the foundation for pursuing a study that applies a combination of them. Namely, these components are (1) additional time dedicated to skill building during the normal school day, (2) small group settings, (3) targeting specific skill areas in need of remediation as identified through assessment, and (4) the addition of computer-aided instruction as a component of the overall instructional approach.

Constructing the total literature review in this way is grounded in the notion that understanding the beginnings and evolution of educational accountability, the characteristics of an identified subgroup as well as educational structures and instructional strategies that promote student achievement, will lead to the promotion of research-based programs in schools across the country that have the capacity to help schools and school districts meet legislative requirements.

History of Educational Reform and Accountability

Origins of Educational Accountability

The current state of educational accountability is not a happenstance, a sudden revelation or an isolated occurrence. The product that is NCLB is the result of decades of changes to education, some of which stemmed from proposed legislation that never passed, others that

received spotty implementation, and still others that gained fairly wide acceptance, but lacked uniformity. NCLB is the result of changing political winds that caused the federal government to completely overhaul previous amendments to the Elementary and Secondary Education Act. Originally passed in 1965, during President Johnson's administration, this legislation outlined the use of Title I federal funds to address inequalities in educational opportunities for students coming from disadvantaged backgrounds. Understanding the forces and events that led to the inception of NCLB are the first steps in helping educators develop sound plans and programs to meet the ever-shifting targets set before public schools. As stated by LaFee (2002), "Right or wrong, external accountability is coming to everyone" (p. 6).

The term accountability itself holds broad meaning and is defined as, "an obligation or willingness to accept responsibility or to account for one's actions" (Merriam-Webster, 2007). Its association with education in the United States can be traced back to the 1960s. It came as an offshoot of the social unrest of that decade, and within the following decade, hundreds of book titles were associated with accountability as related to education (Ohmann, 2000). By the early 1970s, even the Library of Congress had been prompted to introduce "educational accountability" as an official subject heading. The term has been solidly embedded in educational literature ever since, and has become more publicly and politically recognized within the last twenty years.

With the passage of ESEA, the role of the federal government in public education appeared to be that of lessening the achievement gap between students of differing economic backgrounds, without placing mandates on those schools seeming to be doing well (Standerfer, 2006). During this time of social upheaval, the increased spending for education drew the ire of certain factions concerned with governmental spending policies, and a sense for

the need for increased accountability grew. In the late 1960s, the National Assessment of Educational Progress (NAEP) tests were introduced in an effort to provide a general gauge as to how schools were performing by regions, not as a tool for making comparisons between schools or states (Standerfer, 2006). In his very well known book, *Savage Inequalities: Children in American Schools*, Kozol (1991) identifies this time as a period of change from traditional equity models that advocated the same treatment for all to focusing attention on equity in the quality of instructional opportunities.

Slavin (2002) recognizes that the accountability movement is not new to education, and he sees it as the dominant education policy focus since the early 1980s. While testing and school evaluation systems are becoming more complex and having greater influence over educational practice, he sees accountability as only one of several strategies needed to move education to where it needs to be.

A Nation at Risk

The 1980s was a period of time when schools and educators found themselves the topic of a severely critical national report that brought educational accountability to the forefront of public thought (Bonstingl, 2001). The widespread publicity surrounding the report made education a major component of political campaigns for federal governmental offices, including the Presidency. Previously, education had typically been an issue of only local or state importance (Kantrowitz, 1993). The report itself, titled *A Nation at Risk*, criticized student effort, a lack of worthy or evenly applied standards, teacher preparation, and even questioned whether schools had curricula that were viable at all. The report noted that if remedies were not formulated and implemented within a short period of time, the result would be catastrophic for the nation's social structure, culture, economy, and system of national defense (Finn, 1989). The

resulting educational reforms were highly varied in addressing the perceived weaknesses of public education. New testing programs were begun across some states and in individual school districts in states without statewide programs. In other locales, graduation requirements were increased. Some schools made attempts to reduce class size, while others required students to pass standardized tests. Teachers were required to take and pass literacy exams and licensing requirements were redesigned and made more stringent (Finn, 1989).

One of the most strident groups in supporting the need for educational reform as a result of *A Nation at Risk* was the business world. There was a sense among those in business that finding qualified employees had grown increasingly difficult and that an educational system based on completion of a given amount of time in certain courses could not produce the workers needed for the current economy (Spady, 1988). One reform that became widespread in the early 1990s as a result of this strain of criticism was the implementation of Outcome-Based Education (OBE). This educational framework had been in place in a few locations around the nation, and enjoyed some measure of success in places like Sparta, Illinois and Islip, New York (McNeir, 1993). The combination of industry's stance that workers were unfit for hiring out of high school and higher education's accusation that students from America's public schools were not sufficiently prepared to enter college, prompted schools to look for ready answers (Tanner, 2000).

The theory behind the OBE reform movement was to eliminate the focus on the inputs of the educational process, especially seat-time, and look more closely at measuring what knowledge and skills a student could actually demonstrate (McNeir, 1993). Educational practice is to be based on ensuring that students master the outcomes identified within a school or school district by requiring students to demonstrate the target knowledge and skills. This instructional

planning process is the reverse of traditional models. Rather than using the content from a textbook to plan unit lessons then generate an assessment to evaluate student knowledge of the material contained within a chapter, OBE proposes beginning with the desired student outcome and then building the curriculum, instructional materials and assessments to support the accomplishment of that outcome (Acharya, 2000). This particular reform, while gaining a great deal of initial impetus, especially at the state level in many cases, drew the ire of many, who felt that the reform caused schools to delve into realms that should be left to the discretion of the home. Having schools teach value judgments, and the criteria on which judgments are made, became a primary target for opponents of OBE. While this aspect was a very small part of the reform, and in fact was left out of many school plans, its removal became the focal point of many attempts to eradicate OBE from public schools.

In Pennsylvania specifically, OBE was faced with heated opposition, which led to an initiative from the administration of Governor Tom Ridge, resulting in the formation in 1996 of the Advisory Commission on Academic Standards. This Commission recommended that OBE be replaced by academic standards in several subject areas. The written product reflecting this change was Chapter 4 of the Pennsylvania School Code, which included not only the original sets of standards, but regulations outlining assessments and accountability measures. Within three years, the state officially adopted standards in reading, writing, speaking, listening, and mathematics. All other subjects, save world languages, had standards adopted by 2003 (PDE, 2004).

Some strong opposition to OBE and an initial Presidential foray into setting educational policy led to a new direction for public education. During the late 1980s, President George H. W. Bush developed National Education Goals that set minimum competencies for high school

students and set into motion a series of events that would lead down another stretch of difficult times for public schools. Through his *America: 2000* legislation, President Bush tagged federal money for the establishment of charter schools and made provisions for the use of public money in funding private education (Szabo, 1992). At the same time, the National Assessment of Educational Progress was being introduced as a method of making comparisons of student achievement across states (Tanner, 1993), and the Educational Testing Services was tasked with creating one test that could serve as the single indicator of school effectiveness (Lewis, 1999). The foundation had been laid for the next great wave of educational reform, the movement toward standards-based education.

Standards-Based Reform

As federal efforts to develop national subject-specific standards stalled and faltered, individual states were directed by the U. S. Department of Education at the 1989 National Education Summit to begin writing their own standards, if they had not already begun the process (Vaughan, 2002). A change in Presidents brought about a change in the name of the national educational reform movement, and a change in focus from the creation of minimal national standards to state-adopted high academic standards, as President Clinton introduced *Goals: 2000* (Tanner, 2000). Across the course of the 1990s, many states used this federal push to develop standards, benchmarks and statewide assessments that would be used to hold schools and school districts accountable for the achievement results produced by their students. This signaled the beginnings of a shift from state imposed audits and compliance checks as the means of verifying the actions of schools to attempts to reach into classrooms and direct instructional practice. California, New York and Texas were among the states leading the charge to develop standards across several curricular areas, followed by testing programs to assess student progress

toward mastering those standards. Subject-specific organizations, like the National Council of Teachers of Mathematics, also engaged in ambitious efforts to develop standards for expectations of student learning (Fuhrman, 1993).

The movement toward the implementation of educational standards was finalized in 1994, when President Clinton's educational reform package, in the form of the reauthorization of ESEA, required all states to adopt high academic standards for all students by the year 2000 (Newson, 2003). No longer were standards set only for the disadvantaged or academically at-risk. Educational practice was now to be defined by student achievement of standards-based curricula, accomplished through the use of a wider variety of instructional practices. Traditional bell-curve comparisons, in which students were compared with one another were now being replaced with comparisons of students to a fixed standard (Brandt, 2003). State-developed academic standards and high stakes assessment programs multiplied rapidly during this time (Swanson & Stevenson, 2002).

By the end of the decade of the 1990s, high academic standards and high stakes testing made the achievement gap between wealthy and poor school districts and between minority students and their peers more clearly defined. Some identified the very implementation of the rigorous standards as part of the cause for the widening of the gap (Haycock, 2001; Schwartz, 2001). Critics of the movement made claims of narrower curricula, indicting teachers and schools for teaching to the tests rather than providing students with a broad range of academic pursuits, especially in schools with large numbers of students in both academic and economic need (Groves, 2002). Additionally, standards-based education was being attacked on the ground that the standards themselves were generally unclear in terms of specific content language and descriptive rigor (Popham, 1997). The trend within classrooms appeared to actually be moving

away from a rigid approach to instruction to allow for a more diverse instructional approach, reaching out to students who learn in differing and multiple ways (Swanson & Stevenson, 2002). The unreasonable and seemingly impossible task of having students attain mastery of the myriad of standards set forth for any given school year continued to draw the ire of many (Marzano, 2000). If it is recognized that students learn differently and at different rates, then a movement to require students to attain a prescribed and uniform amount of learning in a finite amount of time certainly appears to be at odds. Nevertheless, based on the widely accepted belief that all children can, in fact, learn, the American public, especially parents and policymakers, want and expect high standards and their acquisition to be the focus of their schools (Wolf, 2002).

Over the course of the decade of the 1990s, standards-based educational reform grew from its roots in the late 1980s to become the approach of choice for the federal government, and through law, regulation, and choice, the program at the heart of state agendas. Fueled by political accountability, school improvement through standards and assessment had become the newest educational innovation to sweep the country (Kohn, 2000). By the year 2000, schools in all fifty states were implementing standards that had been either developed at the state or local level in efforts to raise the bar of expectation and achievement (Reeves, 2000). Despite this level of change, the federal government, embodied by the administration of President George W. Bush and the U. S. Department of Education, showed an inclination to bring more oversight and accountability to American public schools.

No Child Left Behind Act of 2001

On January 8, 2002, President George W. Bush signed Public Law 107-110, a piece of bi-partisan legislation entitled the *No Child Left Behind Act of 2001* (NCLB). The passage of this legislation, requiring more than 1,200 pages of print, brought federal involvement in public

education to its highest level in history. As the latest reauthorization of the *Elementary and Secondary Education Act of 1965*, the new law would expand the original focus of the law from urban centers, low-income districts, and federal program coordinators to include every public school system in the country and in such a manner that ripples from the law would be felt by all. The original statute focused primarily on bringing federal aid to help level the educational field for poor and minority children (Robelen, 2005). The latest version, however, incorporated many of the additional influences that had grown within federal movements over the years. Beyond using standards as the basis of education and high stakes tests to assess students, the law represented a new emphasis on using student outcomes as the measure of both school and teacher performance. Public reporting of results and consequences for poor performance define a shift to a higher level of accountability (O'Day, 2002).

Opponents of standards-based education had been dealt a significant setback with the passage of NCLB and, although its implementation and impact over the next few years would create more critics, standards-based instruction and high-stakes assessments, backed with the specter of powerful consequences for failing schools, was now the law of the land (Reeves, 2000). This did not sit well with everyone, and some opponents made claims that the approval and implementation of NCLB was the government's attempt to portray American public schools as hopeless, failing institutions (Kohn, 2000). Much of this criticism was based on the accountability model under which critics felt that schools would be saddled with an impossible task, especially large, poor, urban districts with large numbers of minority and/or special needs students. The consequences, culminating in a complete take-over of the school, were viewed as unavoidable for some locales (O'Day, 2002).

As extensive and sweeping as the legislation has turned out to be, the portions outlining potential consequences to schools failing to reach targets, the required statewide assessment programs, and the continually rising target achievement levels have likely received the most attention from schools and teachers, although the requirements for even veteran teachers to acquire highly qualified teaching credential status has also been a point of some intense focus. Related to school consequences, Part A, Section 1116 (b) (5) describes a schedule patterning an increasing set of negative consequences for schools that repeatedly fail to meet established proficiency levels. These consequences begin with required school improvement plans, mandatory additional services for struggling students, and school choice for parents. In the event that satisfactory results are not achieved with these measures, corrective actions such as major curricular changes, the total restructuring of schools as related to administrative and instructional staff, and even the state assumption of the governance of a school or district may result (U. S. Congress, 2002).

The application of such strong consequences is based on each school or school district's ability to meet the increasing percentages of students required to demonstrate state-defined proficiency on reading and math assessments. Guidelines for states in establishing these targets, referred to as Adequate Yearly Progress (AYP) in the law, are found in Part A, Section 1111 (b) (2) of NCLB (U. S. Congress, 2002). In Pennsylvania, the Pennsylvania System of School Assessment reading and math tests were identified by the state Department of Education (PDE) as the measures by which AYP would be determined. Following the guidelines set forth in NCLB, an increasing scale of proficiency thresholds was produced for the state's schools, as presented in Table 1 below (PDE, 2003). Designated percentages represent the percentage of the total student body, as well as all identified disaggregated subgroups, required to be proficient on

the specified assessment in order for AYP to be attained. Implementation of the stringent disciplinary measures for failure to meet AYP that are applicable to schools related to total school populations are also enforceable in the event that a school or a school system fails to meet AYP with regard to any one of the potential subgroups for which the assessment scores can be disaggregated and comparisons made.

Table 1 *Schedule of AYP Proficiency: State of Pennsylvania – 2002 to 2014*

Year(s)	Reading	Math
2002-2004	45%	35%
2005-2007	54%	45%
2008-2010	63%	56%
2011	72%	67%
2012	81%	78%
2013	91%	89%
2014	100%	100%

Although each state designed its own system and scales to determine AYP, seven thousand schools failed to reach the initial proficiency levels and were labeled “failing schools.” In an effort to raise student motivation to perform well on state assessments, twenty-seven states responded by requiring proficiency on the part of the student for promotion to the next grade or for high school graduation. Pennsylvania was not one of those states making this leap (Olson, 2002). In that same year of 2002, nearly 2,000 state and federal laws were enacted related to

education, with one hundred of those specifically addressing educational accountability (Christie, 2002). Much more attention, and thus more financial resources, began to be directed toward instructional structures and strategies showing success in preparing students for high academic achievement related to assessments. After the first year of implementation of NCLB, over half the states were ranking schools within the state based on test scores, requiring districts to produce assessment result report cards to be distributed across the district, monitoring graduation and drop-out rates, and using a single indicator to determine school and student performance (Christie, 2002).

