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Evaluating Summer School Programs and the Effect on Student Achievement: The Correlation Between Stanford-10 Standardized Test Scores and Two Different Summer Programs

Alicia Kaye Bottorff
Lindenwood University

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by

Alicia Kaye Bottorff

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Dr. Jill Hutcheson, Dissertation Chair — 11-19-10 Date

Dr. John Oldani, Committee Member — 11/19/10 Date

Dr. Linda Miller, Committee Member — 11/19/10 Date

Declaration of Originality

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

Full Legal Name: Alicia Kaye Bottorff

Signature: Alicia Kaye Bottorff Date: 11/19/10

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Abstract

Educators have been looking for a solution to increasing yearly student achievement while at the same time ensuring that the achievement gap between students of high and low socioeconomic status does not continue to widen each year. Many studies examined show that students experience summer learning loss if not in school during the months of June through September. Because of this research, the district being studied extended their summer school program format from four-weeks to six-weeks.

This collaborative, quantitative study examined assessment data from the SAT 10 to explore the correlation between middle school math and language arts test data and extended time in a summer school program. The independent variable was time in the summer school program. The dependent variable was the test data from the 2007 and 2008 language arts, math, and complete battery SAT 10. A group of 30 students were randomly selected to represent the 2007 four-week summer program, and another randomly selected group of 30 students were selected to represent the 2008 six-week summer program.

A *z* test to find the difference in means was used to determine if the extension of time in the summer program correlated with a statistically significant increase in student achievement data. The results did demonstrate a statistical increase in student achievement in math and the complete battery, but not in reading. More specifically, the African American subgroup showed statistically significant gains in math and the Special Education subgroup showed statistically significant gains in the complete battery.

The district studied needs to explore other ways to increase these scores with the remaining subgroups and reading comprehension scores with all subgroups. Before

making any changes to the summer program, the district may want to implement changes to the program which will help assess the growth of the participating students. Analyzing data each summer may give the district leaders a more clear direction of how they want to continue to enhance the six-week summer program.

Table of Contents

List of Tables

List of Figures

Abbreviations

ASCD	Association for Supervision and Curriculum Development
AYP	Adequate Yearly Progress
F/R	Free/Reduced Lunch Participants
GPA	Grade Point Average
HOSTS	Helping One Student to Succeed
IC	Infinite Campus Student Information System
IEP	Individualized Education Plan
MAP	Missouri Assessment Program
MO DESE	Missouri Department of Elementary and Secondary Education
NCE	Normal Curve Equivalent
NCLB	No Child Left Behind Act
NEA	National Education Association
OST	Out-of-School Programs
PDS	Professional Development School
PTA	Parent Teacher Association
SAT 10	Stanford Achievement Test
SD	Standard Deviation
SES	Socioeconomic Status
SSD	Special Education
UNESCO	United Nations Educational, Scientific, and Cultural Organization

Chapter 1: Introduction

Background of the Problem

Educators analyze academic achievement data and other student information for different reasons, but the main goal is for all students to fulfill their academic potential. Since all students are different people with different personalities, learning styles, and areas of strengths and weaknesses, the educational system must have programs in place to ensure that all of the varied students in the educational population are reached. Besides the students at the top of the academic scale, educators also need to focus, maybe even more so, on the students at the bottom of the academic scale.

When a student is not achieving academically, educators must consider many factors and ask themselves questions. Research demonstrates that one of the main contributions educators can make to ensure lower achieving students are also reaching academic success is to have them increase the number of days spent in school (Fairchild & Boulay, 2002). The less time spent out of school the better; they will retain more knowledge from grade to grade because they are constantly immersed in the learning process in a safe environment, and this may be an important factor to help close the achievement gap between the highest and lowest learners.

Other nations have traditional school year calendars that require students to attend school anywhere from 180 days to 220 days. In a study analyzed by UNESCO (2003), 33 of 43 countries studied had a school calendar over 180 days. The school calendar in the United States averages 180 days per year, according to the National Center for Education Statistics (2001-2002). In order for schools in the United States to extend their days of student attendance, many districts are finding that summer school academic programs are

one option. According to Cooper (2003, Concerns Raised section), when students are in school during a portion of the summer months, there is not as much of a learning loss, as there would be if the students took off the whole three months. This study considered a number of different summer school programs, and specifically focused on student results at the middle school level in one particular district in the Midwest.

Statement of the Problem

The school district being studied made a change from a four-week summer school program to a six-week summer school program to see if student achievement would increase and if learning loss would decrease. This would also help the district obtain its AYP goals. Before designing the six-week program, the district initiated a study committee to research various summer programs throughout the nation and decided make changes to their four-week program based on these results. These changes included increasing the time spent in the summer school program by adding meal times and enrichment classes. This collaborative study investigated whether the new six-week summer school program increased SAT 10 scores in the areas of language arts, math, and complete battery as compared to those same measures after only four-weeks of programming. The independent variable was a six-week summer school program introduced in 2008. The dependent variable was the test data from the 2007 and 2008 language arts, math, and complete battery SAT 10 standardized tests.

In 2008, the district of study replaced the existing four-week remedial summer school program with a six-week program. In the past program, students attended remedial classes for three hours a day, totaling 60 hours of instruction. In the new six- week program, students still had remedial classes for three hours a day but also had an

enrichment course for 90 minutes a day, plus breakfast and lunch. This new program had students in summer school for 180 total hours, which is an increase of 120 hours over the old summer school model, and remedial class time increased by 30 hours.

Purpose of the study. The district being studied made a switch to the six-week program to close the achievement gap: to give all students attending the summer program the opportunity to increase their learning and, therefore, their standardized test scores. This summer program was open to all invited students at no cost. Students were invited based on standardized test scores or teacher recommendations. Some students attended only the 2007 or 2008 summer programs, but for this study, only those students who attended summer programs in 2007 and 2008 were selected for analysis. While there was not a specific summer school curriculum in place, it was an expectation that summer school teachers adhered to the guidelines and rigor of the district's curriculum offered during the regular school year. Fall 2007 and fall 2008 SAT 10 scores for students who successfully completed both the four-week and six-week summer school programs were analyzed to see if there was a statistically significant increase for students attending the six-week program.

Role of the researcher. During this study, the researcher, Alicia Bottorff, worked as a middle school language arts teacher and as an assistant principal in an elementary school during the school year and as an assistant principal in a middle school summer school program. In addition, the researcher is a member of the district summer program committee. The committee was formed to evaluate the summer program and to make recommendations to the Board of Education if modifications to the program are needed.

The companion researcher, Brian Koop, worked as a middle school science teacher during the school year and as an assistant principal in a middle school summer school program. He also was a member of the summer program committee for the district being studied.

Both researchers worked in the district summer school program during the 2007 four-week program and the 2008 six-week program. Alicia Bottorff, the researcher for this study, examined different demographic subgroups (African-American, White, Special Education, and Free and Reduced Lunch) of students to see if the six-week summer program had a statistically significant increase on student achievement when compared to the four-week summer program. Brian Koop, the collaborative partner in this study, researched the same district but investigated whether overall student achievement improved as a result of the new six-week program as well as the perceptions that school patrons held regarding the program. His results will be discussed in Chapter 4.

Research questions. The following questions were addressed in this study:

1. Do any of the subgroups of students perform better on the SAT 10 test after completing the six-week summer program when compared to their scores following their previous participation in a four-week summer program?
2. Do any of the subgroups of students show a significant gain in the SAT 10 sub categories of Reading Comprehension, Total Math, or Complete Battery following participation in the six-week summer program?

Independent variables.

Four-week district summer school program. The 2007 program previously offered by the study district was a four-week program that consisted of three hours of

instruction in math and language arts per day. Students attended this program from 8:30 until 11:30 in the morning. Program attendance lasted a total of 20 days.

Six-week district summer school program. The 2008 program provided a six-week program consisting of four and one-half hours of instruction in math, language arts, and an enrichment class. Students attended this summer school program from 8:30 in the morning until 1:30 in the afternoon. Total instructional time per day was four and a half hours. Program attendance lasted a total of 29 days.

Dependent variables.

Stanford achievement test series 10 scores. The dependent variable in the study was the average test score in NCE Reading Comprehension, NCE Total Math, and NCE Complete Battery. This test was taken each year in the fall following the summer school programs.

NCE total math. The total math score includes tests taken in both math procedures and math problem solving.

NCE reading comprehension. This score evaluates how well students can read and then understand what they just read.

NCE complete battery. This is a cumulative score over all subtests taken within the SAT 10. These subtests include: NCE Total Reading, NCE Word Study Skills, NCE Word Reading, NCE Reading Comprehension, NCE Total Math, NCE Math Problem Solving, NCE Math Procedures, NCE Language, NCE Pre-Writing, NCE Composing, NCE Editing, NCE Spelling, NCE Science, NCE Social Science, NCE Listening, and NCE Thinking.

The study considered gains in academic achievement by comparing student scores of the African-American, White, Special Education, and Free and Reduced Lunch subgroups on the SAT 10 following attendance in the first type of summer school program to scores achieved following attendance in the second type of summer school program.

Hypotheses

Null hypothesis 1. For the African American subgroup, student scores achieved on the SAT 10 following attendance in the six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program.

Null hypothesis 2. For the White subgroup, student scores achieved on the SAT 10 following attendance in the six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program.

Null hypothesis 3. For the Special Education subgroup, student scores achieved on the SAT 10 following attendance in the six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program.

Null hypothesis 4. For the Free and Reduced Lunch subgroup, student scores achieved on the SAT 10 following attendance in the six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program.

Alternative hypothesis 1. For the African-American subgroup, student scores achieved on the SAT 10 following attendance in the six-week summer program will show a significant difference when compared to student scores achieved following attendance in the four-week summer program.

Alternative hypothesis 2. For the White subgroup, student scores achieved on the SAT 10 following attendance in the six-week summer program will show a significant difference when compared to student scores achieved following attendance in the four-week summer program.

Alternative hypothesis 3. For the Special Education subgroup, student scores achieved on the SAT 10 following attendance in the six-week summer program will show a significant difference when compared to student scores achieved following attendance in the four-week summer program.

Alternative hypothesis 4. For the Free and Reduced Lunch subgroup, student scores achieved on the SAT 10 following attendance in the six-week summer program will show a significant difference when compared to student achievement scores following attendance in the four-week summer program.

Rationale for the Study

Districts throughout the country persistently look for ways to increase student achievement. These districts are working hard throughout the school year to raise student achievement only to see some groups of children regress over the summer months and therefore start the new school year even further behind their peers. This is one of three reasons that many school districts are trying to implement some type of summer program to combat summer learning loss. The other two reasons are there is a need to provide

support for students who are considered an academic risk and states across the country are holding school districts accountable through AYP which is outlined in NCLB. Districts must be continuously improving student achievement for all students. By addressing the issue of summer learning loss, districts are realizing that they can use the summer as a way to help students by giving them an additional educational opportunity and a safe place where they receive two meals a day.

Some districts, including the one being studied, have tried to create a summer program that maintains student achievement over the summer. To do this, school districts usually encourage at-risk students to attend their summer programs by offering the program at no cost, providing transportation, and offering an additional enrichment course to pique the students' interests, such as physical education or art. As a result, these students should help the district to make AYP. NCLB not only looks at how the overall population is performing in each district but also how demographic AYP subgroups are performing. Each student subgroup must also achieve a certain benchmark on AYP in order for the district to meet the NCLB guidelines. Increasing the student achievement of a small handful of at-risk students could make the difference in making AYP. The challenge is designing a summer program for those students who have been identified as at-risk, instead of allowing all students to attend, that will actually increase student achievement.

At the time of this study several schools in the district being studied were not meeting AYP requirements in one or more of the subgroups defined by NCLB. The district wanted to use the summer months as a way to increase student achievement. The district already identified at-risk students by using scores on standardized measures given

throughout the school year and academic performance with the classroom curriculum. At the end of the year those identified students were invited to attend a summer program to support their learning. Teachers could also recommend students who appeared to be struggling or performing below their peers. Once the students were identified, they were enrolled and scheduled into the appropriate summer classes based on the individual student's needs. With this information, the district being studied was able to provide support for these students and increase academic achievement.

Prior to the summer of 2008, the district being studied decided to evaluate the effectiveness of their four-week summer program. The district leaders examined the negative perceptions of the program from parents and students and also the lack of academic results the next school year. District personnel analyzed other summer programs implemented by other districts around the country. From that information, the district leaders decided that a new six-week summer program would be implemented during the summer of 2008. This program had several differences from the four-week summer program. The most notable difference was that the new summer program would now be six-weeks long. It was the hope of the district that these changes to the district summer program would result in an increase in student achievement.

Generalizations. Results of this study may be of interest to school districts of the same size and demographics. The district studied is located in the Midwest region of the United States in suburban St. Louis County, in St. Louis, Missouri. The district is comprised of four high schools (grades nine through 12), six middle schools (grades six through eight), 19 elementary schools (grades kindergarten through five), two gifted elementary centers (kindergarten through two and three through five), one individualized

learning center for secondary students (grades 10 through 12), and two early childhood centers (ages three through five). The student population reported in 2009-2010 was 22,291 (MO DESE, 2009g). It was also reported that the student to teacher ratio in 2009-2010 was 15:1 (MO DESE, 2009h).

Limitations of the study.

Time. There was approximately a three-month period that passed from the end of the summer program to when the participants took the SAT 10.

Location. Students attended one of two middle school summer school sites during the 2007 and 2008 summers. Some staff members remained the same in the 2007 and 2008 programs, but some staff members were different. Curriculums may have slightly varied from teacher to teacher. The SAT 10 was administered at different home middle schools and in differently structured classrooms with different teaching styles.

Implementation. The SAT 10 was administered by many different teachers and at different locations throughout the district. While the SAT 10 comes with thorough directions on how to administer the test, and a standardized script to read, not every student took the test with the same teacher and/or in the same environment. The district being studied has a testing window, but does not specify specific dates or times for the test to be administered.

Maturation. Students could have possibly scored better on the SAT 10 after the six-week summer program simply because they were another year older.

Incomplete data sets. Students who did not have complete SAT 10 scores for both summer 2007 and 2008 did not have their data included in the study.

Role of the researcher. The researcher and companion researcher both worked as administrators in the studied district's summer school program. SAT 10 standardized test data was used to eliminate bias. Neither researcher was involved the collection of the test data.

Definitions of terms.