In addition to using assessment programs to compare the student bodies of schools and to use overall performance as an indicator of school success, the provisions of NCLB also aimed to use the system to set high expectations for identified subgroups, holding schools accountable for the combined efforts of members of these groups. In Part A, Section 1111 (b) (3) of the Act, state plans are required to be structured in a manner that enables results to be disaggregated by gender, racial and ethnic groups, English proficiency status, migrant status, identified disabilities, and by identification as economically disadvantaged (U. S. Congress, 2002). Historically, each of these groups has demonstrated a consistently lower level of achievement when compared with the level of achievement of the total population of students. NCLB represents the federal government's commitment to identifying schools where the achievement gap exists and to erasing the soft bigotry of low expectations for students of color by demanding that schools show progress in closing the achievement gap between minorities and white students (Scherer & Marzano, 2001).

However, only if the populations of such disaggregated groups reach a statistically significant proportion in size would schools fall under the umbrella where such comparisons

would be made. For a group within a school to be considered large enough to have its members scores disaggregated for AYP consideration, the initial membership number had to equal at least 75 individuals. This number was reduced to a population size of 40 individuals within two years of implementation (PDE, 2002). Particularly in western Pennsylvania, where individual schools and school districts tend to be smaller than in other regions, this provision still only affected the largest of the districts in the area, particularly the two urban districts of Pittsburgh and Erie, although a handful of others would serve populations large enough to make compliance with the targets for some disaggregated groups an issue.

A report out of the University of California at Los Angeles by Zhou (2003), shows that students living in urban areas came from high concentrations of racial and ethnic minorities, where poverty also occurs at a high rate. These students are often ill prepared for schooling and demonstrate difficulty attending and succeeding in school. Saddled with the need to educate the nation's most needy population, urban schools fight an environment in which poverty, unemployment, crime, and inadequate housing add to the hardships of their students (Buttay, et al., 2001). In identifying the subgroups for which scores must be disaggregated from a school's total population scores, and by holding schools and school districts accountable for the educational achievement of such students, the government, through NCLB, is attempting to break through the achievement gaps that have historically existed (Scherer & Marzano, 2001). Closing those achievement gaps, while addressing the individuality that differing learning styles present, has sent each school system on a search to identify the needs germane to the given system and to find ways to address those needs while simultaneously attempting to ensure the steady rise in achievement for all students. Such is the mandate of NCLB.

In developing plans to attend to the needs of students showing a lower level of achievement, many school districts are looking to implement additional instructional programming aimed at those falling behind. Typically, such endeavors require new funding streams, and schools are often on the lookout for grant money tied to raising student achievement that can be accessed and applied to new programs. Often, that grant money is earmarked for programs tailored to meet the needs of a specific group. Such was the case for the Increasing Diversity School District as it sought ways to fund the central idea that became the PSSA Prep Program. The state of Pennsylvania, like many others, had created block grants for which schools could apply to implement new programs (PDE, March 2004). In considering the requirements of the grant application and the demographics of student groups in need of additional assistance to reach proficiency in reading and math, the Increasing Diversity School District designed the PSSA Prep Program to provide focus on students identified as economically disadvantaged.

The Special Case of Economically Disadvantaged Students

Identification of the Economically Disadvantaged Student

The phrase economically disadvantaged has replaced the term poor as the language of our nation has changed through the increased awareness of politicians and media outlets of the dangers incurred in engaging in insensitive speech (Atkinson, 2000). Defining just what the term economically disadvantaged means is as difficult as defining the term poor. Although easily located in a dictionary, defining such concepts in the real world often lead to models of relative comparison. A person considered poor in one part of the world or even in one suburban neighborhood, may be perceived very differently somewhere else. Therefore, the qualifications for being considered economically disadvantaged vary somewhat, although students identified as

such are clearly delineated in NCLB as a group for which scores are to be disaggregated to determine AYP. States and schools typically use some agreed upon set of criteria, often established at the state level, to identify school-age children as economically disadvantaged.

Most commonly, such criteria as participation in free or reduced price school lunch programs, eligibility for participation in programs assisted by the Workforce Investment Act, eligibility for public assistance funds, or an annual family income below the national poverty level are used alone or in some combination (Payne, 2002). In Pennsylvania, participation in the free or reduced price school lunch program has been the most common standard for identifying students as economically disadvantaged. The single largest drawback to such an identification process is that this method relies on self-reporting by students. It is not uncommon for students and families to want to avoid stigma as a result of such labeling. Even students who participate in such programs in their elementary years sometimes resist participation at the secondary level because the stigma becomes more than they want to bear in their adolescent years (Drazen, 1992). Statistics from the 1990s indicate that approximately 40 percent of the child population in the United States could fit the various criteria for being poor (Cohen, 1993). Large percentages of the students who populate this group also can be categorized within identified racial and ethnic minorities and students with identified learning disabilities (Campbell et al., 1991).

Achievement Record of Economically Disadvantaged Students

As is true with every subgroup that has been identified as experiencing an achievement gap when compared with their peers, students falling into the category of economically disadvantaged are not all alike. There are many who attend school on a regular basis and perform quite well academically (Renchler, 1993). Historically, however, this group as a whole has demonstrated a substantially lower rate of academic achievement than is the case with peers

(Hedges, Laine & Greenwald, 1994). Researchers have consistently identified socioeconomic status as one of the most important influences on student achievement (Tajalli & Opheim, 2004). Although a gap in the achievement of economically disadvantaged students has been recognized for decades, it is still the object of significant research and writing. Rothstein (2006) explains several factors that bring students from low-income homes into schools less ready to learn, thus these students already experience a deficit as formal schooling begins. He identifies several parenting factors, the performance of which defines school readiness. One of most important of these is early childhood reading. Educated parents are more likely to read consistently to their young children, giving them at least some word recognition and the concept of holding a book and turning pages to gain knowledge of an idea or story. Additionally, how a parent reads to the child also impacts future learning. Low income parents will follow reading sessions with questions that are essentially factual in nature, while more educated parents will be more likely to ask creative, interpretive or connective questions. Reading is also more often modeled by parents in middle class homes, both for work and pleasure. Infants in these homes are also more likely to be conversed with prior to being able to understand the language, and as toddlers to have the reasons behind chores and duties discussed and explained, rather than simply directed toward them. Another difference cited by Rothstein is found in the opportunities available to children to participate in activities outside of the home. Fees and transportation issues often limit children from low-income homes in their levels of participation. These situations provide children with opportunities to enhance confidence, peer relation and self-assurance, which later translate into more comfort and confidence when faced with new tasks at school. With equal expectations and teaching from the school entry point, the child without extensive experience

with reading, language, reasoning, and who may be lacking in confidence, is less likely to reach the same learning levels.

Upon entering school, children's parental influences continue to help shape their level of achievement. Parents from different social classes supervise homework differently (Rothstein, 2006). Lower-class parents tend to assist students through direct instruction, while middle-class parents are more likely to use leading questions and to break large problems down into smaller ones, allowing the students to reach their own conclusions. Levels of encouragement versus reprimand also play a role, according to Rothstein. Children of professionals received an average of six encouragements for each reprimand, with working class children experiencing a two to one ratio of encouragements to reprimands. Children living in welfare situations received only one encouragement for every two reprimands. Initiative on the part of children that is encouraged often results in students who take responsibility for their own learning. A study conducted by Campbell et al. (1991) connected rigid, authoritarian beliefs about child rearing and education held by low-income parents with a strongly negative influence on their children's achievement levels in reading.

The final factors identified by Rothstein (2006) as contributing to the gap existing between low-income children and others are the quantity and quality of health care and housing. Generally, children living in low-income homes are in poorer health, resulting from less frequent contact with health care professionals and the fact that those appointments are often in public health centers, which typically fail to attract the best in the field. Housing also often contributes to poor health, as children are more likely to live where lead poisoning, high sulfur content heating oil usage, and poorly insulated conditions are present. These situations contribute to a variety of health issues that will lead to absenteeism upon entering school. The other problem

presented by housing for low-income families is the prevalent need to relocate frequently, due to rising housing costs, changes in family dynamics, or other forces often beyond the family's control. Compounding the parenting factors, these environmental conditions contribute to the opening gap faced by economically disadvantaged children as they enter and proceed through their first years of school.

The recognition of this gap was first reflected in federal policy with the passage of the original Elementary and Secondary Education Act (ESEA) of 1965. A significant portion of this legislation related to the establishment of Title I programs, which were aimed at raising the academic performance of students in low-income schools and economically disadvantaged students in all public schools (Jennings, 2000). In initiating legislation for underprivileged student populations, ESEA paved the way (Jennings, 2000). Over the course of time, this legislation was regularly able to gain reauthorization every five years, giving virtually every president since Lyndon Johnson the opportunity to place his own imprint on the legislation. Eventually, under President George W. Bush, ESEA evolved into NCLB. The identification of NCLB's roots in ESEA helps to explain why the population of economically disadvantaged students was established as one of the subgroups for which scores would be disaggregated and considered separately in determining whether a school or school district had met the requirements of AYP.

The original basis for the specific expenditure of federal education funds on students in poverty situations was the burgeoning evidence that students living and attempting to learn in such situations placed them at a decided disadvantage as compared to their peers. Following the decision in *Brown v. Board of Education, 1954*, in which the U. S. Supreme Court ruled that public schools segregated on the basis of race were unconstitutional, the national debate about

the quality of education being provided to African American children led to a broader conversation about the needs of children of all races coming from disadvantaged homes (Jennings, 2000). As data began to demonstrate that the needs of children of color and the needs of children from low-income homes paralleled one another, educational issues related to race and poverty became intertwined. In exploring these data, as well as the wealth of assessment data that have been produced since the inception of the National Assessment of Educational Progress (NAEP) tests, researchers have established that there continues to be a sizable achievement gap between economically disadvantaged students and others (Tajalli & Opheim, 2005). As indicated by former U. S. Commissioner of Education Harold Howe II, however, "...if you introduce legislation that really does try to effect a significant change in institutions and in the teaching of poor kids then you are going to need a lot of patience" (Killacky & Conroy, 1985-86). As indicated by the research on education-related factors affecting children living in low-income homes, schools would have a daunting task before them, even with significant additional funding. Yet, while providing the extra funds, the law and the regulations never specified how children in these circumstances should be taught, nor did they require states to set any level of educational achievement that economically disadvantaged students should be expected to attain (Jennings, 2000). Time and additional educational research would begin to ameliorate both of those situations.

Strategies Employed to Assist Economically Disadvantaged Student Achievement

From studying the financial resource usage in public schools, Okpala (2002), among others, has determined that, "Some of the major factors that are theoretically under the control of a school ... have little if anything to do with student performance" (p. 887). Nevertheless, across a substantial period of time during the second half of the last century, efforts were made to

adapt programmatic and instructional settings to address the needs of students deemed to be economically disadvantaged. Additionally, a number of studies aimed at answering larger questions have taken into consideration the effects of various changes on the population of economically disadvantaged students. In particular, studies of the effects of class and group sizes, such as those conducted in Tennessee on Project STAR and in Wisconsin on the SAGE project, have provided information on the relationship between group sizes and the achievement level of economically disadvantaged students (Bracey, 1999). Some research indicates that students from impoverished communities are much more likely to benefit from smaller schools (Howley & Bickel, 1999). Other areas of interest related to the improvement of achievement for economically disadvantaged students have focused on the use of school time to address the learning needs of these students and the implementation of integrated technology into the curriculum (Anderson, 1999).

Given that the nature of students classified as economically disadvantaged is widely varied and that the possession of academic ability is often equally diverse, much of the research devoted to efforts to support economically disadvantaged students is aimed at those who are less academically able and those who fall into other disadvantaged groups, such as identified special needs students and those who are members of racial or ethnic minorities. Those students identified as economically disadvantaged who demonstrate signs of being successful in school do not draw the attention of researchers.

One fairly early attempt to survey, condense, and disseminate research related to meaningful instructional aspects for economically disadvantaged students was conducted by Susan Garton. Garton (1984) reported on several factors that she found to be effective with economically disadvantaged students ranging from characteristics of effective academic

activities to staffing considerations and curricular design. Noting that these characteristics are generally effective with all students, she made the case for purposefully incorporating them when teaching economically disadvantaged students. Such characteristics include ensuring that students are actively involved in the pursuit of a concrete goal, relating learning experiences to students' own life experiences, planning for students to experience success, including students in the planning and implementation of the activity, and creating circumstances in which students and teachers have the opportunity to get to know one another well.

Having teachers of high quality in schools and classrooms populated with disadvantaged students has been an issue of concern. Typically schools with higher concentrations of low-income homes are not as well maintained, have less equipment and materials than other schools and have a more difficult time attracting and retaining well-qualified teachers (Oakes, 1992). Identifying the right teachers to work with economically disadvantaged students is another important factor (Garton, 1984). Finding teachers who are capable of identifying with the students is the first critical step. This does not necessarily mean that the teacher has to come from a background of disadvantage, but that he or she demonstrates the experience and empathy needed to recognize the special circumstances, and thus, the special nature of economically disadvantaged students. Training those teachers to abandon misconceptions about the ability level of disadvantaged students based on the fact that such students start school already behind should be one of the primary foci of in-service programs. The teacher-training program at the University of North Carolina at Greensboro has taken this concept one step further, partnering with a local elementary school with high rates of economically disadvantaged students. Every pre-service teacher in the program completes at least one field experience in the school (Miller, Duffy, & Rohr, 2005). By spending a defined length of time in a high-poverty school, preparing

teachers are encouraged to gain the kind of empathy desirable in a teacher of economically disadvantaged students.

The final staffing issue identified by Garton (1984) lies in the area of reducing class size. Even by the mid-1980s, researchers were recognizing that smaller class sizes provided teachers with the opportunity for more individual instruction, interaction, and contact with students, providing more chance for personalizing the learning experience. Later studies have pointed to the additional support available for students when teacher/student ratios are reduced, allowing for more individualized instruction for students (Miller, Duffy, & Rohr, 2005).

Three factors are of primary concern when developing and implementing curricula for economically disadvantaged students (Garton, 1984). These are relevancy, ability grouping, and the inclusion of enrichment activities from sources outside of the school. As with most students, those coming from low-income backgrounds tend to be interested in knowing how their current learning will be beneficial to them beyond the end of their formal schooling. A curricular approach that has its roots in real-world application and that is easily identifiable as such is typically more motivating for students. Heterogeneous grouping is important for economically disadvantaged students. Often, because they start school behind their peers, these students get included in homogeneously constructed groups with students possessing lower levels of academic ability, leading to educational experiences that are often aimed at their achievement levels, but below their abilities. Additionally, because they often lack many of the outside-the-home experiences their advantaged peers have, it is important to present economically disadvantaged students with opportunities to engage in experiences that broaden their horizons as related to culture, public institutions, and career awareness.

In implementing instructional strategies to be used with economically disadvantaged students, Garton (1984) supports two primary approaches: mastery learning and holistic teaching. Mastery learning permits students to work at their own pace, yet still requires them to understand and be able to apply the full range of content being studied, granting them many opportunities to interact with the material, if needed. Such an approach allows students beginning from behind others in knowledge and skills to master the same content, but to do it in a time frame that allows for slower processing and the need to revisit content multiple times. Holistic teaching relates back to identifying the right teachers to place into classrooms with economically disadvantaged students. Using this approach, it is critical for a teacher to consider the entire student, recognizing the unique circumstances that each student brings to class each day, and to design instruction flexible enough to allow for daily adjustment as needed. Instructional activities that develop inquiry and problem-solving skills, actively engage students in their own learning, ask students to solve problems using critical thinking skills, and use hands-on experiences present economically disadvantaged students with the best opportunities to learn and learn well (Oakes, 1992).

More recent research has added to the list of instructional strategies that show promise for economically disadvantaged students. It is recommended by Payne (2002) that tactile and/or kinesthetic activities be included in every lesson. Graphic organizers have shown promise as well as the use of sentence frames, question stems, and mental models. Problem-driven instruction that provides high-challenge tasks that emphasize comprehension and genuine literacy instead of rote tasks such as completing worksheets has shown to be an effective method when used with economically disadvantaged students (Miller, 2003). In the University of North Carolina at Greensboro program, assessment during instruction, collaborative student work, and

the use of public presentations of student products have also shown value (Miller, Duffy, & Rohr, 2005).

While the administrative team at the Increasing Diversity School District did not consult the research literature in a formal manner, the combined experience and professional reading in which the members had engaged over the years led them to include in the PSSA Prep Program several of the characteristics that have been identified as having positive influence on economically disadvantaged students. Specifically, additional time devoted to specific content, smaller group size, instruction based on assessment, and integrating computer software into the curriculum were purposeful components. The research supporting these four aspects will be reviewed in the remainder of this chapter. Also, while not discussed further in this chapter, during the hiring process, great consideration was given to identifying and hiring teachers capable of being empathetic with students from low-income homes and the ability to be masters of specific content areas.

Improving Economically Disadvantaged Students' Achievement

Additional Time Devoted to Raising Achievement

In many ways, the idea that spending more time learning something leads to more complete and secure understanding, as well as the practical application of the knowledge or skill, appears self-evident. The phrase “practice makes perfect” is applied to many circumstances, from the performance of an athletic feat, to playing the piano, to learning multiplication facts. In virtually every walk of life, there is an underlying assumption that the more time one spends engaged in an activity or with a body of information, the more adept one becomes at its use. Educational research has shown that increasing “time on task” has a positive effect on student learning (Cavanagh, 2006). Changes in the curricular requirements that have developed as a

result of NCLB have exacerbated the time crunch that many feel in public schools. Because of the increasing expectations on the material students are expected to master, vice president of the Education Commission of the States Kathy Christie (2002) says, "...people need to come up with ways to increase learning time" (p. 261).

Many schools across the nation have implemented after-school tutoring programs in order to provide the extra learning opportunities needed to help close the achievement gap that exists for students of various identified groups (Kugler, 2001). One district in Pennsylvania specifically aimed an after school tutoring program at improving reading skills to boost the amount of time devoted to reading instruction and to add an intensive two hour component to the learning opportunities for those students (Sanderson, 2003). As with many programs aimed at such a goal, there were additional factors involved in developing the program, including maintaining small group sizes and targeting students' attitudes toward reading. The initial results of the program based on both quantitative and qualitative data indicate improvement in students' reading abilities (Sanderson, 2003).

A recent report from the Center for American Progress (2006) not only supports additional time dedicated to academic study, but gives some concrete suggestions as to what to do during that time. Organizing school days to accommodate expanded time for core academic subjects and using technology for customized instruction and feedback are two of these recommendations. Some schools in Massachusetts have implemented schedules that provide such extra time for the study of reading and math. A middle school in Boston has been using an extended day to allow more instructional time in the core subjects. The school has gone from one of the lowest performing middle schools in the city to one of the highest (Chmelynski, 2006). In Sioux Falls, South Dakota, three schools in which about 58 percent of the students

were eligible for free or reduced lunches made the Adequate Yearly Progress requirements for the first time after adding 30 minutes to the length of the student day. The time was focused on instruction geared to increase reading and vocabulary skills (Chmelynski, 2006).

Texas has also seen schools implement extended time for the learning of core subjects, especially for students who have exhibited a lack of proficiency as determined by state level tests. At Mount Pleasant High School, in Mount Pleasant, Texas, students who fail to reach prescribed levels of achievement in reading, math, or science are assigned to “double-dosing” classes, where students spend twice the normal length of time pursuing the study of those subjects (Cavanaugh, 2006). Since the program has been in place, the school’s state test scores have improved. After one year of program participation, 70 percent of the students passed the state grade-level exam, after none of them had passed it the previous year. Studies have also shown positive correlations between extending time for students to learn core subjects and their resulting achievement in Florida (Cavanaugh, 2006) and Missouri (Chmelynski, 2006).

Some studies have placed a particular emphasis on addressing the needs of economically disadvantaged students. Mary Laura Openshaw, the Director of Just Read, Florida! identifies the need for extra time for these students by stating, “...the greater the need, the more time you need in intensive instruction” (Cavanaugh, 2006, p. 2). Providing more time for learning is particularly important to help students identified as at-risk, according to both the American Federation of Teachers and the National Association of School Psychologists (Woelfel, 2005). These organizations go on to state that increasing instructional time that focuses on facilitating the development of academic skills is one of the most effective, standards-aligned intervention methods for struggling students.

Students enrolled in the Increasing Diversity School District's PSSA Prep Program continued to take the courses in English and mathematics to which they would ordinarily be assigned. Another period of the day was used to attend the program, which alternates weeks of more intensive study of reading and math, adding about 50 percent to the amount of time in which a student is engaged with targeted mathematical concepts. At the high school level in this district, there was no formalized reading program, as that ends at the eighth grade level. Therefore, the reading component of the program was actually adding into student schedules time dedicated to reading that would otherwise have none.

Small Group Size

One initiative that has received a great deal of political backing, and thus a great deal of funding and study, is the effort to reduce class size. While the primary thrust to reduce class size has occurred at the elementary level, research has often included the impact of smaller group sizes on the achievement of economically disadvantaged students and, at times, has been expanded to results at the secondary level. Two of the largest studies concerned with the effects of class size reduction were conducted separately in Tennessee and Wisconsin.

Beginning in 1985, some 7000 students from 300 classes in 80 schools in Tennessee were randomly divided into class groups of differing sizes. Teachers were randomly assigned to the classes. Although some students were reassigned to different sized classrooms during the course of the experiment, known as Tennessee's Project STAR (Student/Teacher Achievement Ratio), most students remained within their original cohorts. Throughout the course of the next three years, students were given parallel tests in reading and mathematics to determine whether differences in class sizes resulted in differences in achievement (Prais, 1996). Although some of

the specific findings of the various studies have been challenged, Shaver (2002), one of the most vocal critics of the study, recognizes that the benefits of small class sizes are widely recognized.

J. Finn has written extensively on Project STAR and began his approach to the study of this effort by poring through the historical research on class size prior to the implementation of this initiative. While he takes issue with much of that body of research in terms of scientific performance, he identified a few conclusions that he deemed to be supported by sufficient research. These included an expectation of modest increases in student achievement when class sizes are reduced to numbers below twenty, a higher level of benefit to classes at the primary grade level, and a higher level of benefit to students who are economically disadvantaged (Finn, 2002). His findings related specifically to Project STAR are as mixed as his references to earlier class size research. He took issue with many of the project's parameters but identified some positive results of the experiment that are tangential to student achievement. He discovered that teacher morale was better; that fewer disruptions took place, allowing teachers to spend a greater amount of time on instruction; that students' engagement in learning was increased; and that in-grade retention and drop-out rates were reduced. Others, focusing more specifically on the statistical results of Project STAR, found that students from the small classes had significantly higher scores on standardized tests in every subject tested (Mostellar, Light, & Sachs, 1996).

A later, more detailed, statistical analysis of the data obtained from Project STAR was undertaken by Nye, Hedges, and Konstantopoulos (2001). They sought to isolate the effects of small group size at each grade level and within tested subject, on whole groups and for populations of minority and economically disadvantaged students. They found a strong overall statistical impact for students in the smaller class groups in every grade and for every subject, except for kindergartners in mathematics.

In the mid- to late 1990s, Wisconsin implemented a pilot program aimed at reducing class size, known as the SAGE (Student Achievement Guarantee in Education) program. Molnar, et al. (1999) found positive results associated with this program consistent with those discovered by researchers studying Project STAR. Similar to Project STAR, the SAGE program targeted elementary students, especially students in the primary grades. Class sizes were reduced to fifteen students per teacher, although some situations were set up with 30 students and two teachers assigned to a single classroom (Molnar, Smith, & Zahorik, 1999). Teachers noted an increase in time available for instruction in general, as well as greater opportunities for individualizing instruction and providing one-on-one assistance to students. A noteworthy characteristic of the implementation of the SAGE program is that it was begun in Milwaukee schools comprising student populations almost entirely made up of low-income and minority children (Bracey, 1999). Test score results showed limited benefits to students involved in SAGE classrooms versus their control group peers. However, once the greater percentage of special needs and economically disadvantaged students in the SAGE classrooms was taken into account, gains in student achievement were noted (Maier, Molnar, Percy, Smith, & Zahorik, 1997).

Other researchers have also identified positive effects of smaller group sizes for economically disadvantaged students. One of the few studies on class size at the secondary level showed benefits that may have a strong impact on students from low-income homes. These benefits included stimulation of student engagement, the use of more innovative instructional strategies, increased teacher-student interactions, and minimized feelings of isolation and alienation that stem from anonymity (Deutsch, 2003). In his study of school spending, Wenglinsky (1997) reached a conclusion supporting spending to reduce class size, because he

determined that the resulting smaller teacher/student ratios contribute to a cohesive school environment, which, in turn, raises student achievement.

The framers of the PSSA Prep Program decided to limit group sizes to twelve students per teacher per period. There was strong commitment from the group to maintain small size.

Instruction Based on Assessment

For more than seven decades, the idea has been promulgated that instruction should be built on the results of an assessment of what a student can demonstrate that he or she knows. Such is the foundation of the well-known instructional method of Mastery Learning. The basic tenets of the method include maintaining equal achievement expectations for all students, while allowing them to reach those goals over widely different time intervals. An expected level of achievement is measured by some form of assessment. If a student does not reach the target level, additional learning time and experiences are put in place based on the content demonstrated as not mastered. These are followed by another assessment. This cycle continues until the student reaches the desired mastery level (Howe & Woodrum, 2000). This kind of targeted instruction is one of the foundational characteristics of the PSSA Prep Program. However, while instruction based in Mastery Learning typically divides subject matter into units with predetermined objectives assessed by exams (Davis & Sorrell, 1995), the PSSA Prep Program focuses on assessing and remediating specific skills. A study of teachers successfully using differentiated instruction in their classrooms showed that their perspectives on assessment were similar to one another, but unlike the traditional viewpoint (Tomlinson, 1996). These teachers viewed assessment as a means to modify future instruction, not as something that comes at the end of a chapter or a unit to find out what students learned.

Using assessment data to inform instruction has gained much support in recent years, and while educators have struggled at times to determine what all of the information to which they have access tells them, many are finding the process motivating as well as important. In one setting, with teachers working in teams, it is reported that teachers looked forward to what they consider the real work created by data analysis, namely producing, testing and refining lessons and strategies targeted to areas of low performance. It is through this targeting effort that they saw the possibility of making the greatest difference for students (Schmoker, 2003). McIntire (2003) conducted a study of a Virginia school district that had made a comprehensive and concerted effort to use assessment data to drive instructional decisions. His findings showed that such an approach helped teachers find students' strengths and weaknesses, resulting in instruction that was targeted and thus more efficient.

In their work to push for the alignment of curriculum, instructional practice, and assessment, Johnston and Lawrence (2004) help make the case for targeted instruction based on assessment results. They see assessment as being able to provide accurate identification of learning deficiencies as well as promising instructional strategies to promote the improvement of student learning. Others have also recommended aligning these same three phases of learning, with Law (1999) stating, "We must know what needs to be taught (content standards), we must know how to determine if students have learned what we taught (assessments), and then we must know how to adapt our teaching to meet student needs (diagnostic/prescriptive instruction)" (p. 5). This is exactly the intent of the PSSA Prep Program. Noble High School, in Berwick, Maine, took a similar approach to address its struggling readers. Following a short series of literacy assessments, those students demonstrating the most need were assigned to participate in the literacy center, where they received targeted instruction based on the assessment results.

Throughout the school, efforts were made to make reading instruction a point of focus for everyone, and the results were impressive. While proficiency scores went up across the board, the largest gains were demonstrated by students involved with the literacy center, with 96 percent of those students raising their scores, and advances averaging between two and three grade levels in reading achievement (Perks, 2006).

Fuchs (1995) identified three instructional decisional benefits to teachers from applying assessment results. The first was related to placement decisions, which clearly came into play in deciding on potential participants for the PSSA Prep Program. The second benefit involved formative evaluation decisions that used assessment results to decide whether progress toward a goal was being made and when to move a student forward to further material. The third benefit was the use of assessment results as diagnostic tools to specifically identify content preventing a student from reaching an adequate level of achievement. This was the type of benefit that was made a primary focus of the PSSA Prep Program. The results of previous PSSA Assessments, diagnostic information drawn from both other paper and pencil tests, and the software program associated with the PSSA Prep Program provide results that helped the teachers identify specific content for remediation with individual students.

A yearlong study supported by the Harvard Graduate School of Education during the 2002-03 school year in ten Boston public schools focused on the positive effects of having a school level team work together on using student assessment results (Murnane, Sharkey, & Boudett, 2005). While also discovering many aspects related to teaming and interactions between administrators and teachers, the research produced a clear indication that studying the information provided by the assessment produced improvement in instruction that led to higher levels of student achievement.

Integration of Computer Software as an Instructional Tool

Early uses of computers in schools revolved around the supplementation of instruction to add extra drill and practice or as a means of adding tutoring following the teacher's instruction. Studies on the effectiveness of such applications indicated that the addition of these learning experiences raised student achievement over that of students receiving traditional instruction alone (Capper & Copple, 1985). Attempts have been made to complete instruction solely through the use of computer software, as well, but these attempts did not yield the same positive results as when software instruction was used in combination with traditional methods of instruction. Dalton and Hannafin (1988) summarized their findings related to the use of computers in instruction by stating that both traditional methods and computer-based delivery systems have valuable roles in instruction, but they were of greatest value when used to complement one another.

The integration of computer software instruction in the classroom has been studied as it relates to general student populations and to a number of more specialized groups. Multiple studies have demonstrated the effectiveness of using computer-based instruction with general student populations. Among these are research supporting integrating computer technology into the teaching and learning of math (Xin, 2000), using Internet-based instructional modules (Bayha & Doe, 1998), and moving the use of computer technology beyond drill and practice sessions (Gerber, 1994). An extensive study, conducted across thirty-four schools in the mid-1990s, demonstrated that the literacy achievement results for students participating in a program that included the supplementation of traditional instruction with computer-based instruction were significantly higher than for the control groups of students in those schools where learning was not supplemented with technology (Pisapia, Knutson, & Coukos, 1999).

Anderson (1999) reported on a number of situations in which the integration of technology was applied to the instruction of students with a variety of identified special needs, from some rather strongly disabled students to those falling just short of their nondisabled peers. He cited measurable benefits to students in each category, echoing the conclusion that the value in computer-assisted instruction is as a supplement to the more personal contact students receive through traditional methods of instruction. Extended research conducted by Friend and Bursuck (1996) on classrooms that were designed to include learning-disabled students with their peers and that used computer-based instruction as an individualized supplement to mathematics instruction concluded that the computer technology was an important part of the inclusive classroom and demonstrated overall gains for all types of students. Gains have also been identified for limited-English-proficient students when technology has been included as part of their overall instructional program (Vigil, 1998).