Achievement gap. The achievement gap is a persistent, pervasive and significant disparity in educational achievement and attainment among groups of students as determined by a standardized measure (Public Schools of North Carolina, 2010)

Enrichment summer school program. A series of one-week hands-on, interactive classes offered throughout the district's six-week summer program (Rockwood School District, 2010)

No child left behind (NCLB). Under NCLB, states are working to close the achievement gap and make sure all students, including those who are disadvantaged, achieve academic proficiency. Annual state and school district report cards inform parents and communities about state and school progress. Schools that do not make progress must provide supplemental services, such as free tutoring or after-school assistance; take corrective actions; and, if still not making adequate yearly progress after five years, make dramatic changes to the way school is run (U.S. Department of Education, 2004)

Stanford 10 test scores. The Stanford Achievement Test is a standardized test used to measure academic knowledge of elementary and secondary school students in the United States. The test is available in 13 levels that roughly correspond to the year in school. Each level of the test is broken into sub tests or strands covering various subjects

such as Reading Comprehension, Mathematical Problem Solving, and Science. Formerly known as the SAT, it was often confused with the Scholastic Aptitude Test. It is now more commonly referred to as either the Stanford or the SAT followed by the edition number, for example Stanford 10 or SAT 10, referring to the 10th Edition (Harcourt Assessment Inc, 2004)

***Summer school program*.** School, academic course, etc., held during the summer (Collins Discovery Encyclopedia, 2005)

Summary

This collaborative study compared the relationship between the SAT 10 and two structures of a summer school program. This study was conducted to see if extending from a four-week program to a six-week program produced statistically significant improvement in student test scores. A summer school program can be a useful way of raising student achievement; therefore, helping districts to make AYP as defined by the NCLB Act. The researcher of this study, Alicia Bottorff, analyzed the data to determine if there was a statistically significant gain in student achievement in the African-American, White, Special Education, and Free and Reduced Lunch AYP subgroups, and the collaborative partner, Brian Koop, analyzed the data obtained for the study to determine whether overall student achievement improved as a result of the new six-week program as well as the perceptions that school patrons held regarding the program.

Student achievement is a high priority for all public school districts in the nation, and districts are looking for ways to increase this student achievement through various programs and incentives. During a traditional school year, districts share ideas and best practices, and summer programs are no different. There are countless methods, strategies, and programs available for students to constantly be achieving at high levels during the

summer, as well as during the school year. The district being studied made many changes to their summer program based on current research, and this study investigated the effectiveness of those changes. The next chapter reflects current research on summer school best practices which the district examined to inform changes in the program.

Chapter 2: Review of Literature

When schools and educational systems were designed, the educational schedule needed to revolve around the growing seasons of crops. That need is not there anymore. "Today, about 3% of Americans' livelihoods are tied to the agricultural cycle, and air-conditioning makes it possible for schools to provide comfortable learning environments year-round" (Cooper, 2003, Introduction section, para. 1). The more time a student spends in school will equal the more knowledge a student can gain, so educators ponder why students only attend school for nine months out of the year. "As freshman-level teachers know, many times students enter high school far below where they need to be to be successful. Luckily, more state leaders are recognizing that these students need extra support" (Christie, 2008, p. 157). This makes the case for offering an effective summer program in middle school even stronger.

Problems with the Traditional School Year

> Clearly, we can no longer ignore the fact that the long summer vacation period represents critical hours for learning that must be fully utilized—for those 'beating the odds' during the school year and for those who are not—if we are going to meet our educational imperatives in a global economy. (Miller, B., 2007, p. 7)

Facing facts, there are many students who need support from the educational system all year long. Some researchers, such as Entwisle, Alexander, and Olsen (as cited in Miller, B., 2007) referenced this as the faucet theory, whereas "learning resources are turned on for all children during the school year. But in the summertime, the faucet is turned off" (p. 7). Many problems develop for students throughout the three-month summer vacation,

such as summer learning loss, a large part of the fall of the new school year spent on curriculum review from the previous year, the achievement gap between middle class socioeconomic students and low socioeconomic students, a lack of nutritious meals, a lack of affordable childcare for the parents, and dangerous out-of-school time from a lack of supervision. These issues will each be discussed in this section.

Summer learning loss. The biggest concern with students having three months' vacation in the summer is the amount of summer learning loss that occurs. "Children learn best when instruction is continuous. The long summer vacation breaks the rhythm of instruction, leads to forgetting, and requires a significant amount of review of material when students return to school in the fall" (Walker, 2004, p. 4). Many students do not focus as much or as hard when they have the freedom of summer, and regression is almost sure to take place.

> It's difficult to imagine a professional musician or athlete whose performance would not suffer from a three-month vacation from practice each year. Musicians who only practiced for nine months of the year and never touched their instruments during the remaining 25% of the year would be at a considerable disadvantage compared to those who honed their skills year-round. Similarly, it's reasonable to assume that professional athletes who completely abstained from exercise during the off-season would be unable to compete at optimal levels. While it's clear that everyone should experience periodic breaks from their daily routines, it is also true that prolonged periods of time without practice affects performance. Common sense suggests that consistency in training and practice is

> a key to achieving and maintaining high levels of professional performance. (Fairchild & Boulay, 2002, p. 2)

Some researchers term this the "summer slide". "Summer Slide is a term documenting the learning losses by students following the long summer break" (Borman, 2001, p. 27).

> Although summer school is clearly not an educational "silver bullet", proactive, multi-year programs may play a vital role in preventing summer slide, closing the test-score gap, and providing children the extra learning time many of them need—and all of them can use. (Borman, 2001, p. 29)

Summer learning loss can affect some academic subjects over others. "Summer loss was more pronounced for math overall than for reading overall. The authors speculated that children's home environments might provide more opportunities to practice reading skills than to practice mathematics" (Cooper, 2003, Research on Summer Learning Loss section, para. 2). Many families find it easy to read with their students or get access to a library over the summer, whereas they may not have the resources or skills to bring math into the home environment. This can also affect students' performance on standardized tests. "Students typically score lower on standardized tests at the end of summer vacation than they do on the same tests at the beginning of summer vacation" (Walker, 2004, p. 4). Because of these statistics, many teachers are finding the beginning of each school year is filled with review of the past year's academic content.

Review time in the fall. Many teachers have concern with how much they have to review upon students' return to school in the fall, as well. "As any teacher can attest, the early weeks of the school year are often spent reviewing material learned in the

previous grade" (Miller, B., 2007, p. 8). One middle school math teacher stated, "my students need at least a month to review basic math before we can move ahead" (Black, 2005, p. 39). At Nicolet Elementary School in the Midwestern United States, students who were performing adequately in reading during first grade struggled at the beginning of second grade. A new reading assessment revealed "discrepancies of up to 17 levels in the scores from the previous year. For some first graders, the attainment of even the most basic reading skills comes later in the year than for other first graders" (Malach & Rutter, 2003, p. 50). Review is necessary for all students not involved in some sort of academic program during the summer, but even more so for students of low socioeconomic status. According to data from over 50 studies, "children from low-income families lose nearly three months of grade-level equivalency during the summer months, compared to an average of one month lost by middle-income children" (Fairchild & Boulay, 2002, p. 6).

The socioeconomic achievement gap. "Overall, studies show that students from families with lower socioeconomic status (SES) have learning rates during the school year similar to their more advantaged counterparts' but fall behind during summer vacation" (Douglas, 2007, p. 39). According to Fairchild and Boulay (2002), the most significant learning losses for students from low income backgrounds are in reading comprehension and word recognition.

During the summer, students from low SES homes are not able to afford the luxuries that are provided to them during the regular school year because of the absence of funding, transportation, etc.

On average, these kids have less access to material resources such as books and computers, fewer enriching experiences such as family trips and summer camps,

> as well as fewer high-quality educational interactions with their parents, whose time and energy are often consumed by the challenges of struggling with poverty, raising a family as a single parent, and countless other obstacles. (Johnson, 2000, Introduction section, para. 2)

This is not the case for all students of low SES, however. According to Fairchild and Boulay, "low-income children who spend 25-35 of their non-school hours each week in engaged learning (such as reading for pleasure and playing educational games) received higher grades in school than their more passive peers" (2002, p. 15). Summer school programs can provide the opportunities for both of these activities.

But without this extra enrichment, this achievement gap not only increases during the summer, but, "the academic gap between rich and poor children increases throughout the elementary school years" (Johnson, 2000, Introduction section, para. 3). In research conducted in 2004, Downey, Von Hippel, and Broh concluded that "nearly every minority- white and SES-based achievement gap grew faster during the summer after kindergarten than during the kindergarten and first-grade school years" (as cited in Borman & Dowling, 2006, p. 25). Without the constant reinforcement of learning in a structured environment day to day, students cease to practice the academic routines that have become engrained. According to research completed by Alexander, Entwisle, and Olson (as cited in Monrad & May, 2001), "by the end of the fifth grade, the difference in achievement between poor and non-poor students was more than 2 years in verbal achievement and 1.5 years in math achievement" (Introduction section, para. 4). This gap continues to grow year after year.

> Findings suggest that elementary students with lower SES, begin school with lower reading comprehension skills and continue to lose ground throughout elementary school due to lack of progress during the summer months. (Douglas, 2007, p. 39)

The learning loss and widening of the gap continues to grow in middle school years. When students start middle school with this achievement gap already beginning to form, it can only grow larger, sometimes with a "cumulative lag of 2 years in reading achievement" (Borman & Dowling, 2006, p. 26). Another study by Cuddapah, Masci, Smallwood, & Holland (2008) showed first-through eighth-grade data for their participants entering the ninth grade: "In year 9, the low-SES group's Reading Comprehension average lagged seventy-three points behind the high-SES group's, a large difference of roughly 0.88 SD" (p. 21). The research determined that although about a third of the difference was present prior to the students starting first grade in 1982, the remaining two-thirds of the achievement difference had built up during the in-school and out-of-school experiences over the course of the subsequent eight years. Since students were tested at least once or twice a school year, the school year was determined to have little effect on the disparity of achievement scores. Students who come from a low-income environment experience the gap over and over each summer, and after many summers in a students' education, that equals a huge amount of learning loss. Barton looked at 36 states and their fourth grade data, and found that,

> between 1990 and 2000, 27 states raised average scores, 26 states raised bottom-quartile scores, and 27 states raised top-quartile scores. The bad news is that, at the fourth grade, only 14 states reduced the gap between top and bottom quartiles,

> only two reduced the white/minority gap, and only one reduced the gap between those eligible for subsidized lunches and those not eligible. At the eighth grade, Barton found that only eight states reduced the gap between top and bottom quartiles, no state reduced the white/minority gap, and no state reduced the gap between those eligible for subsidized lunches and those not eligible. (Bracey, 2002, p. 498)

These same research theories continue to be evident in high school experiences as well. Looking at high school graduation and involvement in college-preparatory programs, "over a third of the low SES group and just 3 percent of the high group are permanent dropouts, and while almost 60 percent of the high SES group attended four-year college by age 22, just 7 percent of low SES youth did so" (Alexander, Olson, & Entwisle, 2007, p. 171). Besides looking at college preparatory statistics, state, district, and local assessments can also provide strong information regarding the achievement gap between the socioeconomic classes. According to Braswell, Lutkus, Grigg, Santapau, Tay-Lim, and Johnson (as cited in Poggi, 2004, The Need and Demand for Additional Instructional Support section, para. 3), "results from the 2000 NEAP mathematics assessment show overall gains in fourth, eighth, and twelfth graders, average scores since 1990. However, 1996 to 2000 the percentage of twelfth graders reaching the basic level declined."

No matter what the grade level, low SES is holding students back from the education they deserve. "All lower SES students, regardless of the resources in their home, lost roughly equal amounts of math skills over the summer" (Cooper, 2003, Research on Summer Learning Loss section, para. 3). There are fewer opportunities in

the home and outside of the home, as well as minimal resources to help the students practice and learn new skills. “During the summer, low-income and other disadvantaged youth fall further behind academically than their more advantaged peers—in part, due to a lack of enriching opportunities” (Wimer & Gunther, 2006, Introduction section, para. 1). Fewer opportunities cause reading performance to decline and standardized test scores to lower. “On average, middle-income students experience slight gains in reading performance over the summer months. Low-income students experience an average summer learning loss in reading achievement of over two months” (Walker, 2004, p. 4). Students score better on tests at the beginning of the summer than they do at the end of the summer because they have been immersed in classroom instruction. According to Miller, schools are not only creating an achievement gap during the summer months, they are also creating an opportunity gap.

> While their middle-class peers are engaged in activities and often enrolled in enrichment programs and camps that strengthen and reinforce all kinds of learning, the vast majority of children in lower-income communities have little or no access to such opportunities. Hence, what we have is an enormous opportunity gap. (Miller, B., 2007, p. 5)

Besides educational opportunities students are missing by following the schedule of the traditional school year, there are also many students who are not able to receive the proper nutrition during the days they are not attending school.

Lack of nutritious meals in the summer. “Large numbers of students who qualify for federally subsidized meals do not have the same level of access to nutritious meals during the summer as they do during the school year” (Walker, 2004, p. 4). Many

students are in situations at home where there is no adult present due to work schedules, and no spare income to provide the nutrition needed by a growing child. According to the Food and Research Action Center (as cited in Walker, 2004), "only 1 in 5 (21.1 per 100) of the 15.3 million children who receive free or reduced-price school lunches on a typical day during the regular school year participate in federal nutrition programs during the summer". This is a large number considering all of the school aged-children in the United States. "Free and reduced-price lunches are received by only 3.2 million of 14.9 million eligible children during the traditional nine-week summer break" (Stenvall, 2001a, p. 21). If more of these eligible students were to attend a summer program, they would be able to take advantage of the nutritious meals that various government programs offer all year.

According to Fairchild, McLaughlin, and Costigan (as cited in Fairchild, 2008), "good nutrition is a vital component of a child's education because it stimulates learning, improves school attendance and behavior, and contributes to cognitive development" (Keeping kids healthy section, para. 1). If sufficient nutrition is missing for many students during the summer months, then that stimulation and contribution is missing. If students do not have access to healthy meals and physical activity in summer programs, their likelihood to become unhealthy and possibly obese can increase. According to the Food and Research Action Center (as cited in Fairchild, 2008), "obesity is linked to lower academic achievement, depression, and chronic health problems" (Keeping kids healthy section, para. 2). Most students not in school are not monitored by an adult that can ensure proper nutrition is taking place, and also guarantee the safety of the children in general inside the homes during the summer.