Students identified as economically disadvantaged have been shown to benefit from the inclusion of computer-based instruction. Vollands, Topping, and Evans (1999) reported on a project undertaken to improve the reading achievement of students in two schools located in severely socio-economically disadvantaged areas. Upon evaluation of the implementation of a program that included self-directed interaction with a computer software program, reading achievement gains for participants was notably higher than for nonparticipants, and interview results showed a higher level of motivation and a better attitude toward reading. Students with the lowest ability levels showed the greatest gains. Similar results were obtained when the impact of implementing computer-based instruction for the purpose of remediation was evaluated (Keup, 1998). Such positive results were attributed to characteristics of computer-based instruction that are not present or not present to the same degree in traditional methods of

instruction. These include privacy, objectivity, timeliness of feedback, individualized learning, and flexibility (Wilson, 1992).

Summary

As schools and school districts across the United States continue to try to measure up to the accountability requirements established by the No Child Left Behind Act of 2001, they will be constantly searching for methods to employ to help their students achieve the required increasing levels of proficiency. Although it is likely that this legislation will be modified over the course of time, just as its predecessors were eventually molded into it, the concept of accountability is not going to disappear from the landscape of public education. Also, achievement gaps that have long been recognized for specific populations of students will remain in place until means and methods are in place that are successful in eradicating them.

Both NCLB and educational research literature substantiate economically disadvantaged students as a group in need of intervention to help close the achievement gap. Attempts have been made to identify what factors and instructional procedures may have potential benefits in raising those students to higher levels of achievement. In attending to the needs of economically disadvantaged students, the Increasing Diversity School District has implemented the PSSA Prep Program. This program is characterized by four primary components: additional time during the school day focused on reading and math, small class sizes, instruction based on needs identified through assessment, and the inclusion of computer software in the total instructional approach. Should the program prove to have a positive impact on this population, it is reasonable to foresee its replication in other settings.

CHAPTER III

METHODOLOGY

As indicated throughout Chapters I and II, the increase in public educational accountability brought about by NCLB, and the need to address the lack of proficiency in total student populations, as well as in specified subgroups, have led to the implementation of the PSSA Prep Program in the Increasing Diversity School District. The program was founded on the premise that student achievement could be positively affected by having students spend additional time during school hours devoted to focused study on assessment-identified weaknesses. Additional key characteristics of the program include limiting the size of the classes to a maximum of twelve and the infusion of computer software used on a supplemental basis that tailors activities to individual skills.

The study was centered on the students in the Increasing Diversity School District's graduating class of 2007, whose scores on the eleventh-grade PSSA assessments provide the first opportunity to examine the potential gains provided to students participating in the program. Comparisons were made between similar participating and non-participating students in total. Additionally, comparisons were made specifically related to economically disadvantaged students and economically disadvantaged participants vs. other participants. Consideration was also given to gender within all of these comparisons.

The Increasing Diversity School District serves a mixed community about forty miles north of Pittsburgh, Pennsylvania. The district is home to about 56,200 residents and serves around 8,500 students. Contained within the 150 square miles of the district is a city with a population of about 15,000, another small borough, and six surrounding townships that embody both bedroom neighborhoods for those commuting to Pittsburgh and some rural areas that still

provide extensive farmlands for produce, crops, and dairy cattle. The primary city has shown indications of more urban characteristics over the course of the last ten to fifteen years as large local industrial employers have closed and access to social services has improved. The changes in demographics and a general economic downturn in the area have led to an increasing population of students identified as economically disadvantaged, now comprising about 14 percent of the student population.

The mandates of NCLB directed toward accountability for the achievement of all students, and incrementally increasing targets of proficiency for total student populations and disaggregated subgroups (one of which is economically disadvantaged students) prompted the Increasing Diversity School District to create the PSSA Prep Program. Students are identified for participation in the program based on previous scores on PSSA assessments as well other standardized tests when a gap in the PSSA testing cycle exists. Preference in assignment is given to those students identified as economically disadvantaged as determined by participation in the free and reduced lunch program.

The PSSA Prep Program

Students participating in the PSSA Prep program were removed from either a study hall or an elective class that had originally been placed in their schedules. The students attended the PSSA Prep course for one 46-minute period on a daily basis, receiving additional instruction in reading and math in classes with a size limit of twelve students. Initially, students were given a pre-test to determine which of the state standards in these subjects were areas requiring remediation. An informal analysis of this pre-test and recent PSSA assessment results by the teachers identified topics and processes that were common weak areas. From this point, instruction was planned based on bolstering students' skills in those areas. The diagnostic

assessment contained in the ClassWorks High School computer software, which was specifically purchased for this program, provided individual skill analysis to direct the computer-aided component of the instruction. Students participated in a variety of instructional activities ranging from individual work to small group and whole-class instruction. Groups were based on identified skill deficiencies and varied with the topic. Activities included several forms of skill practice following direct instruction, group discussion, one-on-one instruction, and interaction with the computer software. Students were familiarized with the question formats commonly found on the PSSA assessments in both reading and mathematics. Especially in reading, students were taught how to apply the skills they learned to other courses. Several sources of materials were used, including, but not limited to the PSSA Coach series, The Reader's Handbook, a variety of skill practice resources, several readings from scattered anthologies as well as short novels, and the ClassWorks High School computer software.

Students participating in the PSSA Prep program continued to attend their usual mathematics and English classes as well. Students not participating in the program continued to attend their usual mathematics and English classes, too, but they maintained their study halls or electives and did not receive the additional instruction provided in the PSSA Prep program.

Design of the Study

The study was designed to compare results of students in the PSSA Prep Program with those not in the program, as well as analyze students in selected subgroups, all of whom participated in the program. The study is a quasi-experimental design due to the fact that students were not randomly assigned to participate in the program. Selection for participation in the program was most strongly based on scores from the most recent PSSA assessments.

However, because of multi-year gaps in the testing program, these scores were two years old for some grade levels. Therefore, standardized test results such as those from the Stanford Achievement Tests were considered as well. Student performance on classroom-based quarterly assessments and teacher recommendations also comprised selection criteria. Students identified as being economically disadvantaged were given priority for placement in the program. Students and their parents were then notified of assignment to the program. Upon parental request, students could be withdrawn from participation in the program. Since the aim of the program was to help students raise their achievement levels on the PSSA reading and mathematics tests, especially as related to the revised graduation requirement, scores for eleventh grade students on these assessments were used in this analysis. The analysis provided the answer as to whether the program is working to raise the assessment scores of given groups of students.

The remainder of the study, using interviews to provide limited qualitative data, helped to examine the various components of the program in ways that quantitative analysis could not. Analysis of test scores related to the PSSA program could not separate the influence that the various aspects of the program may have had on producing higher test scores or identifying areas for potential improvement to aide students not showing improvement as a result of participation in the program.

The research questions addressed in this study were:

1. What impact did the Increasing Diversity School District's PSSA Prep program have on student performance on the PSSA reading and mathematics assessments in grade 11 as measured by comparing the results of students participating in the PSSA Prep Program with the results of comparable non-participants? This question was answered by testing hypotheses of the form H_0 : Students participating in the Increasing Diversity School

District's PSSA Prep program will not score higher on the PSSA reading and mathematics assessments in grade 11 than similar students not participating in the program.

2. What impact did the Increasing Diversity School District's PSSA Prep Program have on student performance on the PSSA reading and mathematics assessments in grade 11 as measured by comparing the results of economically disadvantaged students participating in the PSSA Prep Program with the results of similar non-participants? This question was answered by testing hypotheses of the form H_0 : Economically disadvantaged students participating in the Increasing Diversity School Diversity PSSA Prep program will not score higher on the PSSA reading and mathematics assessments in grade 11 than economically disadvantaged students not participating in the program.
3. What impact did the Increasing Diversity School District's PSSA Prep Program have on student performance on the PSSA reading and mathematics assessments in grade 11 as measured by comparing the results of economically disadvantaged students participating in the PSSA Prep Program with the results of non-disadvantaged participants? This question was answered by testing hypotheses of the form H_0 : Economically disadvantaged students participating in the Increasing Diversity School District's PSSA Prep program will not score higher on the PSSA reading and mathematics assessments in grade 11 than non-disadvantaged students participating in the program.

Within each of these primary research questions, the effect of gender was explored to determine whether the interventions comprising the PSSA Prep Program were more effective for males or females within each of the identified groups.

Additionally, some limited qualitative work accompanied the quantitative analysis in the form of sixteen student participant interviews. The interviews were conducted with eight participants whose performance on the eleventh grade PSSA math and reading assessments showed improvement over their previous test scores and with eight participants not demonstrating such growth. Each grouping consisted of two males and two females, representing both economically disadvantaged and non-disadvantaged students, resulting in a total of sixteen interviews. The interviews were directed toward discovering which of the aspects of the program (extra time, small group, targeted instruction or computer-aided instruction) they believe was most beneficial to them in raising their levels of achievement on the state assessments or toward discovering what improvements might be beneficial for those not showing improvement in their assessment scores. Within each of these primary research questions, the effect of gender was also explored to determine whether the interventions comprising the PSSA Prep program are more effective for males or females within each of the identified groups.

Population and Sample

Initially, 144 slots existed for eleventh-grade participants in the PSSA Prep Program. Students were identified for participation through test scores, especially previous PSSA assessments, supported by Stanford Achievement Tests and district-generated PSSA practice tests, teacher recommendations, and socioeconomic status as determined by participation in the free and reduced lunch program. Because there were a finite number of spaces available in the program, not every student whose test scores indicated a need for the program could be offered a slot. Students and parents were notified regarding recommendations for participation in the program. The impact of adding the course on the student's schedule for the following school

year was explained, along with the specific reasons the individual student was being recommended. The new graduation requirement was also explained. Parents were informed that a waiver could be signed to remove their students from the program if they so desired. The waiver contained reminders regarding district graduation requirements related to proficiency on the eleventh-grade assessments and requested parents to give a reason for electing to remove their students from the program. In order to sign a waiver, parents were required to meet with a principal to have all relevant recommendation criteria explained, so the reasons for placement recommendations were thoroughly understood before a waiver was signed. Scores from participants in the PSSA Prep Program were compared with those of students with similar previous assessment scores and belonging to similar disaggregated subgroups that were either not recommended for the program or opted out of the program by parental request. Thus, participating students provide a sample of the total population of students whose scores on previous assessments indicated the potential not to reach proficiency on the eleventh-grade PSSA tests. Table 2 shows the demographics of both the participants and non-participants for whom comparisons were made.

Table 2 *Demographics of PSSA Prep Program Participants and Non-participants*

	Participants		Similar Non-participants	
	Number	Percentage	Number	Percentage
All eligible students	96	100%	97	100%
Below Basic 8 th Grade Reading	27	28%	32	33%
Basic 8 th Grade Reading	37	39%	42	43%
Proficient 8 th Grade Reading	30	31%	23	24%
Advanced 8 th Grade Reading	2	2%	0	0%
Below Basic 8 th Grade Math	24	25%	27	26%
Basic 8 th Grade Math	38	40%	40	41%
Proficient 8 th Grade Math	27	28%	27	26%
Advanced 8 th Grade Math	7	7%	3	3%
Economically Disadvantaged	25	26%	22	23%
Not Economically Disadvantaged	71	74%	75	77%
Male	51	53%	49	51%
Female	45	47%	48	49%
Male Economically Disadvantaged	12	13%	13	13%
Female Economically Disadvantaged	13	14%	9	9%

Data Collection

Data collection for this study included the PSSA reading and mathematics scores of students in the Increasing Diversity School District as reported by the state to the district, as well as scores for those tests used to make recommendations for participation. These include previous administrations of PSSA tests as the primary determinant. Access to these scores was obtained with permission of the superintendent and approval of the Board of School Directors. The student interviews were conducted with eight identified participants whose eleventh grade PSSA assessment scores improved over previous testing outcomes as well as with eight participants whose scores did not improve to the point of proficiency. These students had graduated at the time of the interviews. Although they were students who attended the ninth and tenth grade building at which the researcher is the principal, the PSSA Prep Program had not yet been implemented at the time their class was in attendance. Their only experience with the program came as juniors at the senior high school. Students were asked for information as to various components of the program in terms of effectiveness for them individually. These interviews were relatively short, consisting of five questions.

Data Analysis

The analysis of the test data followed a traditional quantitative approach. The reading and mathematics assessment scores for eleventh grade students were subjected to two-way Analysis of Variance (ANOVA), to determine whether to accept or reject the hypotheses presented in the research questions. This allowed for comparisons of assessment scores between participants in the PSSA Prep Program and similar non-participants, between economically disadvantaged participants and economically disadvantaged non-participants, as well as between economically disadvantaged participants and participants not identified as economically

disadvantaged. The ANOVA analysis also allowed for comparisons to be made among these student groups by gender.

Answers to the qualitative interview questions were analyzed to determine if there was a common theme among them that identified components of the program that those students believe to be the most beneficial in helping them achieve higher assessment results than previously demonstrated or if an aspect of the program is found lacking by participants whose scores did not improve to the point of proficiency. Such an analysis may help other schools and school districts determine what parts of the program are most critical for implementation should positive results be discovered.

CHAPTER IV

ANALYSIS OF THE DATA

This study examined the impact of the Increasing Diversity School District's PSSA Prep Program on student achievement. Three research questions were answered by testing null hypotheses. Interview responses were compiled and compared to determine which components or characteristics of the program were seen by participants to have a positive influence on raising their achievement levels or which components could be improved in the event that improvement did not occur.

Data were entered into SPSS 16.0 for Windows. Descriptive statistics were conducted on the demographic data, consisting of test scores on the eleventh-grade Pennsylvania System of School Assessment (PSSA) reading and mathematics assessments that students took in the spring of the school year. Participants in the PSSA Prep Program would have been in the program during the school year up to that point. To examine the first research question, two two-way ANOVAs (analyses of variance), one each on reading and mathematics scores by PSSA Prep Program participant (yes vs. no) and gender (male vs. female), were conducted. To examine the second research question, considering only economically disadvantaged students, two two-way ANOVAs, one each on mathematics and reading scores by PSSA Prep Program participant (yes vs. no) and gender (male vs. female), were conducted. To examine the third research question, considering only participants, two two-way ANOVAs, one each on mathematics and reading scores by economic disadvantage (yes vs. no) and gender (male vs. female), were conducted.

Results

Research Question 1

To examine the results of the 11th grade PSSA Reading Assessment, a two-way ANOVA (analysis of variance) was conducted on reading scores by participation status (yes vs. no) and gender (male vs. female). There was a statistically significant main effect for participation status, $F(1, 189) = 16.93, p < 0.01$, suggesting students that participated had a larger mean on reading scores compared to non-participants. There was not a statistically significant main effect for gender, $F(1, 189) = 0.43, p = 0.51$, meaning that there was no statistically significant difference between male reading scores and female reading scores. There was not a statistically significant participant status by gender interaction, $F(1, 189) = 2.08, p = 0.15$, meaning that the pattern for participants versus non-participants is the same across genders. The results are presented in Table 3 and means and standard deviations are presented in Table 4.