Lack of affordable child care and supervision in the summer. Many families cannot afford the newly added cost of childcare in the summer months and have to provide for their families in the best way they can. In the geographic area of the study, many daycare facilities charge anywhere from $650-$1000 per month. “The lack of affordable child care may require older children in low-income families to stay at home to care for younger children during the hours in which their parents work” (Miller, K., 2007, p. 8). But some families do not have older children to create their own in-home daycare, and young children just have to stay home alone. This is not a productive solution for the children based upon studies that show out-of-school time is a dangerous time for unsupervised children and teens (Walker, 2004 p. 5). A study from the Carnegie Council showed that “they are more likely to use alcohol, drugs, and tobacco; engage in criminal and other high-risk behaviors; receive poor grades; and drop out of school than those who have the opportunity to benefit from constructive activities supervised by responsible adults” (as cited in Walker, 2004, p. 5). This is not only an issue for educators, but also for society at large.

Many neighborhoods recognize they have families in these situations but struggle with solutions. There is concern for the children put in these situations because “neighborhood safety, cohesiveness, and areas for play all influence learning and development, as do health, housing, and nutrition” (Miller, K., 2007, p. 8). If students were in school all year, instead of having this time in the summer months to struggle with these issues, it would allow students to progress academically in a safe environment. Many children during the summer months

> come home to an empty house in an empty neighborhood. They tend not to be allowed out of the house. They tend to be afraid to answer the door and to have limited phone access, but they often have unlimited television access. This pattern translates to 15 to 20 waking hours weekly without live human contact for as many as 28 percent of the nation's young people during a time that they should be learning to develop relationships and experience their community. (Kugler, 2001, p. 4)

Members in a community want children and adults alike to feel safe in the area in which they live. "Today, more than 28 million school-aged children have parents who work outside of the home. Most voters continue to believe there is a need for some type of organized activity that provides children a safe environment and opportunities to learn" (Poggi, 2004, The Need and Demand for Additional Instructional Support section, para. 7).

Community members are striving to make neighborhoods crime free, but the temptation of the teenage hormones and unoccupied time, is making the battle tough to fight. According to Kugler (2001), juvenile crime peaks during the after school hours because students are bored, and the solutions they develop for their boredom may be intentional risks to themselves and others (p. 5). If students had a productive place to go during the summer months to continue their education, growth, and knowledge, many of these problems could be eliminated. If an educational system could be created that could "modify" the traditional school year and the time students learn, all parties involved would experience more success.

Eliminating the Summer with Modified Calendars

Using the traditional school calendar has many downfalls that are not making all students experience success in their education. With the traditional school schedule, "there often is not sufficient time in the school day to bring all students to high levels of learning" (Miller, K., 2007, p. 1). There are many schools of thought on solving this problem, such as adding time to the school day, adding days to the school year, modifying the school calendar to expand throughout 12 months, or adding a summer school program.

Adding time to the school day. There are many school districts that have chosen to add time to their existing school days. "The James P. Timilty Middle School in Boston Massachusetts, offers 80-90 minutes classes in the core subjects and 50 minute classes in the subject areas of theater, art, and gym. The longer classes add up to about 35 extra days of schooling each year" (Chmelynski, 2006, p. 41-42). Another school district in Springfield, Missouri, tested adding more time to their day, stated by Chmelynski. "Campbell Elementary School has had good results with a voluntary extended-day program. Twice a week, participating students stay for an extra hour, mainly for extra help with communications arts and mathematics" (Chmelynski, 2006, p. 43). Unfortunately many school districts have not chosen this option even though national studies from decades ago have shown it to be necessary.

> Twenty years after *A Nation at Risk* (National Commission on Excellence in Education, in 1983) recommended extending the length of the school day to seven hours and instituting a 200-to 220-day school year, most schools still use a five-or

> six-hour day and a 180-day school year. (Poggi, 2004, The Need and Demand for Additional Instructional Support, para. 6)

Districts are simply not receiving the support from family and community members to add time onto the school day. When Domonique Toombs learned she would stay "for an extra three hours each day in sixth grade at Boston's Clarence R. Edwards Middle School, 'I was like, 'Wow, are you serious? That's three more hours I won't be able to chill with my friends after school'" (Associated Press, 2009, para. 8). Adding time to the school day could be costly and unpopular when considering the other available options.

Adding days to the school year. Another strategy school districts are trying in hopes of raising student achievement and closing the achievement gap is adding more days to their school calendar. "Extended school year programs seek to increase the total amount of time students spend in school by adding instructional days to the calendar" (Fairchild & Boulay, 2002, p. 13). "Most students in the United States spend between 175 and 180 days in school each year, while students in Japan spend 240 days in school" (Fairchild & Boulay, 2002, p. 13). Students in the United States are constantly being compared to the students in Japan, and maybe the 60 extra days in school is accounting for the difference. "We all know that our students attend school far fewer days than those in Japan, Germany, Israel, Korea, and other countries, and many educators would like to similarly extend the American school year" (Stenvall, 2001a, p. 19). One district in Massachusetts decided to try the school year extension and experienced successful results. "The Revere, Massachusetts, school district extended the school year an additional 20 days into the summer last year for 130 third-graders who were reading below grade level. About 85% of the students reached or exceeded grade level for

reading" (Chmelynski, 2006, p. 42). Adding days to the school calendar could be a solution to raise student achievement, but some suggest modifying the calendar in other ways.

Changing the calendar without changing the length of the school year.

Another school of thought is that American students are experiencing learning loss based solely on the three-month break from schooling, and that extra days or hours do not necessarily need to be added to our school year. "Many proponents of school calendar change call for modified arrangements in which children might or might not attend school for more days, but the long summer vacation is replaced by shorter cycles of attendance days" (Cooper, 2003, Three Remedies for Summer Learning Loss section, para. 6). A meta-analysis by Cooper, Charlton, Valentine, and Melson (in press) focused on school districts that modified their school calendars but did not increase the length of their school year. The results were positive, but since all school districts are not experimenting with the calendar change, the significant impact was not a huge one. "First, 62% of 58 districts reported that students in the modified calendar program outperformed students in the traditional calendar program Second, the effect for 39 school districts favored modified calendars, but the size of the impact, though significant, was small" (Cooper, 2003, Three Remedies for Summer Learning Loss section, para. 7). The common point of success in these studies was that school districts were operating without the long summer break. According to Cooper et al. (2003) "in school year 2000-2001, more than 2.16 million students in 45 states attended more than three thousand schools that operated without the long summer break" (p. 3). Many schools followed this method, including schools in California, Hawaii, Arizona, Nevada, and Texas, but "the

U.S. elementary school with the longest continuously running modified calendar is located outside St. Louis, Missouri, in the Francis Howell School District. It has been in operation for nearly 30 years" (Cooper et al., 2003, p. 3).

However, besides the slight gains found with modifying the school calendar throughout the 12-month calendar, there are also some negatives that make this seem like it is not the best choice for students and their achievement. "A lot of teachers in our system feel like you just get things going and then you have to take a break. You have one break after another and it never stops" (Anderson & Blankenship, 2007, p. 10). The momentum of instruction and smooth transitions can be lost when there are continuous breaks built into the school calendar. Students may not take the chunk of learning weeks seriously because they know "freedom" is just around the corner every several weeks. Another issue is the cost to run the schools during 12 months compared to nine months. "The electricity to run our new high school for the month of August cost $20,000. That money would be much better spent serving the children" (Anderson & Blankenship, 2007, p. 10). Also, having school all year does not allow the opportunity for students to have a part-time job in the summer to help pay for some of their life expenses. "And many of the students need to work or they'll never be able to go to college. We have a lot of students in one-parent families" (Anderson & Blankenship, 2007, p. 10).

Another option, which almost every school district in the nation utilizes, is summer school. This is an extension of the regular school year and helps reduce the negative effects of having three months off from school in the summer. "If school hours are extended, time alone will not make the difference, but studies have shown that

successful summer programs get children excited about learning and increase their motivation to pursue knowledge in the months and years ahead" (Miller, K., 2007, p. 12).

Benefits of Summer School Programs

"The growth of summer programs is linked to the expanding educational standards movement and, even more directly, to the current push to end social promotion" (Cuddapah et al., 2008, p. 264). Almost all of the larger school districts in the nation offer summer school programs of some sort.

> From mandatory classes for students who failed high-stakes tests to enrichment programs on virtually any topic, summer school 2001 was big nationwide. The numbers were astounding. In New York City, for example, nearly 30 percent of the public school system's 1.1 million students were enrolled in some sort of summer school program- at a cost of $175 million. Estimated enrollments in other large districts include 234,000 in Los Angeles, 30,000 in Baltimore, 33,000 in Washington, D.C., 50,000 in Chicago and 90,000 in Broward County, Fla. (Glass & Gursky, 2001, p. 7)

The achievement gap is something constantly seen in schools when comparing various student groups. According to Evans (as cited in Edmonds, O'Donoghue, Spano & Algozzine, 2009), "many researchers and other professionals believe that the stability of the gap between the performances of diverse groups of students is the most stubborn, perplexing issue confronting American schools today" (p. 213).

Supporting parents with intervention strategies. Schools and communities see the need to tailor their educational platform to support parents with intervention strategies for their students and design curriculum during the summer months which will help lower

the achievement gap the way that the regular school curricula can not. According to Marzano (2000), "student characteristics such as home environment, learned intelligence/background knowledge, and motivation account for 80% of the variance of student achievement" (as cited in Miller, K., 2007, p. 2).

During the summer months, many parents need support with helping their students succeed educationally. A recent survey by the Academy for Education Development found that 24% of American parents want their children to learn new things during the summer, and 22% want their children preparing for school (Walker, 2004, p. 7). Not all families and parents have the skills or the time to make sure their children receive enriched experiences when school is not in session. Research shows that students from middle and upper-income households may have more opportunities, but students from lower income households may need the intervention of a structured summer school program in the schools.

> The reason summer courses tied to the state curriculum are the most effective, is that middle-and upper-income students generally have families who use a broader vocabulary and keep books in the home. They also are more likely to get their children involved in educational summer activities, like trips to museum, arts classes, or scout camps. (Buchanan, 2007, p. 34)

Also, according to Buchanan, many children from lower income homes do not have many positive things to do around the neighborhood, so if schools can offer summer school programs to *all* students, it is simply "good public policy". "Academically focused summer programs can meet parents' needs and desires to support youth with fun and enriching opportunities and promote learning when school is not in session" (Wimer &

Gunther, 2006, Introduction section, para. 2). Supporting the parents as well as the students will help make the positive perception of a summer program increase.

Lowering the achievement gap. Besides increasing achievement through parental support, summer programs can help lower the achievement gap by helping to prevent learning loss, providing the time for students to gain more instruction throughout the school year, and increasing the amount of time students are engaged in learning. According to Dr. Beth Miller, the most successful summer programs "combine the best of youth development and academic enrichment" (2007, p. 11). If a student attended school in the summer, he or she "could increase the amount of time spent engaged in learning activities by as much as 30-35%" (Fairchild & Boulay, 2002, p. 7). By students attending quality summer programs, and avoiding two months of reteaching in the fall, "students would gain approximately 8-10 weeks of instructional time" (Fairchild & Boulay, 2002, p. 7).

"Summer learning programs, encompassing everything from summer camps to library reading clubs, summer schools to cultural enrichment programs, are playing an increasingly important role in lowering the achievement gap" (Johnson, 2000, Introduction section, para. 4). School districts are trying to remain creative in their summer curricular course selections, offering not only remedial courses, but also enrichment courses to cover the ever-expanding needs of all student stakeholders. One school district, the Meriwether County School District, "uses a national program called HOSTS Learning, which provides intervention strategies to assist struggling students" (Buchanan, 2007, p. 35). Another school district offers a pre-K summer literacy program to try to lower the achievement gap.

> In recent years, both educational policy and best practices have shifted away from intervention models in which children must be experiencing academic or social difficulties to receive specialized services and toward prevention models in which children are placed into prevention programming if they are thought to be at risk for developing academic or social difficulties in the future. We reasoned that positive models focusing on increasing children's successful experiences can often effectively reduce the number of children who later require lengthy and costly individualized services. (Edmonds, O'Donoghue, Spano, & Algozzine 2009, p. 213)

Another school district, in Texas, bases their remediation programs on students who have not achieved certain academic targets by the end of certain points in their educational careers. According to Jacobson, if elementary students do not meet reading targets by the end of third grade, they have to retake the test to enter fourth grade in the fall. " 'Our scores were pretty good this year,' said DeEtta Culbertson, a spokeswoman for the Texas Education Agency. Results show that 93 percent of 3rd graders passed the state test" (2008, p. 18). Intervention even continues through college, where one college offers programs that offer remedial coursework during summer prior to the freshman year, to prepare at-risk students for college, and to reduce the need for offering so many remedial courses. "Pre-freshman summer programs are designed to enable students to get build academic skills, become acquainted with college resources and expectations, develop the structure and discipline needed in order to meet these expectations, and form an attachment to the institution" (Maggio, White, Molstad & Kher, 2005, p. 2). Besides

the aforementioned summer school program designs, many states and districts are creating more and more specialty programs to fit the ever-changing needs of their student populations.

Different Ideas for the Design of Beneficial Summer School Programs

Every school district throughout the nation is made up of widely different student populations. This diversity must be considered when programs are designed to fit the educational needs of each school district. "President Bush has called for increasing flexibility for states and districts to help turn around their struggling schools by allowing them to tailor interventions to each school and to measure individual students' achievement growth over time" (Fitzgerald, 2008, 2008 State of the Union Analysis section, para. 2). Also, according to Fitzgerald, student growth from year to year is a valid measure of learning and local schools should be able to choose the best intervention for improvement. Many schools, over 90% according to Fairchild and Boulay (2002, p. 11), favor summer school programs that focus on academic remediation to close the achievement gap, but there are also programs that offer specialized curricula, educational field trips, university/community partnerships, or project-based learning.

Academic remediation. "Summer school programs which focus on lessening or removing learning deficiencies do have a significant positive impact on the knowledge and skills of participants" (Fairchild & Boulay, 2002, p. 11). School districts need to design their summer school programs using teacher reports as well as state, district, and classroom assessments that provide evidence to support the need for academic remediation. "Many programs serve youth who did not meet certain minimum levels on

standardized tests and remedial summer programs offered instruction in math and language arts" (Wimer & Gunther, 2006, Promoting Learning section, para. 2). Many districts offer remedial summer programs to all students in a district, while others target the students that will attend the program. According to Poggi (2004), there are positives and negatives to targeting kids. Positively, students will receive services, but negatively, they may feel labeled or punished (Issues and Challenges Faced by Decision Makers section, para. 3).

The most common academic remediation practice for summer school is to target at-risk populations in the school district. According to Edmonds et al.(2009), one example includes a summer intervention program for children coming from preschool and starting kindergarten. These students were in the bottom quartile determined by student data and received interventions to prevent from being at-risk for literacy problems during the traditional school year (p. 214-215). The results of the study were promising and demonstrated that summer intervention, even before formal schooling begins, is a successful path for student academic achievement. Another program, the "Gear-Up" program in Washington helps identify seventh and eighth grade students who need help in school.

> Four-to-six-week summer programs for identified incoming high school students were put into place to provide extra help---double doses of math and reading/literacy. There is careful monitoring through meaningful advisory programs (e.g., an "advocate" for every family) and a goal of an annual increase in the number of students taking Algebra I in 8th grade. Besides the summer intervention, the district also provides lower teacher/students ratio in 9th grade,

> common planning time for 9th grade teachers, and transition classes for English and mathematics using a block schedule. (Christie, 2008, p. 158)

This program shows that just offering school in the summer can not be the only intervention taking place. Districts also need to provide support with teacher collaboration time and smaller class sizes. Districts also need to look at standardized data and reflect on the data after the program is implemented, as well. According to Buchanan (2007), in California's Natomas Unified School District, the district examined student data to invite struggling students to receive extra assistance (p. 31-32).

Some school districts have gone even farther than simply targeting students for summer academic remediation; they have mandated requirements that students must pass summer school and a standardized assessment to move on to the next grade.

> In Louisiana, it's the law: Students in grades 4 and 8 are required to pass both the math and language arts portion of the Louisiana Educational Assessment Program (LEAP) before they can be promoted. Those who do not take the test in the spring or who do not pass the test can attend summer school before being re-tested. (Glass & Gursky, 2001, p. 7)

Another school district in Texas, the Corpus Christi Independent School District, has had a program where students have to pass nine of ten standards to be promoted. "If they only pass eight, they have to go to summer school to master the final two- or repeat the course. The attention to specific standards, as opposed to a more general summer class, helps students focus on the work they need to do" (Glass & Gursky, 2001, p. 8).

Furthermore, in Georgia, a "largely low-income district began a summer program to help children get through Georgia's end-of-grade getaways, which require students in grades

three, five, and eight to pass state tests before they are promoted" (Buchanan, 2007, p. 35). "Almost 38 percent of eighth graders and about 28 percent of fifth graders did not pass the tests for their levels. That's about 82,000 students for the two grades" (Jacobson, 2008, p. 18). This stretches much further than just the southern part of the United States; school districts on the east coast are jumping on board as well.

> Delaware began requiring every student who fails the mandatory state test at the end of grade three, five or eight to attend summer school and retake and pass the test in order to be promoted to the next grade. School districts are required to offer summer school for failing students. (Denton, 2002, p. 4)

This is also the case for the whole state of Virginia. "In Virginia, every student who does not pass all required assessments by the end of grade three, five or eight must attend a summer school program or must participate in an unspecified 'alternative support program' that does not necessarily have to include summer school" (Denton, 2002, p. 4). In Johnston County, North Carolina, there is also an effective system in place for helping struggling students. According to Denton (2002), the district identifies students based on their standardized test scores and requires minimum scores to be obtained by third through eighth graders. If students are required to attend summer school, teaching strategies will differ from those used during the year.

A popular form of academic remediation for many districts' summer school programs includes a focus on literacy interventions and supports because literacy is seen as the base foundation for the knowledge of all other subjects.

> An example of this type of programming effort was seen in Luftig's (2003) study of 209 first-fourth-grade students who were from low-SES backgrounds and were

> not retained or referred for special education services. These children participated in a 2-3 week summer literacy intervention that was either (a) school sponsored or (b) private and for profit; an average of 19 students from each grade were placed in a control group receiving no intervention services. After completing the intervention, the intervention groups in each grade performed higher than the control group on a posttest measure of literacy skills. Specifically, over the summer months, the students in the intervention groups maintained or increased their literacy skills, whereas the students in the control group regressed. In addition, there was no difference among students who participated in either the school-sponsored intervention program or the private, for-profit intervention program. (Edmonds et al., 2009, p. 214)

This study proves that interventions can help even the lowest readers in a variety of settings. A similar program was introduced in West Virginia. "The WV Reads program was established to provide summer school to students with reading problems. The program uses strategies based on research, has measurable goals and benchmarks, and identifies other resources to be used in addition to state funds" (Denton, 2002, p. 5).

Starting intervention early in children's lives proves to have worked in the Opening the World of Learning: A Comprehensive Early Literacy Program. "Children participated from 8:00 a.m. to 5:00 p.m. 5 days per week. The schedule on each day involved 3 hours of intensive literacy instruction grounded in the program" (Edmonds et al., 2009, p. 215).

> The present results illustrate that clearly defined, well-structured literacy activities can be successfully implemented and evaluated, resulting in important

> improvements in the early literacy skills of young children who are otherwise unlikely to experience systematic educational programming during the summer before beginning formal primary schooling. (Edmonds et al., 2009, p. 218)

Another successful program in early literacy intervention is the Teach Baltimore program. "Strong components of the Teach Baltimore prototype include small-group or individualized instruction, early intervention during the primary grades, parent involvement and participation, and careful scrutiny for treatment fidelity, including monitoring to ensure that instruction is being delivered as prescribed" (Borman & Dowling, 2006, p. 30). "Improvements in early literacy skills (i.e., letter naming, picture naming, identifying sounds, and rhyming words) were consistently larger for children who participated in summer school than for their peers who did not receive additional or special intervention" (Edmonds et al., 2009, p. 219). Helping students that struggle with academics will help the achievement in not just the summer programs, but with all students' academic experiences.

Designing specialized curricula. Many districts have gone even further than just offering literacy interventions; they have designed specialized curricula. "KidzLit targets literacy by exposing youth to engaging books and by encouraging them to express their feeling and grapple with big ideas through discussion, drama, art, movement, and writing" (Wimer & Gunther, 2006, Promoting Learning section, para. 3). Programs that involve students in academics and social experiences promote successful learning and a positive self image. By offering academic and enrichment classes at the same time it will "attract students with otherwise full schedules" (Stenvall, 2001b, p. 36). A successful example is the Continued Connections Program.

> After review of a map of the school's attendance boundaries, the addresses of the target population were plotted. Five geographically central locations were identified, one for each day of the week. The program involves an RV, which was brightly decorated, and it was supplied with the materials necessary to conduct a guided reading lesson, administer a running record, and replenish the ZIP! (a school wide reading reinforcement effort in which students took leveled trade books home that were congruent with the day's guided reading instruction) program bag with new texts leveled specifically for each student. Parents were informed of the program through a formal meeting held at the school and by means of an informative brochure translated in Spanish and Hmong. During the program, each child met with a teacher who constructed a lesson based on information from a three-ring binder that identified the students' reading level and summarized any difficulties the student had experienced with the reading process following the last reading assessment before the end of the school year. Of the target children who participated in Continued Connections, 76% improved upon or maintained their end-of-first-grade reading level. This compares to 59% for target students who did not participate in Continued Connections (some were enrolled in summer school) and only 22% who maintained or improved the summer before. (Malach & Rutter, 2003, p. 51-53)

Educational field trips. Having outside organizations involved in schooling during the summer not only makes the students more interested to attend the program, it also allows them to experience things going on in the areas where they live, in which they might not otherwise have participated. "Educational field trips to places like museums or

aquariums can complement the learning taking place in the programs" (Wimer & Gunther, 2006, Promoting Learning, para. 4). "Students should take weekly field trips to museums and participate in cultural events offered throughout the community" (Fairchild & Boulay, 2002, p. 19). Having a hands-on, kinesthetic experience will benefit students with various learning styles learn and retain the new information.

Forming partnerships. Options other than just visiting various sites for educational learning opportunities include actually partnering with a community organization or a university. Partnerships such as these may help "to prevent summer loss in reading among low-income students" (Walker, 2004, p. 6).

> In a 2003 study completed by Schachter, of a summer literacy camp program in Los Angeles, CA, it was discovered that when reading instruction and tutoring were integrated into a summer camp atmosphere, disadvantaged first-grade children from schools whose reading test scores were below the 25th percentile made significant gains compared to students who did not attend the summer intervention. (Walker, 2004, p. 6)

Students sometimes feel empowered when they are able to learn outside of their regular school setting. They do not feel the extra educational time is a punishment but rather a privilege and an excitement. Experiencing educational opportunities in a university setting also excites the students, and encourages them to attend college, and gives them a feeling that they "know" the higher educational system. At one university, "twelve second-year university teacher preparation candidates planned and implemented a 3-week ESLP experience (Extended Summer Learning Program, a university working with a secondary school) for middle school students. They taught in teams of four for 1 week

each" (Cuddapah et al., 2008, p. 267). First-year teacher prep candidates assisted for no pay, but earned field experience credit.

> Data from school records for first semester attendance and GPAs of each student participant at the end of his or her first fall semester were collected. Student attendance data were reasonably impressive, averaging only 2.7 days of absence during the 92-day semester. Comparing this to the school's previous year's attendance rate of 96%, which met district standards, the ESLP students, for the first semester, had a slightly higher attendance rate of 97%. The students' average GPA of 2.33 was also encouraging considering that many of these students had previously experienced widespread academic failure in middle school. Particularly noteworthy was that 5 of the 17 students had GPAs of 3.0 or better. (Cuddapah et al., 2008, p. 271)

Project based learning. Another method of sparking interest in a summer or extracurricular learning program includes the involvement of project based learning. Project based learning can go in many directions, such as bookmaking, games, or other fun learning activities. "Using book making to build participants' literacy skills, or hands-on science projects can spark interest in science and learning more generally" (Wimer & Gunther, 2006, Promoting Learning, para. 5). Project based learning can also help teachers in creative lesson planning for students. "Teachers can take advantage of research-based games and other activities to help build vocabulary, which is one indicator of academic background knowledge" (Miller, K., 2007, p. 3). All in all, summer learning is not just about retaining information; "it is about problem solving, analyzing, and synthesizing information, generating new ideas, working in teams, learning to be with all

kinds of people—all skills that help build learning in a broad way" (Miller, K., 2007, p. 14).

Common Challenges to Implementing High Quality Summer Programs

Examining the positive impacts summer school can have on students makes one question why all schools are not entertaining this option. But the reality is that there are many challenges to implementing high quality summer programs, such as enlisting parent support, designing summer programming with intentionality, building connections with the students, recruiting highly skilled staff members, lack of student desire to attend, and scant resources.

Enlisting parent support.

> In Georgia, the news that summer school will be necessary for some students has not been received well by parents who are already upset by problems with the state's social studies scores. Last month, state schools Superintendent Kathy Cox threw out the social studies results on the CRCT because the failure rate was as high as 80 percent in the 6th and 7th grades. (Jacobson, 2008, p. 18)

Although an increased amount of learning time makes sense as a solution, many parents are hesitant to continue their students in an educational system that seems to have failed them. Another issue with parents supporting a summer programs deals with the activities offered in the program. "A recent survey of parents conducted by the Academy of Educational Development found that nearly half of American parents (43%) just want their kids to have fun and relax during the summer" (Fairchild & Boulay, 2002, p. 13). Therefore a summer program needs to not only communicate the academic value of the summer program, but also the social benefits as well. If families know that students will

also have fun and enriching experiences while enhancing their learning, they make more of a commitment to the program.

Designing a summer school program with intentionality. In order to meet the needs of these summer school parents, educators need to design summer school programs with intentionality. School leaders need to communicate their purpose and objective for the summer school programs with their stakeholders, and obtain buy-in from all involved. Many districts have not clued in to this point. "Many schools offer one-shot remedial summer courses, but few use summer school to prevent summertime achievement gaps from occurring in the first place" (Black, 2005, p. 40). Some districts are going into the summer school process backwards. "In many school districts, mandatory summer school programs are designed as single-summer remedial programs rather than as long-term solutions to the cumulative impact of summer learning loss" (Fairchild & Boulay, 2002, p. 3). If summer school is to make an impact, it cannot just be a one time incentive; it has to be a continuous effort of improved learning for our students.

"High quality summer programs must become a significant and central component in school reform efforts" (Fairchild & Boulay, 2002, p. 3). Currently, many programs do not connect to the "regular" school year and the "regular" instructional programs or curriculum. Many involve "loose organization and little time for advanced planning" (Fairchild & Boulay, 2002, p. 11). "Summer school programs need to set goals for summer school, and continuously plan and design programming with this goal in mind" (Wimer & Gunther, 2006, Challenge 1 section, para. 2). Programs should include formative assessments during frequent checkpoints of the program and "put priority on student mastery of reading and math skills" (Christie, 2003, Strengthening Summer

School section, para. 8). This will allow students, teachers, and families to gauge the student success throughout the program and not wait until the summer session is over. "If the program's mission is to keep youth from failing in school or to ensure their proficiency in certain subjects, activities should be purposely designed to achieve these goals" (Wimer & Gunther, 2006, Design Activities section, para. 1). Aligning curriculum with standards (national, state, or district) can ensure this is happening in the summer programs being offered.

Building connections with students. Districts also need to hire staff and publicize the summer program in a way that builds "positive and individualized connections with youth" (Wimer & Gunther, 2006, Challenge 2 section). Youth need to feel connected to their environment and see the purpose and importance for learning to *want* to attend the program. "Summer school is a hard sell with camp, parks, fishing, swimming, hanging out" (Chmelynski, 1998, p. 48). Influencing students that learning can take place along with the summer activities they like to be involved with outside of school can make a huge impact by "facilitating trust between staff and youth, making youth more excited about and engaged in the program, and allowing staff to tailor programming to youth's interests and needs" (Wimer & Gunther, 2006, Challenge 2, para. 2). Districts have to give staff members the opportunity to make that connection with the student population, so all parties involved in the summer program can experience success. "In many staff evaluations, staff reported not having enough information on participating students' backgrounds and needs" (Wimer & Gunther, 2006, Challenge 2 section, para. 3). School districts can help all involved by establishing these connections between teacher and the student population attending the program. Wimer

and Gunther suggest “having small staff-to-student ratios” (2006, Challenge 2 section, para. 4) and “developing mechanisms to provide staff with accurate information on students’ needs and backgrounds” (Wimer & Gunther, 2006, Challenge 2 section, para. 5). But that is not all; school districts also need to recruit and develop highly trained staff to teach the summer program. This is critical because many districts cannot find the staff who is interested in giving up their summer to teach these students that need the instruction the most.