Table 3

Two Way ANOVA on Reading Scores by Gender and PSSA Prep Program Participation Status

Variables	<i>F</i>	<i>Sig.</i>
Gender	0.43	0.51
Participant Status	16.93	0.00
Gender* Participant Status	2.08	0.15
Error	(31218.86)	

Note. Values in parentheses represent the mean square errors

Table 4

Means and Standard Deviations for Reading Scores by Gender and PSSA Prep Program Participation Status

Participant Status	Male			Female			Total		
	N	M	SD	N	M	SD	N	M	SD
Yes	51	1292.43	142.22	45	1272.33	196.41	96	1283.01	169.16
No	49	1150.92	177.41	48	1204.33	189.11	97	1177.35	184.30
Total	100	1223.09	174.73	93	1237.24	194.65	193	1229.91	184.25

To examine the results of the 11th grade PSSA Mathematics Assessment, a two-way ANOVA (analysis of variance) was conducted on mathematics scores by participation status (yes vs. no) and gender (male vs. female). There was a statistically significant main effect for participation status, $F(1, 189) = 9.38, p < 0.01$, suggesting students that participated had a larger mean on mathematics scores compared to non-participants. There was a statistically significant main effect for gender, $F(1, 189) = 3.97, p = 0.05$, suggesting that males had a larger mean on mathematics scores compared to females. There was not a statistically significant participant status by gender interaction, $F(1, 189) = 2.39, p = 0.12$, meaning that the pattern for participants versus non-participants is the same across genders. The results are presented in Table 5 and means and standard deviations are presented in Table 6.

Table 5

Two Way ANOVA on Mathematics Scores by Gender and PSSA Prep Program Participation Status

Variables	<i>F</i>	<i>Sig.</i>
Gender	3.96	0.05
Participant Status	9.38	0.00
Gender* Participant Status	2.39	0.12
Error	(21149.62)	

Note. Values in parentheses represent the mean square errors

Table 6

Means and Standard Deviations for Mathematics Scores by Gender and PSSA Prep Program Participation Status

Participant Status	Male			Female			Total		
	N	M	SD	N	M	SD	N	M	SD
Yes	51	1326.27	139.74	45	1252.11	139.75	96	1291.51	143.90
No	49	1229.65	154.25	48	1220.35	147.28	97	1225.05	150.13
Total	100	1278.93	154.13	93	1235.72	143.79	193	1258.11	150.42

Research Question 2

To examine the results of the 11th grade PSSA Reading Assessment for economically disadvantaged students, a two-way ANOVA (analysis of variance) was conducted on reading scores by PSSA Prep Program participation status (yes vs. no) and gender (male vs. female). There was not a statistically significant main effect for participation status, $F(1, 43) = 2.35$, $p = 0.13$, meaning that there was no statistically significant difference between economically disadvantaged participants reading scores compared to non-participants. There was not a

statistically significant main effect for gender, $F(1, 43) = 2.27, p = 0.14$, meaning that there was no statistically significant difference between male reading scores and female reading scores.

There was not a statistically significant economically disadvantaged participant status by gender interaction, $F(1, 43) = 3.14, p = 0.08$, meaning that the pattern for economically disadvantaged participants versus economically disadvantaged non-participants is the same across genders. The results are presented in Table 7 and means and standard deviations are presented in Table 8.

Table 7

Two Way ANOVA on Economically Disadvantaged Reading Scores by Gender and PSSA Prep Program Participation Status

Variables	<i>F</i>	<i>Sig.</i>
Gender	2.27	0.14
Participant Status	2.35	0.13
Gender* Participant Status	3.14	0.08
Error	(33968.94)	

Note. Values in parentheses represent the mean square errors

Table 8

Means and Standard Deviations for Economically Disadvantaged Reading Scores by Gender and PSSA Prep Program Participation Status

Participant Status	Male			Female			Total		
	N	M	SD	N	M	SD	N	M	SD
Yes	12	1324.25	159.25	13	1146.08	150.26	25	1231.60	176.54
No	13	1144.54	185.34	9	1159.00	249.64	22	1150.45	208.38
Total	25	1230.80	192.86	22	1151.36	191.53	47	1193.62	194.32

To examine the results of the 11th grade PSSA Mathematics Assessment for economically disadvantaged students, a two-way ANOVA (analysis of variance) was conducted on mathematics scores by PSSA Prep Program participation status (yes vs. no) and gender (male vs. female). There was a statistically significant main effect for participation status, $F(1, 43) = 7.82$, $p < 0.01$, suggesting economically disadvantaged students that participated had a larger mean on mathematics scores compared to economically disadvantaged non-participants. There was a statistically significant main effect for gender, $F(1, 43) = 5.69$, $p = 0.02$, suggesting that economically disadvantaged males had a larger mean on mathematics scores compared to economically disadvantaged females. There was not a statistically significant difference for the economically disadvantaged on participant status by gender interaction, $F(1, 43) = 3.17$, $p = 0.82$, meaning that the pattern for economically disadvantaged participants versus economically disadvantaged non-participants is the same across genders. The results are presented in Table 9 and means and standard deviations are presented in Table 10.

Table 9

Two Way ANOVA for Economically Disadvantaged on Mathematics Scores by Gender and PSSA Prep Program Participation Status

Variables	<i>F</i>	<i>Sig.</i>
Gender	5.69	0.02
Participant Status	7.82	0.01
Gender* Participant Status	3.17	0.82
Error	(18365.05)	

Note. Values in parentheses represent the mean square errors

Table 10
Means and Standard Deviations for Economically Disadvantaged Mathematics Scores by Gender and PSSA Prep Program Participation Status

Participant Status	Male			Female			Total		
	N	M	SD	N	M	SD	N	M	SD
Yes	12	1374.92	90.39	13	1208.38	139.98	25	1288.32	144.06
No	13	1191.92	161.21	9	1167.67	138.22	22	1182.00	149.26
Total	25	1279.76	159.52	22	1191.73	137.46	47	1238.55	154.51

Research Question 3

To examine the results of the 11th grade PSSA Reading Assessment for PSSA Prep Program participants based on economic status, a two-way ANOVA (analysis of variance) was conducted for those students that participated on reading scores by economic disadvantage (yes vs. no) and gender (male vs. female). There was not a statistically significant main effect for economic disadvantage, $F(1, 43) = 3.26, p = 0.07$, meaning that there was no statistically significant difference on reading scores between economically disadvantaged participants compared to non-disadvantaged participants. There was not a statistically significant main effect for gender, $F(1, 43) = 3.32, p = 0.07$, meaning that there was no statistically significant difference between male reading scores and female reading scores. There was a statistically significant economically disadvantaged by gender interaction, $F(1, 43) = 8.47, p < 0.01$. Post hoc analysis consisting of four independent sample t-tests revealed two significant findings. First, economically disadvantaged participants that were male ($M = 1324.25, SD = 159.25$) had a larger mean on reading compared to economically disadvantaged female participants ($M = 1146.08, SD = 150.26$). Also, female participants not at economic disadvantage ($M = 1323.63, SD = 191.35$) had a larger mean on reading compared to economically disadvantaged female

participants ($M = 1146.08$, $SD = 150.26$). The results are presented in Table 11 and means and standard deviations are presented in Table 12. Statistically significant post hoc t-test results are presented in Table 13.

Table 11

Two Way ANOVA for PSSA Prep Program Participants on Reading Scores by Gender and Economic Disadvantage

Variables	<i>F</i>	Sig.
Gender	3.32	0.07
Economic Disadvantage	3.26	0.07
Gender* Economic Disadvantage	8.47	<0.01
Error	(221185.27)	

Note. Values in parentheses represent the mean square errors

Table 12

Means and Standard Deviations for PSSA Prep Program Participants on Reading Scores by Gender and Economic Disadvantage

Economic Disadvantage	Male			Female			Total		
	N	M	SD	N	M	SD	N	M	SD
Yes	12	1324.25	159.25	13	1146.08	150.26	25	1231.60	176.54
No	39	1282.64	137.31	32	1323.63	191.35	71	1301.11	163.93
Total	51	1292.43	142.22	45	1272.33	196.41	96	1283.01	169.16

Table 13

Statistically significant post hoc t-tests for PSSA Prep Program Participants on Reading Scores for Gender and Economic Disadvantage Interaction

vs. Economically

Disadvantaged Females	df	t	Sig.
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Economically

Disadvantaged Males	23	2.88	<0.01
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Non-economically

Disadvantaged Females	43	2.98	<0.01
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To examine the results of the 11th grade PSSA Mathematics Assessment for PSSA Prep Program participants based on economic status, a two-way ANOVA (analysis of variance) was conducted for those students that participated on mathematics scores by economic disadvantage (yes vs. no) and gender (male vs. female). There was not a statistically significant main effect for economic disadvantage, $F(1, 92) = 0.00, p = 0.97$, meaning that there was no statistically significant difference on mathematics scores between economically disadvantaged participants compared to non-disadvantaged participants. There was a statistically significant main effect for gender, $F(1, 92) = 10.39, p < 0.01$, suggesting that males had a larger mean on math scores compared to females. There was not a statistically significant economically disadvantaged by gender interaction, $F(1, 92) = 3.76, p = 0.06$, meaning that the pattern for economically disadvantaged participants versus non-disadvantaged participants is the same across genders. The results are presented in Table 14 and means and standard deviations are presented in Table 15.

Table 14

Two Way ANOVA for PSSA Prep Program Participants on Mathematics Scores by Gender and Economic Disadvantage

Variables	<i>F</i>	<i>Sig.</i>
Gender	10.39	<0.01
Economic Disadvantage	0.00	0.97
Gender* Economic Disadvantage	3.76	0.06
Error	(19169.63)	

Note. Values in parentheses represent the mean square errors

Table 15

Means and Standard Deviations for PSSA Prep Program Participants on Mathematics Scores by Gender and Economic Disadvantage

Economic Disadvantage	Male			Female			Total		
	N	M	SD	N	M	SD	N	M	SD
Yes	12	1374.92	90.39	13	1208.38	139.98	25	1288.32	144.06
No	39	1311.31	149.51	32	1269.88	137.86	71	1292.63	144.85
Total	51	1326.27	139.74	45	1252.11	139.75	96	1291.51	143.90

Results of Student Interviews

A total of 16 student interviews were conducted, all with participants in the PSSA Prep Program. Eight of these were conducted with students whose scores demonstrated a notable improvement and eight with students whose scores did not rise. Within each of these primary groups, students were also selected according to gender and identification as economically disadvantaged, so that two economically disadvantaged males, two economically disadvantaged females, two non-disadvantaged males, and two non-disadvantaged females were included in each group. Sets of interview questions are given in Appendix A.

The opening question for students who demonstrated improvement asked them to make a determination as to whether participation in the PSSA Prep Program had a role in their improved achievement and what influence they recognized. All eight of these students reported a belief that participation in the program had been a factor in their improvement, with four students indicating that the program helped them focus more directly on content, two students recognizing a specific boost in mathematics, one reporting a similar effect in reading, and one responding that the program helped in general. The descriptive degree to which they attributed benefit from participating in the program varied, with female students providing more strongly stated belief than males. The female students tended to respond with stronger statements, claiming that the program “helped a lot,” or saying they “wouldn’t have done nearly as well” without it, while the males said participation “probably helped” or “helped somewhat”. Additionally, while only four students specifically identified the subject area in which they felt the program had helped, the two who named mathematics were both economically disadvantaged, but of different genders, and neither of the two who named reading were economically disadvantaged, and were also of different genders.

Students whose scores did not show marked improvement were first asked why they believed participation was not beneficial in raising their level of achievement. Five of these eight students noted some slight variation on the theme that they either simply put no effort into getting anything out of the course, or that they actually fought the assistance and purposefully rejected any help available through participation. Students from both genders and economic standings were included in this group. Two felt that had put in effort, believed that they had actually benefitted from the program, but that their test scores did not reflect how they felt they had performed on the assessments. They both viewed themselves as poor test-takers. One

student indicated that the content of the course was not aligned closely enough with the content tested.

The second and third questions posed to all 16 interviewees asked them first to identify one aspect of the program that they believed either had the greatest impact on helping them improve or that they might recognize as a positive influence even if their assessment scores did not improve. Following the identification of that component, interviewees were asked to indicate whether they viewed each of the other identified program components as being helpful to them or not. These results are displayed in Table 16 below, with additional discussion following.

Table 16

Participant Perceptions of the Influence of Specific Aspects of the PSSA Prep Program

	Participants Showing Improved Achievement			Participants Not Showing Improved Achievement		
	Named as Primary Positive Influence	Viewed as a Helpful Influence	Not Viewed as a Helpful Influence	Named as Primary Positive Influence	Viewed as a Helpful Influence	Not Viewed as a Helpful Influence
Additional time devoted to reading and mathematics	1	7	0	0	4	4
Small class size leading to more individual help	4	3	1	1	1	6
Instruction targeted to specific areas of need	3	5	0	5	2	1
Use of auxiliary computer software as individualization	0	3	5	0	2	6

Three of the four responders naming individual assistance as the primary benefit were females, meaning three of the four females whose performance improved named this component. Two students responding in this manner were economically disadvantaged and two were not. The three students indicating that targeted instruction had been the primary factor in the PSSA Prep Program's positive influence on their achievement were all males. Three of the five interviewees whose achievement did not improve, but who named targeted instruction as the most beneficial component of the program were males, meaning that six of the eight males interviewed identified this component as the single most important. Both students who indicated that there was no primary beneficial component were females. No trends relative to economic status appeared in the responses to this question.

The interviewees whose achievement improved universally saw having additional time during the school day spent on reading and mathematics as a positive influence. Within the group not demonstrating improvement, half saw it as beneficial, with three out of four being economically disadvantaged students. Similarly, having small class sizes in the PSSA Prep Program was viewed as a positive influence by seven of the eight interviewees who raised their achievement levels, while only two of those without improvement identified small class size as beneficial. Both of these students were economically disadvantaged males. Targeted instruction was the program component most commonly viewed as a positive influence by all interviewees, including all eight of those whose achievement showed improvement and seven of the eight whose did not, clearly cutting across all population characteristics. Conversely, the addition of the computer software as a program component was the least positively received. Five of the eight interviewees demonstrating improvement and six of the eight who did not raise their

achievement levels indicated that this component was not a positive influence. No patterns based on gender or economic status appeared within these responses.

Because students were assigned to the program as a course in their daily class schedules, and because very few parents opted to pursue the waiver that would excuse identified students from participation, there was no real option for the students to make a choice not to participate in the program. Therefore, they were asked whether they would have voluntarily participated if the PSSA Prep Program had been offered outside of school time, either immediately after school or on the weekend. Only two of the 16 students interviewed had entertained the thought, with most indicating a definite refusal to participate, had they been given the choice. One student, indicating the possibility of attending outside of the school day, said that she would have tried the program to see if she felt it would help her, while another said she would have tried it for mathematics only. One of the two respondents who indicated some consideration for participation outside of the school day came from the group demonstrating improved achievement and one came from the group who did not. Both, however, were economically disadvantaged females. Each indicated that she would have used some kind of a trial period to determine whether the PSSA Prep Program would be worthwhile.

Finally, all 16 students were asked to identify an improvement in a component of the program that may have helped them raise their achievement levels further. Five interviewees from each group indicated that there was nothing they would recommend for improvement in the program. One student from each group recommended finding a better software package if the program was going to continue to employ one. One student from each group felt that their individual deficiencies could have been targeted more accurately. The remaining participant with improved assessment scores indicated that less repetition would be welcomed, while the

remaining participant without improved assessment scores wanted better alignment between the instruction and the assessments.