Hiring highly skilled staff. “Many schools reported trouble filling all teaching slots because so few teachers wanted to teach summer school. These schools had no opportunity to be selective” (Denton, 2002, p. 9). According to Stenvall (2001a), “there are personal and family adjustments that must be made. Also, there are teachers who look forward to the long break to attend university classes or take a summer job” (p. 21). Some educators go into the profession because of the love of children, of course, but also for the extended vacation in the summer. When teaching all year starts to become a requirement, there are some that just will not be interested. They might want to vacation with their families or participate in a summer job that explores a personal hobby or interest. One way that could possibly combat this challenge is to “engage community members, groups, and institutions in programming” (Wimer & Gunther, 2006, Introduction section, para. 3). This could take away some of the summer competition with other programs if they were to combine their programs with offerings in the summer school educational setting, and would also help youth see other adult members of the community as positive role models.

Lack of student desire to attend. Besides finding interested, dedicated teachers to participate in the summer school program, districts also need to find those same interested, dedicated students. A major challenge schools face is that students do not have the desire to attend summer school.

> One middle school program staff member explained: The simplest way to turn away kids in their early teens from your program is to give them hoops to jump through that involve (1) communicating with parents, and (2) doing something on their own away from their peers. Teenagers operate on the spur of the moment and travel in clumps, so plan your program around those two "givens" and principals will succeed. (Kugler, 2001, p. 38)

Students need planned activities that engage learning but also allow for social opportunities. "Some program evaluations found that when programs emphasized remediation and conducted it in a dry, rote manner, youth tended to become disengaged and attendance flagged" (Wimer & Gunther, 2006, Challenge 7 section, para. 1).

Student desire can also increase if the program is promoted in such a way that the students have the choice to attend the program, and it is advertised so students know the benefits and successes they will experience while in the program. According to Stenvall, only about 20% of the original 50% of students who enroll in summer school make it to the end of the program. "That means about 10 percent of the students who need extended learning actually receive it" (2001a, p. 20).

Limited resources. Scant students in summer school programs are not the only challenge; "relatively scant resources are earmarked for summer learning experiences" (Miller, B., 2007, p. 6). Although public school districts are federally and state funded, if

economic distress is present in the community, funding for summer school and summer school transportation is one of the first things to be cut. “An instructional leader that conducted a 10 day summer program said that no one in the district thought that a 10 day program was sufficient; it was simply all that they could afford to provide with available funds” (Monrad & May, 2001, Discussion section, para. 2). This funding shortage could also be a reason it is difficult to find highly skilled staff for employment in the programs. “Many programs do not pay teachers at levels comparable to what they earn during the school year” (Denton, 2002, p. 9).

Budget issues for summer school affects districts all over the nation, in rural, urban, and suburban districts. “No state funding is earmarked specifically for summer school to help struggling students in Alabama, Mississippi, Oklahoma and Tennessee. Local school districts that want to provide summer schools must find other ways to pay for them; some districts charge tuition” (Denton, 2002, p. 6). Also, states in budget crisis, such as Illinois have to make mandatory cuts and the summer school programs are being affected. “Typically, about 25,000 Chicago elementary and middle school students and 13,000 high school students take summer school classes for promotion purposes. Summer classes instead are being reserved largely for high school students who need to pass the state’s graduation exam” (Jacobson, 2008, p. 18).

Characteristics of Successful Summer School Programs

Even with all these challenges, it is possible for districts to design successful summer school programs, and there are many components such as hiring high quality teachers, adequate and reliable funding, an emphasis on reading and math, innovative teaching, a focus on student achievement, planning the program early, small group

instruction, parental involvement, operating part of the day for many weeks, the recruitment of students, and being accessible for parents that need to be considered.

Hiring high-quality teachers. Hiring high-quality teachers is the strongest component of developing and retaining a successful summer school program. These teachers "focus on understanding the content and structure of the summer curricula, instructional planning, and strategies, and monitoring what students know and/or their progress" (Wimer & Gunther, Challenge 3, para. 5). Instructional planning is critical for summer programs because at times a full semester or even year of curriculum is crunched into a six-week format, and teachers have the opportunity "to tailor instruction to meet the individual students' needs and interests" (Fairchild & Boulay, 2002, p. 17). This definitely calls for essential learning targets to be developed, as well as a formative pacing guide for instruction.

To ensure this high-quality standard, training also comes into play. The greatest teacher may still need some support in condensing the curriculum. "In the Anchorage School District, teachers were required to attend two days of teacher in-service before the start of summer school. Training was done by the literacy teacher and past practitioners of summer school wrote the revised curriculum" (Opalinski, Ellers, & Goodman, 2004, p. 34). The teachers should also have a connection to the students in the program and the program itself. "Content taught during the extended learning period must be taught by qualified instructors who are familiar with and can be held accountable for improving student achievement. Providers must offer evidence that competent staff is employed for delivering the services" (Poggi, 2004, Issues and Challenges Faced by Decision Makers section, para. 4).

A high-quality staff is also a consistent staff. “Maintaining consistency of staff from day to day and week to week, allowing relationships between volunteers (teachers) and students to develop and grow throughout the summer is beneficial for children’s development” (Johnson, 2000, Foster a Sense of Community section, para. 2). Every new school setting starts with the bonding of student and teacher, so it is imperative that teachers are coming to school everyday to represent the educational support system for the student. “Summer programs represent an unhurried opportunity for children and youth to develop strong relationships with adults and peers, and the can also provide a sense of having a valued place in a larger community” (Miller, K., 2007, p. 12). If students were not in school during the summer, they may not be receiving any positive adult interactions at all, which could drastically change their path. “Young people need consistent, ongoing adult guidance and support in all developmental domains if they are to achieve productive adulthood” (Fairchild & Boulay, 2002, p. 7).

Many cities and states have developed creative ideas to attract these high-quality teachers to their summer programs, such as “in New York City, the United Federation of Teachers negotiated a contract that pays summer school teachers $32 per hour. They also hope to add the opportunity for teachers to gain pension credit” (Pipho, 1999, p. 7). High-quality teachers are typically “more experienced teachers (who would typically take summer off) through special incentive packages, such as extra compensation for experience” (Wimer & Gunther, 2006, Challenge 3 section, para. 2), so it is important for districts to offer a reason to teach in the summertime.

High quality teachers ensure the success of a program, but a program also has to have adequate and reliable funding to exist.

> If schools or districts believe that extended academic support can raise student achievement and close achievement gaps, then they must consider these programs essential and reallocate resources to provide the services. This may mean changing staff schedules by alternating starting and end times, redesigning the school day for specific students, or abandoning programs that are not able to demonstrate results. (Poggi, 2004, Issues and Challenges Faced by Decision Makers section, para. 8)

Many districts have set aside money for summer programs, increased the amounts allotted to or added a budget line to their district budget for summer school expenses, and/or taken advantage of Federal programs, such as matching grants or Title I money.

Adequate and reliable funding. "Florida, Georgia, Kentucky, North Carolina, South Carolina, and Texas have programs to provide schools with funds to help at-risk students, and these funds may be used for summer schools" (Denton, 2002, p. 6). Many districts are seeing the need for summer programs and are leaning in this direction. According to Poggi, "at least 26 states plan to increase funding for extra learning opportunities" (2004, The Need and Demand for Additional Instructional Support section, para. 11). Districts need the money not just to pay the staff, but also to provide teacher training, and strategies and programs that would ensure summer success. "One question on a survey asked instructional leaders to identify strategies that would improve the effectiveness of their summer school programs. Almost 80% of the instructional leaders identified needed strategies that would require additional funding" (Monrad &

May, 2001, Discussion section, para. 2) Additional funding would also ensure low student to teacher ratios and teacher training in the latest technology (Denton, 2002, p. 12).

If districts cannot afford to set aside funding for summer school, many Federal programs and incentives are available. "Districts often turn to such money pots as local levy funds, Title I money, state allocations, and even private sources" (American School Board Journal, 2001, p. 7). Many federal politicians have a vested interest in education and continuing education and are willing to support programs and endeavors that will provide these funds.

> Democratic presidential candidate and U.S. Sen. Barack Obama of Illinois is co-sponsoring the Summer Term Education Programs for Upward Performance Act of 2007. The legislation would authorize $100 million to be divided among five states selected by the U.S. secretary of education for summer programs that combine fun and academics for children eligible for the federal free-lunch program. States would have to match the federal contribution of $1,600 per child per summer. (Cech, 2007, p. 15)

Besides just the funding, there are sources that will contribute money to scholarship programs, which can even further support the cause for summer program education. "President Bush has called on Congress to fund $800 million of scholarships for 21st Century Learning Opportunities, which will give students the opportunity to attend high-quality after-school and summer school programs aimed at increasing student achievement" (Fitzgerald, 2008, State of the Union Analysis, para. 10).

Some districts are even paying their students to attend the program since "a majority of programs require attendance from students who do not score above certain thresholds on standardized tests" (Fairchild & Boulay, 2002, p. 11). In Buffalo, New York, a high school is paying students minimum wage to attend a six-week summer school program. "James Foxworth, 14, said, 'He'd be doing nothing all summer if he were not earning $900 to prep for high school course work during the six-week program'. This program was paid for by a grant through Buffalo Employment Training Services" ("Should You Pay", 2001, p. 6). In another area of the country, "students received incentive, like gift cards for local restaurants, for good attendance throughout the program" (Cuddapah et.al., 2008, p. 268). These are radical approaches, however; most districts try to impress the intrinsic value of the summer program.

Emphasis on reading and math. Another component of success for a summer program would include content emphasizing reading and math. "Teachers can benefit from experience in dealing effectively with reading and math in the intense and individually oriented setting of summer school, and their improved skills also will bring results during the regular school year" (Denton, 2002, p. 14). One of the main goals of summer school is to prevent learning loss from school year to school year, so carryover of skills during the summer can only be positive. "International comparative investigations, such as the Third International Mathematics and Science Study have shown that countries in which students spend more days and more time in school on mathematics and science instruction demonstrate higher achievement in those subjects" (McMillen, 2001, p. 67). Therefore, giving students the opportunity to expand their

knowledge in these areas will allow districts to close their achievement gap and improve educational quality (Borman, 2001, p. 28).

Innovative teaching. The course work for these content areas must be presented in innovative and creative ways, however. Otherwise, districts will lose their audience, and student desire to attend will decrease. Districts should "design activities that are hands-on and focused on active learning" (Wimer & Gunther, 2006 Challenge 7 section, para. 3). Students learn better by doing, instead of just reading a textbook in the traditional classroom; that obviously did not work for them during the regular school year. "Programs need to ensure an engaging curriculum and so must go beyond simply repeating instruction that students did not get the first time" (Christie, 2003, Other Issues section, para. 1).

Curriculum needs to take on meaning in these students' lives for them to honestly connect with it and have the desire and appreciation for learning.

> Connect the subject matter to real-life situations. Find books about baseball to read and use baseball statistics in math instruction for a student who lives and breathes the sport. Use musical themes to engage a student who constantly drums on his desk or incorporate a lot of physical movement to reach the aspiring dancer. (Denton, 2002, p. 14)

All of these methods can connect these students in ways they may not have connected before, and will help increase their student achievement.

Focus on student achievement. Student achievement is definitely a goal districts should use as a measurement when gauging the success of their summer program. Districts should evaluate their programs year after year with input from all their

stakeholders (students, staff, and parents) and determine whether the program has been successful, or if changes need to be made.

Districts should ask themselves the following questions:

- Can the district and/or provider product evidence of effectiveness, that is, demonstrate improved student achievement for the same type of population that will be served in the program?
- Is the program balanced? If the program simply teaches to the test, the benefits may not last.
- Can the district and/or provider achieve the goals of the program?
- How much time and effort will be needed from the district staff to ensure program success?
- How will student progress be monitored and communicated?
- How will consistently qualified and effective staff be recruited and supported?
- Where will funding come from, and is it sustainable over time?
- What are the advantages and disadvantages of working with for-profit organization, nonprofit organization, and district-developed programs? (Poggi, 2004, Issues and Challenges Faced by Decision Makers section, para. 5)

Based on the answers to these questions, districts can evaluate what is and is not working, and what changes need to be made in the program.

Pre and post testing of students in the summer program can also provide for an evaluation of student achievement. These tests can "assess progress, for curriculum with demonstrated effectiveness in accelerating student learning, for manipulatives and

instructional supplies, for transportation funding, and for professional development for teachers" (Monrad & May, 2001, Discussion section, para. 4). Several districts have already designed their summer programs with these assessments in place. "In Anchorage, the curriculum areas were developed around weekly themes or objectives, which were aligned with curriculum standards, so all of the teaching was standards-based" (Opalinski et al., 2004, p. 36). "In 2005, 79 percent of Meriwether County students who failed the state Criterion-Referenced Competency Test passed after attending summer school" (Buchanan, 2007, p. 35). Student achievement should be the main focus of the summer programs and schools should do all they can to maintain this focus.

Plan the program early. Planning the summer program early and connecting it to part of the regular school will lead to successes during the summer months. "There needs to be a consistent, formal, and specific communication between extended and regular school day staff" (Poggi, 2004, Components of Effective Extended Academic Programs section para. 7). This provides "critical information about youth's academic and social situations" (Wimer & Gunther, 2006, Challenge 4 section, para. 1), and will assist summer staff in providing individualized, tailored instruction to give the summer students success.

Small group instruction. "One advantage to summer programs- no matter whether the emphasis is on remediation or enrichment- is typically smaller class size, which means that teachers can give more individual attention to students" (Monrad & May, 2001, Discussion section, para. 3). At times, students who are not interested in learning, or who are having difficulties learning prefer to be in large classes so they can blend in and not have to put forth the effort. When teachers have the ability to focus on a

smaller group of students, it leads to success for everyone. “Classes are smaller in size than a regular classroom, so the students receive more one-on-one attention and experience smaller teacher ratios” (Miller, K., 2007, p. 2). When students experience this smaller connection with staff, they are apt to be more connected with the learning and more capable of success.

Parent/community involvement. Students are not the only stakeholders that provide a summer program with success, however; parent/community involvement and participation is essential for a program to be successful. Starting with parents, “linkages between families and summer programs may also benefit parent involvement in children’s education and help parents better support their children’s learning and development at home” (Wimer & Gunther, 2006, Challenge 5 section, para. 2). To create and sustain the home-school connection with students makes a tremendous impact on what they can achieve in a summer session. “Asking parents to be partners in supporting their children’s learning and development and to sign contracts with the program pledging their participation” (Wimer & Gunther, 2006, Challenge 5 section, para. 7) will help their children have regular attendance and therefore regular participation. “Inviting parents and families to participate in program events and opportunities can make parents more likely to be involved” (Wimer & Gunther, 2006, Challenge 5 section, para. 4).

Many districts have also created programs to have community organizations involved in partnerships with the schools during the summer school program.

West Virginia’s Energy Express, a summer learning program partnering with the Summer Food Service Program sponsored by the US Department of Agriculture.

Reach Out and Read, a national program aimed at promoting early childhood

> literacy, has volunteers read books to children while they wait in doctors' waiting rooms, and instructs physicians to talk with parents about reading with their children. Houston READ Commission reaches out to the children of students in its adult literacy programs. The library program in Columbus has formed relationships with organizations like the YMCA and Boys & Girls Clubs, which pull in many at-risk kids who would not normally take part in a summer reading program. St. Louis Public Library's summer reading club reports that one of its most exciting developments is a growing partnership with the public schools in that city. Staff at 80 summer schools work closely with the library program, and has even assigned three full-time staff members to work specifically on bringing the summer reading club to its at-risk summer students. (Johnson, 2000, Form Partnerships with Other Services section, para. 2)

Local colleges also have interest in partnering with summer school programs in the area, and this is a benefit because "colleges can provide an excellent source of program staff, classroom space, and laboratory facilities" (Wimer & Gunther, 2006, Challenge 6 section, para. 3). Another program, mentioned previously in this paper, "Teach Baltimore is an academically intensive summer program that recruits and trains outstanding university students to provide approximately eight weeks of reading and writing instruction to low-income elementary students" (Fairchild & Boulay, 2002, p. 17). When students positively connect to outside organizations and volunteer groups while accessing their education, they see their academic achievement as part of a bigger picture in the community.

Operating part of a day for many weeks. Teach Baltimore is an example of a successful summer school program because "summer achievement is higher in districts where programs operate part of a day for many weeks" (Black, 2005, p. 39). In the district studied, the summer school program changed in 2009; it went from a three-hour/day, four-week program to a five-hour/day, six-week program. "Stretching summer school out longer 'reduces the gaps' between the regular school year and provides students with more continuity in learning" (Black, 2005, p. 39). Other districts have also followed that lead. "North Carolina's Johnston County school district has academy summer sessions that run five hours a day, five days a week, for most of the summer, with the last session ending about two weeks before the new school year begins" (Black, 2005, p. 39). This trend is not only on the coast, but also in the Midwest. "Chicago has the Summer Bridge program which includes seven weeks in intensive remedial classes during the summer" (Chmelynski, 1998, p. 47). Some districts are doubling the length of their summer school program to increase achievement. "Officials of the Virginia district added math classes to the reading classes that were available to previous years. In recent years, the district has gradually increased the number of weeks the program is offered to six, from three" (Zehr, 2008, p. 11). Many districts that have extended their summer programs are experiencing gains in academic achievement of students.

Recruitment of students. Allowing for this scheduling for district summer programs can give students more exposure in school which allows them to increase their achievement and feel better about the educational time they spent during the summer

months. “Students stated that they enjoyed the summer program, found it interesting, and generally had fun during the class sessions” (Stone, Engel, Nagaoka, & Roderick, 2005, p. 942).

> According to one 7th grade student, ‘usually when you think of summer school, you think boring and you think it is a waste of time. To be truthful, I liked summer school because I learned a lot of stuff I thought I could never learn. Before summer school, I did not care about learning and school. But now I really feel confident about school and my future’. (Opalinski et al., 2004, p. 34)

Program accessible for parents. Making the program “accessible and convenient for parents” (Johnson, 2000, Make the Program Accessible and Convenient for Parents section, para. 1) is another component a summer program needs to be successful. According to Johnson (2000), districts should work around family’s schedules, provide a convenient location and transportation, provide meals, and include family and community members in assemblies, field trips, and events. Students need to do their part in the learning, but parents also need to be involved in conversations about how their children are doing in school and what their achievement may look like in the upcoming school year.

Summary

The issue of increasing student achievement is one that has gained a great deal of attention from researchers and stakeholders of educational systems. Studies offer a wide variety of factors that contribute to the relationship between summer school and increased student achievement that range from school initiatives to student initiative. Although there are factors beyond those listed in this chapter that have affect the relationship

between summer school and student achievement, the majority of the research shows hiring high-quality teachers, providing adequate and reliable funding, an emphasis on reading and math, innovative teaching, a focus on student achievement, planning the program early, small group instruction, parent/community involvement, operating part of a day for many weeks, the recruitment of students, and making the program accessible for parents to be some of the key factors. The next chapter compares two different summer school programs implemented by one district in consecutive years to increase student achievement.

Chapter 3: Methodology

This mixed methods**,** comparative study analyzed the relationship between the types of summer programs attended and the scores achieved on the SAT 10. More specifically, this study identified which subgroup had the largest increase in student achievement with the new summer program implemented by the district being studied.

The main reason that the district being studied switched from a four-week summer program to a six-week summer program was to raise student achievement. More specifically they wanted to close the achievement gap. On state testing, the district being studied almost always meets the AYP target set by the state for the subgroup of White ethnicity. However, oftentimes most buildings struggled to meet the AYP targets set for the other subgroups that the district qualifies for. Those subgroups include African-American ethnic students, Special Education students, and Free and Reduced Lunch students. Free and Reduced Lunch students are those students who qualify for free or reduced lunch prices because of their SES. While the district's overall scores were very good, these three subgroups were not meeting the mark when analyzed separately. The district being studied implemented the new six-week summer program in order to stop the summer learning loss many of the students in these subgroups experience and start to close the achievement gap.

SAT 10 subtests used in this study were NCE Reading Comprehension, NCE Total Math, and NCE Complete Battery. These three subtests were chosen because the state of Missouri measures a school district's success by how well the students score in the areas of language arts and math, and these are the areas on which the district being studied based their new six-week summer program. While the state of Missouri evaluates

a school district on its MAP scores, the SAT 10 was used because it is the first standardized test given to the students starting the new school year. It is typically given in the early fall. The MAP is given in the spring semester. For this reason, the SAT 10 Test scores appeared to be a better indicator of how well the new six-week summer program worked to close the achievement gap.

Identifying whether or not the new six-week summer program has started to effectively close the achievement gap will allow the district to make an informed decision when deciding which summer program should be implemented in the future. In addition, it will allow the district to see which specific subgroups are making gains and which are not. The district will then be able to adjust or implement new strategies in the summer program to help raise achievement for all students.

Research questions. The following questions were addressed in the study:

1. Do any of the subgroups of students perform better on the SAT 10 test after completing the six-week summer program when compared to their scores following their previous participation in a four-week summer program?
2. Do any of the subgroups of students show a significant gain in the SAT 10 sub categories of Reading Comprehension, Total Math, or Complete Battery following participation in the six-week summer program?

Independent variables.

Four-week district summer school program. One program previously offered by the study district was a four-week program that consisted of a total of three hours of instruction in math and language arts. Students attended this program from 8:30 until 11:30 in the morning. Program attendance lasted a total of 20 days.

Six-week district summer school program. The second program, more recently offered by the study district, provided a six-week program consisting of four and one-half hours of instruction in math, language arts, and an enrichment class. Students attended this summer school program from 8:30 in the morning until 1:30 in the afternoon. Total instructional time per day was four and one-half hours. Program attendance lasted a total of 29 days.

Dependent variables.

Stanford achievement test series 10 scores. The dependent variable in the study was the average test score in NCE Reading Comprehension, NCE Total Math, and NCE Complete Battery. This test was taken each year in the fall following the summer school programs.

NCE total math. The total math score includes tests taken in both math procedures and math problem solving.

NCE reading comprehension. This score evaluates how well students can read and then understand what they just read.

NCE complete battery. This is a cumulative score over all subtests taken within the SAT 10 test. These subtests include: NCE Total Reading, NCE Word Study Skills, NCE Word Reading, NCE Reading Comprehension, NCE Total Math, NCE Math Problem Solving, NCE Math Procedures, NCE Language, NCE Pre-Writing, NCE Composing, NCE Editing, NCE Spelling, NCE Science, NCE Social Science, NCE Listening, and NCE Thinking.

The study considered gains in academic achievement by comparing student scores on the SAT 10 following attendance in the first type of summer school program to scores achieved following attendance in the second type of summer school program.

Methodology

In this study, a two-tailed *z* test for comparison of means was used to analyze data from the demographic subgroups of African-American, White, Special Education, and Free and Reduced Lunch Students for each of the three SAT 10 subtests analyzed in this study. The three subtests of the SAT 10 that were used were NCE Reading Comprehension, NCE Total Math, and NCE Complete Battery. The *z* test was run to compare the scores for these three subtests following the 2007, four-week summer program, to scores following after the 2008, six-week summer program. The z-test value was used to determine if the scores following the six-week summer program were significantly different than the scores following the four-week program.

Hypotheses

Null hypothesis 1. For the African American subgroup, student scores achieved on the SAT 10 following attendance in the six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program.

Null hypothesis 2. For the White subgroup, student scores achieved on the SAT 10 following attendance in the six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program.

Null hypothesis 3. For the Special Education subgroup, student scores achieved on the SAT 10 following attendance in the six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program.

Null hypothesis 4. For the Free and Reduced Lunch subgroup, student scores achieved on the SAT 10 following attendance in the six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program.

Participants. The participants in this study were selected from a district within a large suburban area, located in the Midwest. During the regular school year the district being studied operates six middle schools, serving roughly 5,100 students in grades 6-8. However, only two middle schools are used for the summer program. All of the participants in this study attended one of the two summer program sites in both 2007 and 2008.

Table 1 represents the demographics for the four subgroups used in this study. Each subgroup consists of 30 randomly selected students who fit the demographic qualifications for each subgroup. Students could fit the qualifications for more than one subgroup.

Table 1

Demographics: Randomly Selected Students to Represent each Subgroup

	African-American Subgroup	White Subgroup	Special Education Subgroup	Free and Reduced Lunch Subgroup
African-American	30	0	15	26
White	0	30	15	4
Qualify for Special Education Services	6	15	30	8
Qualify for Free or Reduced Lunch	23	7	15	30

Note. Calculated by data provided by the district participating in this study (2009)

The White subgroup and Special Education subgroup seemed to be represented evenly. Half of the representatives in the Special Education subgroup qualified for free and reduced lunch while the other half did not. Also, half of the population was made up of African-American students while the other half were white. The White subgroup was similarly proportioned with half of the group qualifying for special education and the other half not. The two subgroups that were not as well-proportioned were the African-American subgroup and the Free and Reduced Lunch subgroup. In the African-American subgroup, most of the participants also qualified for free and reduced lunch. This also occurred in the Free and Reduced Lunch subgroup where almost all of these participants were also African American. However, this disparity is a result of random sampling.

Demographics.

Table 2 represents the demographics for the district for the two years accessed for the study. The data shows demographics for the years 2007 and 2008 respectively.

Table 2

Demographics: Study Site School District and District Middle Schools

	School District		District Middle Schools	
Year	2007	2008	2007	2008
Enrollment	22,245	22,412	5335	5298
% Asian	4.3	4.6	3.9	4.4
% Black	11	11.2	12.5	11.7
% Hispanic	1.5	1.7	1.6	1.7
% Indian	0.2	0.2	0.1	0.2
% White	83	82.3	81.9	82
% Free / Reduced Lunch	13.1	13	14.5	13.4

Note. January Membership Data is used as the denominator when calculating the percent. Adapted from Missouri Department of Elementary and Secondary Education (2009a-g).

The information included in Table 3 represents the demographics of the population who attended the summer programs of the district being studied. It is important to note that these demographics are much different than the demographics detailed in Table 2 which represents the demographics of the district being studied during the normal school year. In addition the demographics in Table 3 only represent those students who attended the summer programs at the middle school level. Both middle school summer program sites for the district are represented in Table 3. Also, there is data that represent the demographics over two years. The data in 2007 represents those

students who attended the four-week summer program and 2008 represents those students who attended the six-week program.

Table 3

Demographics: Summer Program at the Middle School Level

Year	2007	2008
Enrollment	442	423
% Asian	3.8	2.3
% Black	48.9	56.3
% Hispanic	1.6	1.4
% Indian	0.7	0.5
% White	45	39.5

Note. Provided by the district participating in this study (2010).

Companion Research

There have been many studies that examined the topic of student learning loss over the summer months, in particular comparing the success of students from different ethnic and socioeconomic backgrounds. It is thought that summer learning loss is one of the main contributors of the achievement gap that many districts face. Alexander, Entwisle, and Olson found results which "established that achievement gaps by family SES and race/ethnicity widen more during the summer months than during the school year" (p. 167). The district being studied has long recognized this problem which is why they have a summer program in place. However, the district was looking to improve their summer program in order to reduce the achievement gap even further and to grow and

meet the AYP mark set by the state of Missouri. This AYP mark is set by MODESE through the completion of the MAP. In order to improve upon their current summer program, the district being studied made several changes in 2008, one of which was extending the summer program from a four-week term to a six-week term. The length of a summer program has been studied and found to make a difference on academic achievement. Cooper notes that, "Hazleton and colleagues based on work by Karweit 1984 suggested that 35 extra days would be needed to produce a noticeable change in student achievement"(Cooper, 2003, Three Remedies for Summer Learning Loss section, para. 3). While the six-week summer program did not meet Cooper's recommendation, the district did acknowledge that they needed to reduce the amount of time that struggling learners spend out of the school setting. In addition to the studies that are outlined in the literature review, the collaborative researcher, Brian Koop, used the data obtained from this study to evaluate more specifically the overall impact of the new six-week program in regards to whether or not student achievement improved when compared to the four-week program. In addition, he analyzed data collected from perception surveys given to the patrons, students, and faculty regarding their feelings towards the summer programs. These results will be included in the discussion in Chapter 4.