The ten interviewees who were unable to make recommendations for improvement represented both genders and economic backgrounds. The commonalities in the responses to this question showed in the two suggestions made by two people each. Neither of the participants voicing the need for more individualized targeting of instruction was economically disadvantaged, while both of the participants recommending a better software package were economically disadvantaged females.

In summary, the analysis included in this chapter was focused on two different types of data: eleventh grade student reading and mathematics assessment scores from the state test for both participants and non-participants in the PSSA Prep Program and participants' interview responses. The findings are discussed in Chapter 5.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This final chapter restates the research problem and reviews the methodology used in this study. The sections of this chapter include the summary of results and a discussion of their implications, recommendations for designing and implementing skill remediation programs in reading and mathematics, recommendations for further study, and a final summary.

Restatement of the Problem

The large Increasing Diversity School District in western Pennsylvania implemented a program aimed at improving the scores on the Pennsylvania System of School Assessment tests of one particular subgroup, its economically disadvantaged population. Called the PSSA Prep Program, it included four key components that were specifically incorporated to improve student achievement. These consisted of: (1) additional time during the normal school day dedicated to skill building, (2) small group settings, (3) targeted instruction in specific skill areas identified by assessment as in need of remediation, and (4) the addition of computer-aided instruction as a component of the overall instructional approach. A committee of district personnel that included secondary principals, mathematics and English departmental chairs, the Assistant Superintendent for Secondary Education, and the Assistant Superintendent for Personnel, Technology and State and Federal Programs identified these four primary components. While no specific research or consultants were directly referenced, members of the group represented extensive years of educational practice and several advanced degrees. Additionally, members generally remained current with professional publications and attended workshops and conferences. Therefore, a generally high level of knowledge and awareness benefited the discussions leading to the implementation of the program.

The study used a chiefly quantitative approach using data from one graduating class in the Increasing Diversity School District. The secondary program within the district is divided into three separate buildings, housing grades seven and eight, nine and ten, and eleven and twelve, respectively. During the 2004-05 school year, the three secondary schools of the Increasing Diversity School District implemented the PSSA Prep Program, aimed at students who had demonstrated limited success on previous administrations of the Pennsylvania System of School Assessment, other standardized tests, and/or district level comprehensive examinations, with the intent of raising their achievement levels on subsequent tests, especially the PSSA reading and mathematics assessments. Participants at the junior high school experienced alternating instruction in math and reading for a nine-week period as part of the rotation of special classes including shop, music, computers, and family and consumer science classes. Ninth and tenth grade students participated in separate semester courses of mathematics and reading remediation. Senior high school participants alternated reading and mathematics instruction on a weekly basis for the duration of the school year.

The instructional approaches and focus on the four components identified by the district remained consistent across the buildings. The program at the junior high school, housing the seventh and eighth grades, was aimed at strengthening skills of students identified as needing remediation from results of earlier PSSA assessments and getting students prepared for the PSSA assessment conducted in the spring of the eighth grade year. Students not proficient at this level were entered into the PSSA Prep Program at the schools serving students in grades nine and ten or eleven and twelve. Skills of students requiring remediation were identified from both PSSA testing results and additional diagnostic testing available through computer software implemented in the PSSA Prep Program.

The efficacy of the program at the ninth and tenth grade level is difficult to ascertain as there is no standardized assessment administered at those levels to determine growth. For this reason, and because the policy governing graduation requirements only addresses results on the eleventh grade test, those results alone provided the foundation for this study. The research questions addressed in this study were:

1. What impact did the Increasing Diversity School District's PSSA Prep program have on student performance on the PSSA reading and mathematics assessments in grade 11 as measured by comparing the results of students participating in the PSSA Prep program with the results of comparable non-participants? This question was answered by testing hypotheses of the form H_0 : Students participating in the Increasing Diversity School District's PSSA Prep Program will not score higher on the PSSA reading and math assessments in grade 11 than similar students not participating in the program.
2. What impact did the Increasing Diversity School District's PSSA Prep Program have on student performance on the PSSA reading and mathematics assessments in grade 11 as measured by comparing the results of economically disadvantaged students participating in the PSSA Prep program with the results of similar nonparticipants? This question was answered by testing hypotheses of the form H_0 : Economically disadvantaged students participating in the Increasing Diversity School District's PSSA Prep Program will not score higher on the PSSA reading and mathematics assessments in grade 11 than economically disadvantaged students not participating in the program.
3. What impact did the Increasing Diversity School District's PSSA Prep Program have on student performance on the PSSA reading and mathematics assessments in grade 11 as measured by comparing the results of economically disadvantaged students participating in

the PSSA Prep Program with the results of non-disadvantaged participants? This question was answered by testing hypotheses of the form H_0 : Economically disadvantaged students participating in the Increasing Diversity School District's PSSA Prep Program will not score higher on the PSSA reading and mathematics assessments in grade 11 than non-disadvantaged students participating in the program.

Within each of these primary research questions, the effect of gender was also explored to determine whether the interventions comprising the PSSA Prep Program were more effective for males or females within each of the identified groups.

Additionally, some limited qualitative work, based on interviews with sixteen students that participated in the program, accompanied the quantitative analysis. Eight of the interviews were conducted with students whose performance on the eleventh grade PSSA mathematics and reading assessments showed improvement over their previous test scores. The students participating in the interviews consisted of two males and two females each, representing both economically disadvantaged and non-disadvantaged students, resulting in a total of eight interviews. The interviews were directed toward discovering which aspects of the program (extra time, small group, targeted instruction or computer-aided instruction) they believed most beneficial to them in raising their levels of achievement on the state assessments. The other eight interviews were conducted with a similar cross-section of participating students whose achievement levels did not reflect improvement. In addition to providing a comparison set of answers to those garnered from the students raising their proficiency levels, these interviews provided a basis from which changes or improvements to the PSSA Prep Program could be identified to help more participants reach proficiency.

Review of the Methodology

Data collection for this study included the PSSA reading and mathematics scores of students in the Increasing Diversity School District as reported by the state to the district, as well as scores for those tests used to make recommendations for participation, including previous administrations of PSSA tests as the primary determinant. Access to these scores was obtained with permission of the superintendent and approval by the Board of School Directors. The student interviews were conducted with eight identified participants whose eleventh grade PSSA assessment scores improved over previous testing outcomes and with eight participants whose scores did not improve to the proficient level. These students had graduated at the time of the interviews. Although they were students who attended the ninth and tenth grade building at which the researcher is the principal, the PSSA Prep Program had not yet been implemented at the time their class was in attendance. Their only experience with the program came as juniors at the senior high school. Students were asked for information as to various components of the program in terms of effectiveness for them individually. These interviews were relatively short, consisting of five questions.

The analysis of the test data followed a traditional quantitative approach. The reading and mathematics assessment scores for eleventh grade students were subjected to an Analysis of Variance (ANOVA) to determine whether to accept or reject the hypotheses presented in the research questions. This allowed for comparisons of assessment scores between participants in the PSSA Prep Program and similar non-participants, between economically disadvantaged participants and economically disadvantaged non-participants, and between economically disadvantaged participants and participants not identified as economically disadvantaged.

Answers to the qualitative interview questions were analyzed to determine if there were common themes that identified components of the program that those students believed to be the most beneficial in helping them achieve higher assessment results than previously demonstrated or whether an aspect of the program was found lacking by participants whose scores did not improve to the point of proficiency. Such an analysis may help other schools and school districts determine which parts of the program are most critical for implementation should positive results be discovered.

Summary and Discussion of the Results

Research Question #1

What impact did the Increasing Diversity School District's PSSA Prep Program have on student performance on the PSSA reading and mathematics assessments in grade 11 as measured by comparing the results of students participating in the PSSA Prep Program with the results of comparable non-participants?

Summary. This question was examined by conducting a two-way ANOVA on both the reading and mathematics assessment scores for grade 11 students participating in the PSSA Prep Program and comparable non-participants. The null hypothesis was rejected for both reading and mathematics. Students participating in the PSSA Prep Program showed statistically significantly higher assessment scores in both reading and mathematics than their non-participating peers. No statistically significant differences appeared on reading scores on the basis of gender. There was a statistically significant difference in mathematics scores based on gender, with males scoring higher than females.

Discussion. The statistical analysis results indicate a lower than one percent probability that the differences in scores in both reading and mathematics are due to chance for the total

population. This is very strong indicator that the PSSA Prep Program is providing participants with the type of instruction required to raise their achievement levels on both types of the eleventh grade PSSA Assessments. There is also an indication at the .05 confidence level that male participants are experiencing a greater improvement in mathematics performance than females.

Research Question #2

What impact did the Increasing Diversity School District's PSSA Prep Program have on student performance on the PSSA reading and mathematics assessments in grade 11 as measured by comparing the results of economically disadvantaged students participating in the PSSA Prep program with the results of similar nonparticipants?

Summary. This question was examined by conducting a two-way ANOVA on both the reading and mathematics scores for grade 11 economically disadvantaged students participating in the PSSA Prep Program and comparable economically disadvantaged non-participants. The null hypothesis was rejected for mathematics, but the null hypothesis for reading was not rejected. Economically disadvantaged students participating in the PSSA Prep Program showed significantly higher assessment scores in mathematics than their economically disadvantaged non-participating peers, but not in reading. No statistically significant differences appeared on reading scores on the basis of gender. There was a statistically significant difference in mathematics scores based on gender, with males scoring higher than females.

Discussion. The statistical analysis involving only economically disadvantaged students provides both a departure from the results of the total population and two similarities with those

findings. Within the economically disadvantaged subgroup, participation in the PSSA Prep Program did not have the statistically significant impact on reading scores found in the first research question. However, economically disadvantaged participants did achieve almost as much in mathematics as compared to non-participants as was found in the total population. Additionally, the difference in the scores for males was more pronounced in this subgroup than in the total population, with only a two percent probability that the results were due to chance.

The results for reading for economically disadvantaged participants lead to the conclusion that the PSSA Prep Program provided insufficient intervention to raise their reading achievement levels. Two possible corrections arise for this discrepancy as compared the rest of the results of this study. It is possible that the type of intervention required for economically disadvantaged struggling readers has to implemented when those students are at an earlier point in their educational careers, or it is possible that other instructional strategies than those comprising the PSSA Prep Program are necessary for these students.

Research Question #3

What impact did the Increasing Diversity School District's PSSA Prep program have on student performance on the PSSA reading and mathematics assessments in grade 11 as measured by comparing the results of economically disadvantaged students participating in the PSSA Prep program with the results of non-disadvantaged participants?

Summary. This question was examined by conducting a two-way ANOVA on both the reading and mathematics scores for grade 11 economically disadvantaged students participating in the PSSA Prep Program and non-disadvantaged participants. The null hypothesis was not

rejected for either reading or mathematics. Economically disadvantaged students participating in the PSSA Prep Program did not score significantly higher than non-disadvantaged participants in either reading or mathematics. For this research question, post hoc tests run based on the indication of a statistically significant interaction between economic status and gender of participants revealed two additional statistically significant findings. Male economically disadvantaged participants had a larger mean on reading scores compared to economically disadvantaged females, and non-disadvantaged females also had a larger mean on reading scores compared to economically disadvantaged females.

Discussion. This result indicates that no clear benefit existed for economically disadvantaged participants in the PSSA Prep Program over non-disadvantaged participants in either reading or mathematics. This may be because the same programmatic structures and instructional strategies helped to improve achievement for both economically disadvantaged and non-disadvantaged participants. Similar to results from the first two research questions, however, males showed a higher level of achievement in mathematics than females. Additionally, economically disadvantaged females show lower reading means than both economically disadvantaged males and non-disadvantaged females in the only analysis that showed any significant interaction between the two variables under study.

Analysis of Interview Responses

The interview responses were examined by reviewing the notes taken by the interviewer during the course of the interviews. The interviews consisted of five questions, phrased differently for those who had not reached proficiency on the 11th grade PSSA Assessments in reading and mathematics than for those who had, but the questions addressed the same topics for

each group (Appendix A). The review of the findings is divided into five sections, one for each of the questions.

Influence on Achievement of PSSA Prep Program Participation

Summary. Of the participants whose achievement improved on the eleventh grade testing over previous assessments, all eight of those interviewed responded that participation in the program had been a factor in their improvement. Of the eight participants interviewed whose scores did not demonstrate improvement, two felt that they had actually benefited from participation, but not enough to raise the level of their achievement to proficiency.

Discussion. The responses to this question support the positive impact Swanson & Stevenson (2002) reported in their findings that delivering instruction through a diverse set of strategies that match student needs can have. Support was stronger from those students achieving at higher levels than previously, but some of those not demonstrating higher levels of success also made remarks that the program was beneficial to them.

Primary PSSA Prep Program Component Influencing Achievement

Summary. Of the eight interviewed participants whose achievement showed improvement over previous assessments, half named the individual assistance made possible by the small class sizes as the primary positive influence in their performance. Three others indicated that it was experiencing instruction targeted to specific areas of need that helped most, and one responded that simply having more time dedicated to the assessed content made the most difference. Among the eight interviewees not showing improved achievement, two

indicated that nothing about the program was of primary assistance to them. Five indicated that having the targeted instruction was the most helpful to them, and one named the individual assistance afforded by small class size.

Three of the four responders naming individual assistance as the primary benefit were females, meaning three of the four females whose performance improved named this component. Two students responding in this manner were economically disadvantaged and two were not. The three students indicating that targeted instruction had been the primary factor in the PSSA Prep Program's positive influence on their achievement were all males. Three of the five interviewees whose achievement did not improve, but who named targeted instruction as the most beneficial component of the program were males, meaning that six of the eight total males interviewed identified this component as the single most important. Both students who indicated that there was no primary beneficial component were females. No trends relative to economic status appeared in the responses to this question.

Discussion. Eight of the interviewees identified targeted instruction as being the most important component of the PSSA Prep Program, four each from the group demonstrating raised achievement and four from the group not showing improvement. This component was most commonly identified as having the greatest positive influence on performance. Five of the sixteen students interviewed identified small group size as the primary positive factor because of the increased individual attention they received from the teacher as a result. Four of these five students were in the group whose scores improved. This finding mirrors the findings of Molnar, Smith, & Zahorik, (1999) in their study of Milwaukee's SAGE project and Wenglinsky's (1997) study of school spending and its impact in the classroom.

Positive Influence of Additional PSSA Prep Program Components

Summary. Although only one of the eight interviewed participants who demonstrated improved achievement named having additional time devoted to reading and math as the primary positive influence of the PSSA Prep Program, all seven others identified this component as being important. Half of the group not showing improvement deemed this component helpful. The five interviewees showing improvement who did not identify targeted instruction as the primary positive influence indicated that it was an important factor, as did two of the three in the group demonstrating less success. From the group showing improved achievement, three of the four interviewees who did not name small group size as the primary factor viewed it as being helpful, while only one of those not showing improvement found small group size beneficial. The use of the computer software was not indicated by anyone as the primary positive influence and five of those demonstrating improvement and six of those who did not indicate that the software was not a helpful influence.