Sampling Procedure

The testing coordinator of the district of study was contacted. She was able to provide the SAT 10 data for those students who participated in both the 2007 summer program and the 2008 summer program. This was done using the district's student information system. Once this list was exported into a spreadsheet, the district testing coordinator assigned each student a random identification number and their full name

was deleted for security purposes. The list consisted of over 200 students. However, many students were eliminated from the list because they had incomplete SAT 10 scores for either one or both of the years being studied. The list then consisted of 161 students. Of the 161 students on the list, 102 were African American students and 57 were white students. Thirty students were randomly selected from both of these two subgroups using a randomizing website (Research Randomizer, 2010). Once these two subgroups were identified, the subgroup of Special Education was randomly pulled from the complete student list consisting of all 161 students. Forty-five of these students qualified for Special Education services and 30 of those students and their data were randomly selected using the randomizing website. Finally, the fourth subgroup was selected from the entire 161 student list. There were 98 students that qualified for free and reduced lunch services based on their family's SES. Thirty of those students were randomly selected using the randomizing website. Once all of the subgroups were randomly selected, the student's 2007 SAT 10 scores were compared to their 2008 SAT 10 scores to analyze student achievement for each of the respective summer programs. The three subtests that were analyzed for both years were NCE Reading Comprehension, NCE Total Mathematics, and NCE Complete Battery.

External Validity of the Study

As far as external validity is concerned, there is little concern because at no time did the students participating in the district summer school programs know that they were part of a study. In fact, all of the data and parameters of the study were designed after the completion of the 2008 summer program. At no time were the students asked to participate in either of the district's summer programs in place during 2007 or 2008. The

decision to participate in both the 2007 and 2008 summer programs was strictly voluntary. Only the testing coordinator for the district being studied knew that this study took place until the study was completed.

One area that is a concern is the area of multiple treatment interference. The district being studied decided to change from a four-week summer program in 2007 to a six-week program in 2008. This extended the number of attendance days of the district summer program by nine days. One of the weeks added overlapped with Fourth of July, which is an observed holiday by the district. This however was not the only change made to the program. The district being studied decided to lengthen the day as well. In 2007, students attended summer school for three hours. With the new 2008 program, students attended the summer program for five hours. An extra enrichment class was added to the schedule as well as a half hour for lunch. The enrichment class did not focus on either math or language arts like the other two classes offered during the day. The enrichment class was intended by the district to foster positive feelings within the students attending the new summer program. In addition, breakfast was offered to students for purchase. Lunch was also provided for those who were willing to buy it or who qualified for free or reduced lunches. Neither breakfast nor lunch was offered during the 2007 summer program. Since there was more than one change to the new 2008 program it is most likely that a combination of these changes could lead to an increase in student achievement. We are unable to define one change having a greater effect than another.

A final area of concern is time. More specifically it deals with the amount of time lapse between the time the students completed the summer program and the time that they took the SAT 10 test. The students take the SAT 10 test early in the fall semester of

school. This is about two months after students completed the summer program. While roughly the same amount of time passed between both summer school programs and the time that the students were given the assessment instrument, it could be that the results may have been more relevant had the students been given the SAT 10 test closer to the end of the summer school program. However, the SAT 10 was given to students early in the fall, before they had much instruction from the regular school year.

Considerations in the Study Procedure

The type of summer program was the independent variable in this research study and the SAT 10 test data was the dependent variable. In 2007 the four-week summer program was in place and in 2008 the district being studied implemented a redesigned six-week program in efforts to raise student achievement and close the achievement gap.

This study analyzed student achievement after the completion of the six-week summer program at the middle school level by comparing to SAT 10 results following student participation in the previous four-week summer program. The middle school level was chosen because the high school summer program went from a four-week program in 2007 to two, three- week programs in 2008. While students attended the program for a longer period of time each day than in 2007, the number of days that they have to attend is actually less than what they attended in 2007. However, this was not true for those students who attended both of the high school summer school sessions in 2008. The elementary summer school program has been six-weeks for the past several years so it is not new to the district at that level. Middle school was chosen mainly because this is the level that most recently made the change to a longer summer school program that was not broken up into two different sessions.

When examining at the SAT 10 test scores, the researchers chose data from three subtests. Those three subtests were NCE Reading Comprehension, NCE Total Math, and NCE Complete Battery. While there were many other subtests to choose from, these were the three subtests that best represented the goals the district being studied was trying to improve through the new summer program. The new program focused on improving reading and math scores as well as improving overall student achievement. In addition, Communication Arts and Mathematics are the two areas in which the district being studied is held most accountable for on the MAP. While the MAP is the main test that evaluates each Missouri school district, this test is not administered to students until the spring. This is approximately eight months after the students complete a district summer program. The SAT 10 test is administered roughly two months after the completion of the summer program which gives a better indication of whether or not the new district six-week summer program is increasing student achievement within the four subgroups of students.

When looking at the SAT 10 scores, the data from four subgroups were analyzed. These four subgroups are African American, White, Special Education and students who qualify for Free and Reduced Lunch. Most schools in the district being studied are consistently not making AYP in several or all of these subgroups as mandated by DESE. The district wanted to increase the student achievement in the data of these four subgroups which is one of the main reasons that they implemented the new six-week summer program.

Reliability and Validity of Instrumentation

The SAT 10 was created in 2003. It was created to "build upon the strong standard of reliability, validity, and technical excellence for which the *Stanford Achievement Test* Series is known" (Harcourt Assessment Inc., 2004, p. 5). With an ever-changing world, the tests that are used to assess the progress of students must also change. The creators of the SAT 10 pride themselves on the reliability and validity of the exam. The definition found in the SAT 10 documentation was developed using the standard for educational psychological testing. The publishers of the SAT 10, Harcourt, view validity as "an integrated and unifying concept as it relates to the development and evaluation of Stanford 10" (Harcourt Assessment, Inc., 2004, p. 45). In addition, "Harcourt's judgments about test validity are based primarily on the following sources of evidence of validity: test content, response processes, internal structure, relationships to other variables, convergent and discriminate analysis, test criterion relationships, consequences of testing" (Harcourt Assessment Inc., 2004, p. 45). Harcourt uses reliability data combined with validity evidence to create the SAT 10. It is because of these high standards that the scores from the SAT 10 can be used to make informed decisions about student achievement.

Threats to Internal Validity

There were six areas of concern when examining at the internal validity of this study. Those six areas were time, location, implementation, maturation, data collection, and role of the researcher. The first area dealt with the amount of time that passed between the end of the summer programs and the administration of the SAT 10. The SAT 10 was administered about two months after the completion of the summer program. This

was the case in both 2007 and 2008. After the completion of both programs, students that participated in the summer program had a few weeks of summer vacation left and then started the new school year in mid-August. While the time lapse between the end of the summer program and the administration of the SAT 10 test was not significant, it is still an internal validity concern.

The next area of concern was the location of the study. Every participant in the study attended one of the two district summer school sites. These were the same two sites used in the 2007 program and the 2008 program. However, the summer middle school site that each participant attended was not necessarily the same middle school that they attended during the regular school year. Participants returned to their regular year school in mid-August where they received instruction from their new teachers and started learning new curriculum. With students attending six different middle schools in the district and receiving instruction from numerous teachers, it is a possibility that these conditions may have affected the students' SAT 10 test scores.

A third area that needs to be considered is the implementation of the SAT 10 test itself. While the district has a testing window, it is the individual school's decision to decide what the testing schedule will look like. Some schools prefer to test all students in the morning while other schools have them test throughout the day. Also, the test does come with clear instructions for the administration of the test, but there are many teachers throughout the district that are administering the test to the students.

A fourth area of internal validity was the area of maturation. Each student in this study attended both the 2007 and 2008 district summer programs. While they took different SAT 10 tests after the completion of each program, they were a year older after

the completion of the 2008 program. That maturation may have led to higher achievement scores on the SAT 10 test.

A fifth threat to internal validity was the way in which the data was obtained. The testing coordinator for the district being studied was contacted. She was asked to provide SAT 10 scores for those students who participated in both the 2007 and 2008 summer programs. It is assumed that the testing coordinator extracted that information with the parameters that were given to her. There was no way to identify the students since their names were removed from the data spreadsheet to insure confidentiality.

One final threat to internal validity was the role of the researcher. Since the researcher and the companion researcher both worked in the summer program, SAT 10 data was used to eliminate any bias.

Efforts to control limitations of the study.

Incomplete data sets. Data was supplied by the district being studied for every middle school student who attended both the 2007 four-week summer program and the 2008 six-week summer program. Once this student data was received, any student that did not have complete scores for either or both of the SAT 10 subtests, were eliminated from the list. After all students with incomplete scores for either or both years were eliminated, the list showed 161 students were left and randomly selected for each of the investigated subgroups.

Confidential treatment of data. All data was collected and organized by the testing coordinator of the district being studied. The students' names were excluded from the data spreadsheets and every student was instead assigned a random number. At no time were students' names or personal information communicated to anyone else or any

other institution. There is no way that anyone could link the data received from the district being studied to an individual student.

Summary

This collaborative study analyzed whether or not the new six-week summer school program implemented by the district being studied did in fact raise student achievement compared to the four-week summer program previously in place as measured by the SAT 10. More specifically the subtests of NCE Reading Comprehension, NCE Total Math, and NCE Complete Battery were analyzed for those students who fell into four subgroups: African-American, White, Special Education, and Free and Reduced Lunch. The district of study has four qualifying subgroups based on Missouri Department of Education guidelines. The data from these four groups (African-American, White, Special Education, and Free and Reduced Lunch) were analyzed for this study. The student demographics of the district being studied consists of 82.3% White, 11.2% African American, 4.6% Asian, 1.7% Hispanic, and 0.2% Indian. (MO DESE, 2009g). However, the student demographics of the district are much different at the middle school level during the summer programs. The demographics for the summer programs are 56.3% African American, 39.5% White, 2.3% Asian, 1.4% Hispanic, and 0.5% Indian. Data were collected from the district being studied for all students who participated in the 2007, four-week summer program and the 2008, six-week summer program. Once this list was populated, 30 students were randomly chosen that met the qualifications of each of the four subgroups. A *z* test was then run to compare their SAT

10 scores for each of the three subtests in 2007 to scores from 2008. This discussion continues in Chapter 4 which includes the analysis of the statistical data related to this study.

Chapter 4: Results

In this study, a large suburban school district's summer programs were analyzed to determine if the new summer program in place created a higher level of student achievement. Prior to 2008, the district being studied had a four-week summer program in place which focused on reading, writing, and mathematics. In 2008, the district decided to change the summer program to a six-week program. While the focus was still reading, writing, and mathematics, the district made other changes as well. The day was extended by offering a third enrichment class. This enrichment class was a way to increase student interest and increase student knowledge. A third change implemented in the new program was the offering of breakfast and lunch for purchase. The 2007 summer program did not offer meals, even for purchase.

The district being studied hoped that these changes would increase student achievement by limiting summer learning loss and preparing students for the upcoming school year. Data was collected from the district for those students who participated in both the 2007 and 2008 district summer programs. The students' demographic information as well as their SAT 10 scores was collected. While data for SAT 10 subtests were collected, the NCE Reading Comprehension, NCE Total Math, and NCE Complete Battery, subtests were the subtests that were analyzed. These three areas were chosen because of the district's emphasis on reading, writing, and mathematics in both summer programs.

Participants

The same two middle school sites were used by the district for both the 2007 and 2008 summer programs. Data was collected for every student that attended both summer

programs. Once that data was collected, students were randomly selected based on their demographics. Data from four separate demographic groups were analyzed. They were African-American, White, Special Education, and Free and Reduced Lunch. These areas were chosen because it was communicated by the district that these were the areas in which they wanted to increase student achievement. These are the four main demographic groups that make-up the district being studied. Some participants could fall into more than one category. For example, any given student could fall into several subgroups including white, special education, and free and reduced lunch. The data from each randomly selected subgroup were analyzed by comparing the groups 2007 and 2008 SAT 10 scores.

Mixed Methods, Comparative Study

Research questions. This collaborative study addressed the following questions and subsequent hypotheses.

1. Do any of the subgroups of students perform better on the SAT 10 test after completing the six-week summer program when compared to their scores following their previous participation in a four-week summer program?
2. Do any of the subgroups of students show a significant gain in the SAT 10 sub categories of Reading Comprehension, Total Math, or Complete Battery following participation in the six-week summer program?

Hypotheses

Null hypothesis 1. For the African American subgroup, student scores achieved on the SAT 10 following attendance in the six-week summer program will show no

significant difference when compared to student scores achieved following attendance in the four-week summer program.

Null hypothesis 2. For the White subgroup, student scores achieved on the SAT 10 following attendance in the six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program.

Null hypothesis 3. For the Special Education subgroup, student scores achieved on the SAT 10 following attendance in the six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program.

Null hypothesis 4. For the Free and Reduced Lunch subgroup, student scores achieved on the SAT 10 following attendance in the six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program.

A two-tailed *z* test for comparison of means was run for all four of the subgroups for each of the three SAT 10 subtests analyzed in this study. Each subgroups' 2007 SAT 10 scores were compared to their 2008 SAT 10 scores. In the area of NCE Reading Comprehension, the researcher discovered that there was no statistical increase in student achievement for any of the four subgroups. In the area of NCE Total Math, it was found that there was a statistical increase in student achievement for the African-American subgroup. Finally, in the area of NCE Complete Battery it was found that there was a statistical increase in student achievement for the Special Education subgroup. The results of these tests concluded that the null hypotheses regarding the White and Free and

Reduced Lunch subgroups should not be rejected and the null hypotheses regarding the African-American and Special Education subgroups should be rejected.

Results

A two-tailed *z* test to discover the difference between means was used to analyze the data collected from the subgroups selected for this study. The four student demographic subgroups analyzed were African-American, White, Special Education, and Free and Reduced Lunch students. Three SAT 10 subtests were analyzed for each subgroup in this study. Those subtests were NCE Reading Comprehension, NCE Total Math, and NCE Complete Battery. In addition to the results found in this study, Brian Koop designed a collaborative study to analyze the same two summer programs with similar results. However, Brian Koop focused on the summer program populations as a whole and did not break down the results by subgroup. His results are mentioned later in this chapter.

African-American subgroup. The African-American subgroup includes all students that are of the African-American ethnicity. Some of these students may also qualify for Special Education services, Free and Reduced Lunch services based on their family's socioeconomic status, or both.

***Null hypothesis*.** For the African American subgroup, student scores achieved on the NCE Reading Comprehension subtest of the SAT 10 following attendance in the six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program.

Table 4 represents the African –American subgroup results of the two tailed *z* test for the difference in means that was performed for the NCE Reading Comprehension

subtest. Scores from the students' 2008 SAT 10 were compared to their 2007 SAT 10 scores for this subtest.