The interviewees whose achievement improved universally saw having additional time during the school day spent on reading and mathematics as a positive influence. Within the group not demonstrating improvement, half saw it as beneficial, with three out of four being economically disadvantaged students. Similarly, having small class sizes in the PSSA Prep Program was viewed as a positive influence by seven of the eight interviewees who raised their achievement levels, while only two of those without improvement termed small class size as beneficial. Both of these students were economically disadvantaged males. Targeted instruction was the program component most commonly viewed as a positive influence by all interviewees, including all eight of those whose achievement showed improvement and seven of the eight whose did not, clearly cutting across all population characteristics. Conversely, the addition of

the computer software as a program component was the least positively received. Five of the eight interviewees demonstrating improvement and six of the eight who did not raise their achievement levels indicated that this component was not a positive influence. No patterns based on gender or economic status appeared within these responses.

Discussion. The two components identified as being positive influences as a result of this question were targeted instruction based on assessment and having additional time devoted to the study of reading and mathematics. These results reflect similar findings by Cavanaugh (2006) in Texas and Florida and Chmelynski (2006) in Missouri that implementation of additional time during the school day increases student achievement. Similarly, the student responses that having instruction targeted to their individual deficits was beneficial supports the findings of research conducted by McIntire (2003) in Virginia and the work of Law (1999) and Johnston and Lawrence (2004).

Participation Beyond the School Day

Summary. The question of the interviews on which the most overall agreement occurred was that related to potential participation in the PSSA Prep Program if, instead of being scheduled into the school day, it was offered after school or on the weekend. Fourteen of the sixteen interviewees would not have considered participating, and one of the remaining two would only have considered participating during the week and only if participation didn't interfere with work.

One of the two respondents who indicated some consideration for participation outside of the school day came from the group demonstrating improved achievement and one came from

the group who did not. Both, however, were economically disadvantaged females. Each indicated that she would have used some kind of a trial period to determine whether the PSSA Prep Program would be worthwhile and one would have only done so for the mathematics portion of the program, not for reading.

Discussion. High school students are aware of their time commitments and are often concerned about reserving time for non-academic activity, especially during non-school hours. Students participate in a wide array of school activities beyond the school day, many work part-time jobs, and many participate in groups outside of school that hold their activities after school or on weekends. Without a consequence structure in place to make participation in a setting like the PSSA Prep Program mandatory, operating it outside of the school day would likely draw little participation.

Suggestions for Program Component Improvement

Summary. Five of the eight interviewees from both the group of participants whose achievement improved and from the group whose achievement did not improve indicated that they were unable to target a component of the PSSA Prep Program for improvement that would have made a difference to their performance. One member of each group suggested improving the computer software being used in the program and one member of each group suggested targeting instruction more individually. The other suggestion from the group with improved achievement was to reduce repetition, while the other suggestion from the group not showing improvement was to align instruction even more closely with test items.

The ten interviewees who were unable to make recommendations for improvement represented both genders and economic backgrounds. The commonalities in the responses to this question showed in the two suggestions made by two people each. Neither of the participants voicing the need for more individualized targeting of instruction was economically disadvantaged, while both of the participants recommending a better software package were economically disadvantaged females.

Discussion. In considering the responses to this question, two essential points were made by the interviewees. First, students want to be engaged in learning experiences that they determine to be relevant to their current position and likelihood of success. The indication is that in order for the program instruction to be effective, it is important that it be informed by both the individual student deficits identified through assessment and by the content for which students would be held accountable. Secondly, because of the monetary investment as well as the student time invested, if a computer software program is to be a component of a program such as the PSSA Prep Program, careful screening and analysis of content must be done prior to implementation to insure that the software makes a positive contribution to overall program, or students grow to resent its use.

Recommendations for Designing and Implementing Reading and Mathematics

Skill-Building Programs

The results of this study suggest that the Increasing Diversity School District's PSSA Prep Program was generally effective in raising students' performance on state reading and mathematics assessments. The program was designed to include four specific components:

additional time devoted to reading and mathematics during the school day, instruction targeted to areas of deficit as identified through assessment, small class size, and the addition of computer software as an instructional tool. Recommendations are offered regarding each of these components based on the findings of this study.

Spending additional time practicing virtually any skill is bound to provide the basis for improvement in performing that skill. This is true for academic pursuits as well as physical endeavors. The results of this study indicate that placing this additional time during students' regular school day is the only way to gain wide acceptance and participation. Students, especially secondary students, are generally highly protective of their time outside of the school day to preserve their opportunities for extracurricular and work experiences.

Targeting instruction and determining what deficits to address is a time intensive process. Data analysis, and therefore reliable, effective, and searchable data warehousing becomes critical. School administrators have become increasingly adept at using data storage systems to analyze student results. At this level, information is typically analyzed on group data, either for the total population or for one of the disaggregated sub-groups. Teachers instructing in programs designed to raise less than proficient students to proficiency, however, must be able to carry data analysis down to the student level. Identifying the content to be targeted for improving assessment performance must occur in two phases. Individual student results must be made available and easily sorted so that students' specific deficits can be identified. It is also important that teachers be highly familiar with the standards and anchors that comprise the assessment at the next testing stage. Determining where these sets of topics intersect informs the necessary instruction for these students.

In terms of both planning and student-teacher interaction, smaller group sizes allow for more individualized attention. Initially, each section of the PSSA Prep Program was limited to a maximum of twelve students. As indicated by the student interviewee responses, the increase in individual attention that this small group size afforded them was determined to be a positive influence in increasing their achievement. In the second year of the program, results from which are not analyzed in this study, class sizes were raised to sixteen, as selected students with identified special needs were included. Anecdotal information from the teachers in the program suggest that this number is too large, creating a sense for them that they could not provide a sufficient amount of individual attention to the students in the program.

This study does not allow for a clear recommendation as to whether incorporating self-paced software is an effective program component, but does allow for an implication as to the value of the specific software currently in place. The software chosen for the program, the high school edition of *ClassWorks Gold*, was selected based on its alignment to Pennsylvania reading and mathematics standards and the prescriptive ability built into the ongoing assessment portion of the software. It was to have provided teachers in the program an additional source of data for each student to help identify deficits and thereby help inform instruction, especially in terms of the modules available in the software. Almost universally, however, the participants interviewed described the work they did with the software to be of little or no learning value. As time passed, the teachers also began to view the software as a component to be relegated to occasional use, based on feedback they were receiving from the students as well as their own perceptions of its efficacy as they monitored students' use of and progress through the modules.

The literature supports the use of self-paced software with economically disadvantaged students, as one part of an overall instructional approach. However, the software selected for use

in the PSSA Prep Program has not garnered the kind of results or support the literature suggests. Being unable to reject the null hypothesis for reading in the second research question may be related to the ineffectiveness of the software in helping economically disadvantaged students make significant progress in reading.

Recommendations for Further Study

A few key outcomes can be gleaned from this study, but many areas remain uncertain. As the percentages of students required to demonstrate proficiency on state assessments increases, catching an increasingly larger number of schools and school districts in the need to provide instruction in ways different from traditional models, programs like the Increasing Diversity School District's PSSA Prep Program will need to be highly responsive to specific student needs and therefore must have each component carefully considered and designed. This study did not separate reading and mathematics preparation or performance. While not yet calculated into the formula for AYP, Pennsylvania has recently incorporated a science test into the cycle of assessments. Exploration as to whether the structure of the four identified components will be equally effective for specific subject areas may be warranted.

Additionally, the class groups assigned to the PSSA Prep Program were selected randomly, based only on which periods of the day best fit the students' other course requirements. It would be worth investigating whether grouping students by specific skill deficiencies, by economic status, or even by gender, would allow the progress of skill building to move at more rapid pace. Incorporating the first recommendation as to whether this approach may be more appropriate within one subject or another would make for a rich investigation.

Another area ripe for further study involves the impact of race. Although the level of diversity in the subject school is increasing annually, the subjects of this study were not racially diverse enough to provide samples large enough to be analyzed statistically. In a situation where differences in race are greater, a similar study that would allow that student characteristic to be considered, as well as those of gender and economic status, would provide more direction. The same could be said for a study population including a significant number of identified special needs students. The Increasing Diversity School District has begun to place selected students with Individualized Education Plans (IEPs) in the PSSA Prep Program, but the group is small and no data are yet available as to impact.

Finally, although there was no reference to teachers made in the interview questions, several participants mentioned the quality of the teachers as a part of one or another of their answers. Many in education have the sense that the teacher is more important than the program. Additional study as to what the characteristics good instructional teachers possess and how these interact with the curricula they teach would help schools and school districts to appropriately consider teacher selection or assignment for programs aimed at raising performance on specific assessments, as well as in designing specific program components.

Summary

As the need for schools and school districts to meet ever-rising levels of accountability as measured by student test scores increases, the search for methods and programs that are effective in raising student achievement will intensify. Additionally, NCLB specifically identifies certain subgroups whose constituent students must meet the proficiency targets set by the states independently of the total student population. Designing and implementing programs composed

of components that have been demonstrated as being effective with these identified groups will become critical and schools will want to be able to develop programming that fits their needs both in terms of student population and school structures.

This study measured the effectiveness of the Increasing Diversity School District's PSSA Prep Program. In addition to the general efficacy in raising student assessment scores, the study examined its specific effect on economically disadvantaged students. This study was also aimed at determining how important each of four identified program components is in helping students raise achievement.

In considering total student population, the results clearly show that the PSSA Prep Program is effective in raising student achievement in both reading and mathematics, with males showing significantly higher scores in mathematics. Examining economically disadvantaged students, participants demonstrated significantly better performance in mathematics than non-participants, but not in reading. Additionally, among disadvantaged participants, males scored significantly higher than females in both reading and mathematics. Comparing economically disadvantaged participants to non-disadvantaged participants revealed no differences in achievement. While not easily discernible from every statistic, the study demonstrates that the program does have an overall positive impact on student assessment scores in reading and mathematics and there is a definitive benefit to economically disadvantaged males.

Three of the four identified components of the PSSA Prep Program received support as being positive influences in promoting improvement by at least a large majority of the sixteen participants interviewed. These three components included providing additional time spent on reading and mathematics during the school day, having instruction targeted to the specific topics identified as deficits through assessment, and receiving this instruction in small group settings.

The addition of computer software as an instructional option was not identified as having a positive influence on performance, but this study was not broad enough to determine whether it was the particular software originally implemented as part of the PSSA Prep Program, or the use of computer software in general that the participants found not to be beneficial.

The impact of Increasing Diversity School District's PSSA Prep Program on student achievement has been established as being statistically significant in terms of participation versus non-participation. While inconsistent, the results indicated a particular benefit for economically disadvantaged males. These findings add to the body of knowledge relative to designing and implementing programs aimed at raising student assessment achievement. In particular, specific programmatic components that have yielded positive results have been identified, as well as one component that may not be beneficial to include, that being computer-aided instruction.

REFERENCES

- Acharya, C. (2000, November). Outcome-based education (OBE): A new paradigm for learning. *Centre for Development of Teaching and Learning, 4*(3), 10-14.
- Anderson, N. (1999, June). *Curriculum and instructional strategies: Using higher order computer tasks with disadvantaged students*. Paper presented at the National American Computers in Education Conference, Atlantic City, NJ.
- Atkinson, P. (2000). *A theory of civilization*. Melbourne, Australia: Cooray Publishers
- Bayha, B., & Doe, T. (1998). The Internet: An inclusive magnet for teaching all students. *Proceedings of the World Institute on Disability, Oakland, CA*.
- Bonstingl, J. J. (2001, May). Are the stakes too high? *Principal Leadership, 1*(5), 8-14.
- Bracey, G. (1999). Reducing class size: The findings, the controversy. *Phi Delta Kappan, 81*, 246-247.
- Brandt, R. (2003, January/February). Don't blame the bell curve. *Leadership 32*(3), 18-20.
- Buttay, J. A., Manswell, L., LaPoint, V., Thomas, V. G., & Thompson, D. (2001, September). The changing face of after-school programs: Advocating talent development for urban middle and high school students. *NASSP Bulletin, 85*(626), 22-34.
- Campbell, F. A., Goldstein, S., Schaefer, E. S., & Ramey, C. (1991, June). Parental beliefs and values related to family risk, child intervention, and child academic competence. *Early Childhood Research Quarterly, 6*, 167-182.

- Capper, J., & Copple, C. (1985). *Computer use in education: Research review and instructional implications*. Washington DC: Center for Research Into Practice.
- Cavanagh, S. (2006). Students double-dosing on reading and math. *Education Week*, 25(40), 1-13.
- Center for American Progress. (2006). *Expanding learning time in high schools*. Washington DC: Author.
- Chmelynski, C. (2006). Extend school day and year for NCLB? *Education Digest: Essential Readings for Quick Review*, 71(7), 41-44.
- Christie, K. (2002, December). 2002 highlights and 2003 predictions. *Phi Delta Kappan*, 84, 261-263.
- Cohen, D. L. (1993, April). New study links lower I.Q. at age 5 to poverty. *Education Week* 12(28), 4-5.
- Council of Chief State School Officers. (2000, May). *Extended learning initiatives: Opportunities and implementation challenges*. Washington, DC: Author.
- Dalton, D. W., & Hannafin, M. J. (1988). The effects of computer-assisted and traditional mastery methods on computation accuracy and attitudes. *Journal of Educational Research*, 82(1), 27-33.
- Davis, D., & Sorrell, J. (1995). *Mastery learning in public schools*. Unpublished manuscript, Valdosta State University: Valdosta, GA.

- Deutsch, F. M. (2003). How small schools benefit high school students. *NASSP Bulletin*, 87, 35-44.
- Drazen, S. (1992, April). *Student achievement and family and community poverty: Twenty years of education reform*. Paper presented at the annual meeting of the Eastern Psychological Association, Boston, MA.
- Finn, C. E. (1989, May) A nation still at risk. *Commentary* 7(5), 17-23.
- Finn, J. D. (2002, March) Small classes in American schools: Research, practice, and politics. *Phi Delta Kappan*, 83, 551-561.
- Friend, M., & Bursuck, W. (1996). *Including students with special needs: A practical guide for classroom teachers*. Boston: Allyn and Bacon.
- Fuchs, L. S. (1995). Connecting performance assessment to instruction: A comparison of behavioral assessment, mastery learning, curriculum-based measurement, and performance assessment. *ERIC Digest E530*. (ERIC Document Reproduction No. ED381984)
- Fuhrman, S. H. (1993, October). Developing content standards: Creating a process for change. *Consortium for Policy Research Education*, 46, 1-9.
- Gallagher, J. J. (2000, Spring). The beginnings of federal help for young children with disabilities. *Topics in Early Childhood Special Education*, 20(1), 3-6.
- Gambone, M. A., Klem, A. M., Moore, W. P., & Summers, J. A. (2000). *First things first: Creating the conditions & capacity for community-wide reform in an urban school district*. Gambone & Associates: Philadelphia.

- Groves, P. (2002, Spring). Doesn't it feel morbid here? High stakes testing and the widening of the equity gap. *Educational Foundations*, 16, 15-30.
- Haycock, K. (2001, March). Closing the achievement gap. *Educational Leadership*, 58(6), 6-11.
- Hedges, L. V., Laine, R. D., & Greenwald, R. (1994). Does money matter? A meta-analysis of the effects of differential school expenditures on school performance. *Educational Researcher*, 23(3), 5-14.
- Howe, J., & Woodrum, V. (2000, October). Have you experienced the benefits of mastery learning? *Teaching for Success*, 12(7), 3.
- Howley, C., & Bickel, R. (1999). The Matthew project: National report. Randolph, VT: Rural Challenge Policy Program (ERIC Document Reproduction No. ED433174)
- Jennings, J. F. (2000). Title I: Its legislative history and its promise. *Phi Delta Kappan*, 81, 516-522.
- Johnston, D. A., & Lawrence, J. T. (2004, November/December). Using data to inform instruction. *Leadership*, 34(2), 28-35.
- Kafer, K. (2004, July 6). No Child Left Behind: Where do we go from here? *Backgrounders*, 1775, 1-8.
- Kantrowitz, B. (1993, April 19). A nation still at risk. *Newsweek*, 57(15), 46-49.
- Keup, J. R. (1998). Using technology in remedial education. *ERIC Digest*, 90. (ERIC Document Reproduction No. ED421180)

- Killacky, J. & Conroy, M. C. (1985-86, Winter). ESEA twenty years later: A talk with Francis C. Keppel and Harold Howe II. *College Board Review*, 138, 4-7, 27-29.
- Kohn, A. (2000). *The case against standardized testing: Raising the scores, ruining the schools*. Portsmouth, NH: Heinemann.
- Kozol, J. (1991). *Savage inequalities: Children in American schools*. New York: Corwin Publishers.
- Kugler, M. R. (2001). The why and how of after-school programs. *NASSP Bulletin*, 85, 3-11.
- LaFee, S. (2002, December). Data-driven districts. *School Administrator*, 59(11), 6-15.
- Law, N. (1999). Value-added assessment and accountability. *Thrust for Educational Leadership*, 28(3), 28-31.
- Lewis, A. C. (1999). Standards and testing. *Phi Delta Kappan*, 81(3), 179-180.
- Maier, P., Molnar, A., Percy, S., Smith, P., & Zahorik, J. (1997). *First year results of the Student Achievement Guarantee in Education Program, executive summary*. Madison, WI: University of Wisconsin at Madison. (ERIC Document Reproduction Service No. ED441002)
- Marzano, R. J. (2000). Introduction to the special section. Implementing standards in schools. Updating the standards movement. *NASSP Bulletin*, 84(620), 2-4.
- McDonnell, L. M. (2005). No Child Left Behind and the federal role in education: Evolution of revolution? *Peabody Journal of Education*, 80(2), 19-38.

McIntire, T. (2003, March). Digging for Data. *Technology and Learning*, 23(8), 42-46.

McNeir, G. (1993, November). *Outcome-based education* (ERIC Digest No. 85).

Clearinghouse on Educational Policy and Management: University of Oregon,
College of Education.

Merriam-Webster collegiate dictionary (18th ed.). (2007). Springfield, MA: Merriam-

Webster.

Miller, S. (2003). How high- and low-challenge tasks affect all motivation and learning:

Implications for struggling readers. *Reading and Writing Quarterly*, 19, 39-57.

Miller, S., Duffy, G. G., Rohr, J. (2005, May). Preparing teachers for high-poverty

schools. *Educational Leadership*, 68(8), 62-65.

Molnar, A., Smith, P. & Zahorik, J. (1999). *Evaluation results of the Student*

Achievement Guarantee in Education (SAGE) Program, 1998-99. Milwaukee,

WI: University of Wisconsin at Milwaukee. (ERIC Document Reproduction

Service No. ED431003)

Molnar, A., Smith, P., Zahorik, J., Palmer, A., Halbach, A. & Ehrle, K. (1999).

Evaluating the SAGE program: A pilot program in targeted pupil-teacher

reduction in Wisconsin. *Educational Evaluation and Policy Analysis*, 21, 165-

177.

- Moore, A. (1993, May). *Computer Assisted Instruction for Adults*. Paper presented at the Annual International Conference of the National Institute for the Staff and Organizational Development on Teaching Excellence and Conference Administrators, Austin, TX.
- Mostellar, F, Light, R. J., & Sachs, J. A. (1996). Sustained inquiry in education: Lessons from skill grouping and class size. *Harvard Educational Review*, 66, 797-842.
- Murnane, R. J., Sharkey, N. S., & Boudett, K. P. (2005). Using student-assessment results to improve instruction: Lessons from a workshop. *Journal of Education for Students Placed At Risk*, (10), 269-280.
- Newson, J. (2003, February). Struggling to comply: Education vital signs. *American School Board Journal Special Report*, 6-10.
- Nye, B, Hedges, L. V., Konstantopoulos, S. (2001), The long-term effects of small classes in early grades: Lasting benefits in mathematics achievement at grade 9. *Journal of Experimental Education*, 69, 245-258.
- Oakes, J. (1992, September). Test-driven school reform and the disadvantaged. *Education Digest*, 58, 20-23.
- O'Day, J. (2002, Fall). Complexity, accountability, and school improvement. *Harvard Educational Review*, 72, 293-329.
- Ohmann, R. (2000). Historical reflections on accountability. *Academe*, 86(1), 24-29.
- Okpala, C. (2002). Educational resources, student demographics and achievement scores. *Journal of Education Finance*, 27, 885-908.

- Olson, L. (2002). Finding the right mix. *Education Week, Quality Counts Special Issue*, 12-20.
- Payne, R. (2002). *Framework for understanding poverty*. [Brochure]. Normal, IL: Illinois State University.
- Pennsylvania Department of Education. (2002, November). Adequate yearly progress. *No Child Left Behind in Pennsylvania, 1*, 1.
- Pennsylvania Department of Education (2003). *Pennsylvania's Accountability System*. Retrieved December 29, 2006, from <http://www.pde.state.pa.us/nclb/cwp/view.asp>
- Pennsylvania Department of Education (2004). *Advisory Commission's Report on Academic Standards*. Retrieved October 12, 2006, from http://www.pde.state.pa.us/stateboard_ed/cwp/view.asp.
- Pennsylvania Department of Education (2004, March 31). *Block Grant Guidelines Release*. Retrieved January 13, 2007, from <http://www.pdenewsroom.state.pa.us/newsroom/cwp/view.asp>.
- Perks, K. (2006, September). Reconnecting to the power of reading. *Principal Leadership, 7(1)*, 16-20.
- Pisapia, J. R., Knutson, K., & Coukos, E. D. (1999, November). *The Impact of Computers on Student Performance and Teacher Behavior*. Paper presented at the annual meeting of the Florida Education Research Association, Orlando, FL.
- Popham, W. J. (1997). The standards movement and the emperor's new clothes. *NASSP Bulletin 81(590)*, 21-25.

- Porter, A. (1995). Critical issue: Integrating assessment and instruction in ways that support learning. *North Central Regional Educational Laboratory, Madison, WI.*
- Prais, S. J. (1996). Class-size and learning: The Tennessee experience – what follows? *Oxford Review of Education, 22*, 399-415.
- Reed, C., Briley, B., Kindberg, C., McCarthy, M., McCray, M., Pritchard, R., et al. (2000, May/June). What's happening in our schools? Conveying an accurate picture of school performance. *The Clearing House, 73(5)*, 291-294.
- Reeves, D. B. (2000). Standards are not enough: Essential transformations for school success. *NASSP Bulletin, 84(620)*, 5-19.
- Reeves, D. B. (2000, May/June). Finishing the race. *Thrust for Educational Leadership, 29(5)*, 26-29.
- Reeves, D. B. (2002). *Holistic Accountability: Serving students, schools, and community.* Thousand Oaks, CA: Corwin Press, Inc.
- Renchler, R. (1993). Poverty and learning. *ERIC Digest 83.* (ERIC Document Reproduction Service No. ED357433)
- Robelen, E. W. (2005, April 5). 40 years after ESEA, federal role in schools is broader than ever. *Education Week, 24(31)*, 1, 42.
- Rothstein, R. (2006, Winter). The social and economic realities that challenge all schools: Independent, charter, and regular public school alike. *Independent School, 65(2)*, 18-22, 24, 26.

- Sanderson, D. R. (2003, Spring). Setting up a successful after school tutorial program: One district's journey. *Reading Improvement, 40(1)*, 13-20.
- Scherer, M. & Marzano, R. (2001, September). How and why standards can improve student achievement: A conversation with Robert J. Marzano. *Educational Leadership, 59*, 14-18.
- Schmoker, M. (2003). First things first: Demystifying data analysis. *Educational Leadership,*
- Schwartz, W. (2001, December). Closing the achievement gap: Principles for improving the educational success of all students. *ERIC Digest.*
- Shaver, J. P. (2002). A superficial take on Project STAR. *Phi Delta Kappan, 84*, 226-227.
- Slavin, R. E. (2002, October). Evidence-based education policies: Transforming educational practice and research. *Educational Researcher, 31(7)*, 15-21.
- Spady, W. G. (1989, October). Organizing for results: The basis of authentic restructuring and reform. *Educational Leadership, 46(2)*, 4-8.
- Standerfer, L. (2006, April). Before NCLB: The history of ESEA. *Principal Leadership, 6(6)*, 26-27.
- Swanson, C. & Stevenson, D. L. (2002, Spring). Standards-based reform in practice: Evidence on state policy and classroom instruction from the NAEP state assessments. *Educational Evaluation and Policy Analysis, 24(1)*, 1-27.
- Szabo, J. C. (1992). Schools for the 21st century. *Nation's Business, 80(2)*, 22.

- Tajalli, H., & Opheim, C. (2005). Strategies for closing the gap: Predicting student performance in economically disadvantaged schools. *Educational Research Quarterly*, 28(4), 44-54.
- Tanner, D. (1993). A nation truly at risk. *Phi Delta Kappan*, 75, 288-297.
- Tanner, D. (2000). Manufacturing problems and selling solutions: How to succeed in the education business without really educating. *Phi Delta Kappan*, 82, 188-202.
- Tomlinson, C. (1996). Good teaching for one and for all: Does gifted education have an instructional identity? *Journal for the Education of the Gifted*, 20, 155-174.
- U. S. Congress (2002, January). *No Child Left Behind Act of 2001*. Washington, D.C.
- Vaughan, A. (2002, Spring). Standards, accountability, and the determination of school success. *The Educational Forum*, 66, 206-213.
- Vigil, J. L. (1998, August). Integrating technology into your classroom. *Intercultural Development Research Association Newsletter*, 25(8), 15-18.
- Vollands, S. R., Topping, K. J., & Evans, R. M. (1999). Computerized self-assessment of reading comprehension with the accelerated reader: Action research. *Reading and Writing Quarterly: Overcoming Learning Difficulties*, 15, 197-211.
- Wenglinsky, H. (1997). How money matters: The effect of school district spending on academic achievement. *Sociology of Education*, 70, 221-237.
- Wilson, A. M. (1992). *The INVEST Program: A computer-based system for adult academic upgrading*. Cumberland, NS: Nova Scotia Community College. (ERIC Document Reproduction Service No. ED377896)

- Woelfel, K. (2005). Learning takes time for at-riskers. *Education Digest: Essential Readings for Quick Review*, 71(4), 28-30.
- Wolf, D. P. (2002, December). When raising isn't rising. *School Administrator*, 59(11), 20-23.
- Would more time in school help students achieve? (2006, December). *NASSP Newsleader*, 54, 4.
- Xin, J. F. (2000, July). *Integrating technology into instruction in an inclusive classroom for diverse learners*. Paper presented at the International Special Education Congress 2000, Manchester, United Kingdom.
- Zhou, M. (2003, March). Urban Education: Challenges in Educating Culturally Diverse Children. *Teachers College Record*, 105(2), 208-225.
- Zuelke, D., & Nelson, J. (2001, Summer). The effect of a community agency's after-school tutoring program on reading and math GPA gains for at-risk tutored students. *Education*, 121(4), 799-809.

Appendix A
Interview Questions

INTERVIEW QUESTIONS FOR STUDENTS DEMONSTRATING
PSSA ASSESSMENT PROFICIENCY FOLLOWING PARTICIPATION
IN THE IDSD PSSA PREP PROGRAM

1. As a junior, you were recommended for and participated in the PSSA Prep program, which was developed to help students perform better on the eleventh grade PSSA tests. Your scores that year showed notable improvement over earlier years. Do you think being in the PSSA Prep program had anything to do with those results? If so, what influence do you recognize?
2. Please come up with one thing about the class that you believe helped make a difference for you and the way you performed on the eleventh grade PSSAs.
3. (The topics of this question must be flexibly based on the answer to the second question.) You identified _____ as being an important aspect of the program for you. What about:
 - The small size of the class?
 - The fact that instruction was based on content that tests showed were your weaknesses?
 - The addition of the computer software as an extra learning tool?
 - The fact that you had more class time dedicated to those topics?
4. If this class had been offered outside of the regular school day, either after school or on Saturdays, would you have taken advantage of it?
5. Can you identify any aspects of the program that could be improved to help you perform better than you did?

**INTERVIEW QUESTIONS FOR STUDENTS NOT DEMONSTRATING
PSSA ASSESSMENT PROFICIENCY FOLLOWING PARTICIPATION
IN THE IDSD PSSA PREP PROGRAM**

1. As a junior, you were recommended for and participated in the PSSA Prep program, which was developed to help students perform better on the eleventh grade PSSA tests. Your scores that year didn't show notable improvement over earlier years. Why do you think you were still unable to reach proficiency?
2. Even given your testing results, was there any one thing about the class that you believe helped make a positive difference for you on the eleventh grade PSSAs?
3. (The topics of this question must be flexibly based on the answer to the second question.) You identified _____ as being an important aspect of the program for you. What about:
 - The small size of the class?
 - The fact that instruction was based on content that tests showed were your weaknesses?
 - The addition of the computer software as an extra learning tool?
 - The fact that you had more class time dedicated to those topics?
4. If this class had been offered outside of the regular school day, either after school or on Saturdays, would you have taken advantage of it?
5. Can you identify which aspects of the program that could be improved to help you perform better than you did?

February 8, 2007

Dr. Robert Beebe, Principal Investigator
Mr. John Wylie, Jr., Co-investigator
Department of Educational Foundations, Research, Technology & Leadership
UNIVERSITY

RE: HSRC Protocol Number: 62-2007
Title: The Impact on Student Achievement of the Pennsylvania System of School
Assessment (PSSA) Prep Program

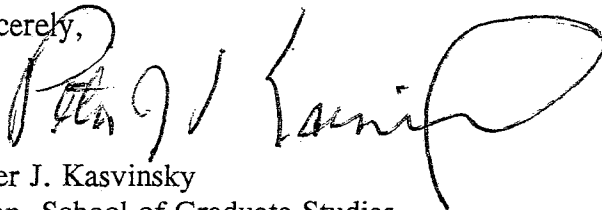
Dear Dr. Beebe and Mr. Wylie:

The Human Subjects Research Committee has reviewed the abovementioned protocol and determined that it is exempt from full committee review based on a DHHS Category 1 exemption.

Any changes in your research activity should be promptly reported to the Human Subjects Research Committee and may not be initiated without HSRC approval except where necessary to eliminate hazard to human subjects. Any unanticipated problems involving risks to subjects should also be promptly reported to the Human Subjects Research Committee.

The HSRC would like to extend its best wishes to you in the conduct of this study.

Sincerely,



Peter J. Kasvinsky
Dean, School of Graduate Studies
Research Compliance Officer

PJK/cc

c: Dr. Robert Beebe, Chair
Department of Educational Foundations, Research, Technology & Leadership