Table 4

NCE Reading Comprehension African American Subgroup

	2008	2007
Mean	38.17667	34.30667
Known Variance	330	196
Observations	30	30
Hypothesized Mean Difference	0	
Z	0.924227	
P(Z<=z) two-tail	0.355368	
z Critical two-tail	1.959964	

Note. Confidence Level = .95

The z-test value for this test was 0.924227. The critical z value was 1.644854 which indicates that the null hypothesis for the African-American subgroup was not rejected and that the compared data did not show a statistically significant difference in student achievement in the area of NCE Reading Comprehension.

A two-tailed *z* test was also calculated for the data from the African-American subgroup for the NCE Total Math subtest. The results for this test are shown in Table 5. The 2008 SAT 10 scores were compared to the 2007 SAT 10 scores.

***Null hypothesis*.** For the African American subgroup, student scores achieved on the NCE Total Math subtest of the SAT 10 following attendance in the six-week summer

program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program.

Table 5

NCE Total Math African American Subgroup

	2008	2007
Mean	35.77333	30
Known Variance	111	114
Observations	30	30
Hypothesized Mean Difference	0	
Z	2.108123	
P(Z<=z) two-tail	0.03502	
z Critical two-tail	1.959964	

Note. Confidence Level = .95

Unlike the results of the NCE Reading Comprehension test, Table 5 shows that the null hypothesis was rejected and that there was a statistically significant difference in student achievement in regards to the African-American subgroup. The *z* test value of 2.108123 was greater than the critical *z* value of 1.959964 which indicates rejection of the null hypothesis. This indicates support for a statistically significant difference in student achievement for this subgroup in the area of NCE Reading Comprehension.

Since there was a significant increase in student achievement in the area of NCE Total Math, further investigation was done. Both of the SAT 10 math subtests were analyzed to see more specifically where the increase in student achievement took place. One of the math subtests is NCE Math Problem Solving. The results for the *z* test for

difference in means regarding the data from the African-American subgroup are represented in Table 6.

***Null hypothesis*.** For the African American subgroup, student scores achieved on the NCE Math Problem Solving subtest of the SAT 10 following attendance in the six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program.

Table 6

NCE Math Problem Solving African American Subgroup

	2008	2007
Mean	34.90333	32.13667
Known Variance	170	121
Observations	30	30
Hypothesized Mean Difference	0	
z	0.888323	
P(Z<=z) two-tail	0.374367	
z Critical two-tail	1.959964	

Note. Confidence Level = .95

The z test value of 0.8883232 falls outside the critical region indicated by the *z* score of 1.959964. Therefore, it was confirmed that the null hypothesis was not rejected and there was no statistically significant difference in student achievement in the area of NCE Math Problem Solving.

The other math subtest was analyzed as well. This subtest was NCE Math Procedures. Table 7 shows the results of the two-tailed *z* test for the difference in means

performed for this subtest. The 2008 SAT 10 scores were compared to the 2007 scores for the African-American subgroup.

***Null hypothesis*.** For the African American subgroup, student scores achieved on the NCE Math Procedures subtest of the SAT 10 following attendance in the six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program.

Table 7

NCE Math Procedures African American Subgroup

	2008	2007
Mean	38.61667	30.53667
Known Variance	135	162
Observations	30	30
Hypothesized Mean Difference	0	
z	2.567993	
P(Z<=z) two-tail	0.010229	
z Critical two-tail	1.959964	

Note. Confidence Level = .95

The *z* test value for this two-tailed *z* test was 2.567993. This indicates the rejection of the null hypothesis and support for a statistically significant difference in student achievement for the NCE Math Procedures subtest, since the *z* critical value was 1.959964. These findings also support the statistically significant increase in student achievement for the NCE Total Math subtest.

The final subtest that was analyzed for the African-American subgroup was NCE Complete Battery. This test summarizes the overall achievement of the SAT 10 subtests. The scores were analyzed with a two-tailed *z* test for difference in means and the results are described in Table 8.

***Null hypothesis*.** For the African American subgroup, student scores achieved on the NCE Complete Battery of the SAT 10 following attendance in the six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program.

Table 8

NCE Complete Battery African American Subgroup

	2008	2007
Mean	38.48	34.61333
Known Variance	101	107
Observations	30	30
Hypothesized Mean Difference	0	
z	1.468472	
P(Z<=z) two-tail	0.141976	
z Critical two-tail	1.959964	

Note. Confidence Level = .95

The *z* test value of 1.468472 for this test fell outside the *z* critical range indicated by the value of 1.959964. Therefore this test did not show a rejection of the null hypothesis and did not support a significant difference in student achievement for the African-American subgroup. The data from the African-American subgroup was

analyzed in order to see if this subgroup showed a statistically significant increase in student achievement by participating in the six-week summer program that was implemented in 2008 by the district being studied.

In summary, for the African-American subgroup, these hypotheses were examined:

Null hypothesis 1. For the African American subgroup, student scores achieved on the SAT 10 following attendance in the six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program.

Alternative hypothesis 1. For the African-American subgroup, student scores achieved on the SAT 10 following attendance in the six-week summer program will show a significant difference when compared to student scores achieved following attendance in the four-week summer program.

For this subgroup, the null hypothesis was rejected and the alternative hypothesis was supported. While the data from the African-American subgroup did not show a statistically significant increase in student achievement on the NCE Reading Comprehension and NCE Complete Battery subtests, a statistically significant increase was discovered for the NCE Total Math subtest. When analyzed further, the data from this subgroup also showed a statistically significant increase on the NCE Math Procedures subtest. This data indicates that the six-week summer program implemented in 2008 may have had a positive effect on student achievement for the African-American subgroup for some sub-categories.

White subgroup. The students in the White subgroup included those students of white ethnicity. However, students in this subgroup may have also qualified for Special Education services and/or Free and Reduced Lunch services. These two other subgroups are discussed later in this chapter.

***Null hypothesis 2*.** For the White subgroup, student scores achieved on the SAT 10 following attendance in the six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program.

The SAT 10 NCE Reading Comprehension subtest was analyzed by comparing 2008 scores to 2007 scores for those students in the white subgroup. A two-tailed *z* test for the difference in means was run and the results are outlined in Table 9.

***Null hypothesis*.** For the White subgroup, student scores achieved on the NCE Reading Comprehension subtest of the SAT 10 following attendance in the six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program.

Table 9

NCE Reading Comprehension White Subgroup

	2008	2007
Mean	42.02333	35.19333
Known Variance	273	229
Observations	30	30
Hypothesized Mean Difference	0	
z	1.669665	
P(Z<=z) two-tail	0.094986	
z Critical two-tail	1.959964	

Note. Confidence Level = .95

The critical value for the *z* test was 1.959964. Since the *z* test value of 1.669665 falls outside of the critical range indicated, the researcher concluded that the null hypothesis was not rejected and that the 2008 summer program did not significantly increase student achievement in the area of NCE Reading Comprehension for the white subgroup. This information provides support for the null hypothesis.

The next area that was examined for the White subgroup was the NCE Total Math subtest. A *z* test for difference in means was run and the results are portrayed below in Table 10. Again, the results represent the White subgroup students.

***Null hypothesis*.** For the White subgroup, student scores achieved on the NCE Total Math subtest of the SAT 10 following attendance in the six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program.

Table 10

NCE Total Math White Subgroup

	2008	2007
Mean	34.8	33.16667
Known Variance	160	174
Observations	30	30
Hypothesized Mean Difference	0	
z	0.489511	
P(Z<=z) two-tail	0.62448	
z Critical two-tail	1.959964	

Note. Confidence Level = .95

For NCE Total Math the *z* test value of 0.489511 falls outside the critical range indicated by the *z* critical value of 1.949964. This indicates that the null hypothesis was not rejected and that data from the White subgroup students did not support significant gains in student achievement after completing the 2008 summer school program. This data also supports the null hypothesis for the White subgroup.

The final *z* test for difference in means that was conducted for the data from the White subgroup was for the NCE Complete Battery subtest. Table 11 represents the data found when analyzing the White-subgroup scores for this test using a *z* test.

***Null hypothesis*.** For the White subgroup, student scores achieved on the NCE Complete Battery subtest of the SAT 10 following attendance in the six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program.

Table 11

NCE Complete Battery White Subgroup

	2008	2007
Mean	39.73333	34.65
Known Variance	83	140
Observations	30	30
Hypothesized Mean Difference	0	
z	1.864476	
P(Z<=z) two-tail	0.062255	
z Critical two-tail	1.959964	

Note. Confidence Level = .95

Table 11 shows that the *z* test value of 1.864476 falls outside the critical range indicated by the *z* critical value of 1.959964. This indicates that null hypothesis was not rejected and that the data following the 2008 summer program did not support a significant increase in student achievement for the White subgroup on the NCE Complete battery subtest. In summary, data from the White subgroup was analyzed by running three *z* tests in order to determine if this subgroup showed a statistically significant increase in student achievement after participating in the six-week summer program.

In the area of the White subgroup, the following hypotheses were examined:

Null hypothesis 2. For the White subgroup, student scores achieved on the SAT 10 following attendance in the six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program.

Alternative hypothesis 2. For the White subgroup, student scores achieved on the SAT 10 following attendance in the six-week summer program will show a significant

difference when compared to student scores achieved following attendance in the four-week summer program.

All three *z* tests showed that the data from the White subgroup did not increase student achievement after completing the six-week summer program implemented in 2008 by the district being studied. Therefore, the null hypothesis has not been rejected.

Special Education subgroup. Students who fall into the Special Education subgroup qualifying for services have been evaluated by the Special School District and received services from them. Each child had an IEP. This was determined sometime during the regular school year and not during the summer program implemented by the district. Students who belong in this subgroup also fall into at least one of the other subgroups analyzed in this study. Every student that was randomly selected for the Special Education subgroup was of African-American or White ethnicity. In addition, these students may or may not also fall into the Free and Reduced Lunch subgroup.

***Null hypothesis 3*.** For the Special Education subgroup, student scores achieved on the SAT 10 following attendance in the six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program.

Table 12 displays the data gathered by running a two-tailed *z* test for the difference in means for the SAT 10 subtest, NCE Reading Comprehension. The 2008 NCE Reading scores of the students that fall into the Special Education subgroup were compared to their 2007 NCE Reading scores to determine if the six-week summer program increased student achievement in this area.

***Null hypothesis*.** For the Special Education subgroup, student scores achieved on the NCE Reading Comprehension subtest of the SAT 10 following attendance in the six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program.

Table 12

NCE Reading Comprehension Special Education Subgroup

	2008	2007
Mean	34.84333	29.33667
Known Variance	248	143
Observations	30	30
Hypothesized Mean Difference	0	
z	1.52532	
P(Z<=z) two-tail	0.127179	
z Critical two-tail	1.959964	

Note. Confidence Level = .95

The *z* test value of 1.52532 falls outside the critical region indicated by the *z* critical value of 1.959964. Therefore, the null hypothesis is not rejected and there is support for the conclusion that students in the Special Education subgroup did not show a statistical gain in student achievement for NCE Reading Comprehension.

NCE Total math was the next SAT 10 subtest that was analyzed with the data from the Special Education subgroup. Table 13 shows the data that was analyzed based on the two-tailed *z* test. Again, 2008 scores were compared to 2007 scores for the students who fall into the Special Education subgroup.

***Null hypothesis*.** For the Special Education subgroup, student scores achieved on the NCE Total Math subtest of the SAT 10 following attendance in the six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program.

Table 13

NCE Total Math Special Education Subgroup

	2008	2007
Mean	34.07667	28.70667
Known Variance	194	110
Observations	30	30
Hypothesized Mean Difference	0	
z	1.686934	
P(Z<=z) two-tail	0.091616	
z Critical two-tail	1.959964	

Note. Confidence Level = .95

The z test value for this test was 1.644854. This fell outside the critical range indicated by the *z* critical value of 1.959964. Based on these results, the researcher concluded that the null hypothesis was not rejected and the data from the Special Education subgroup supports that there was not a statistically significant improvement in the area of NCE Total Math after participating in the six-week summer program.

The final SAT 10 subtest that was analyzed for the Special Education subgroup was NCE Complete Battery. The results of this two-tailed *z* test for the difference of means are presented in Table 14.

***Null hypothesis*.** For the Special Education subgroup, student scores achieved on the NCE Complete Battery subtest of the SAT 10 following attendance in the six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program.

Table 14

NCE Complete Battery Special Education Subgroup

	2008	2007
Mean	36.36	30.57
Known Variance	144	117
Observations	30	30
Hypothesized Mean Difference	0	
z	1.962994	
P(Z<=z) two-tail	0.049647	
z Critical two-tail	1.959964	

Note. Confidence Level = .95

For this two-tailed *z* test, the *z* test value was 1.962994. This score does fall within the critical region indicated by the critical *z* value of 1.959964. Therefore, the null hypothesis was rejected, which means data for students in the Special Education subgroup supports a statistically significant difference in student achievement in the area of NCE Complete Battery.

The NCE Complete Battery subtest is a copulated score of how the students did on the entire SAT 10. Since the data from the Special Education subgroup showed a statistically significant increase in student achievement for the NCE Complete Battery

subtest, a two-tailed *z* test for difference in means was performed for each of the SAT 10 subtests. When analyzed further, the data from this subgroup also showed a statistically significant increase on the NCE Math Procedures subtest. The results for this two-tailed *z* test are located in Table 15.

***Null hypothesis*.** For the Special Education subgroup, student scores achieved on the NCE Math Procedures subtest of the SAT 10 following attendance in the six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program.

Table 15

NCE Math Procedures Special Education Subgroup

	2008	2007
Mean	39.13667	31.72
Known Variance	218	157
Observations	30	30
Hypothesized Mean Difference	0	
z	2.09775	
P(Z<=z) two-tail	0.035927	
z Critical two-tail	1.959964	

Note. Confidence Level = .95

The *z* test value of 2.09775 for this two-tailed *z* test was greater than the *z* critical value of 1.959964. This indicates that the null hypothesis was rejected and there was support for a statistically significant difference in student achievement in the area of NCE Math Procedures.

Analyzing the Special Education subgroup was one way to decide if the six-week summer program implemented by the district being studied increased student achievement significantly or not.

In summary, in the area of the Special Education subgroup, the following hypotheses were examined:

***Null hypothesis 3*.** For the Special Education subgroup, student scores achieved on the SAT 10 following attendance in the six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program.

Alternative hypothesis 3. For the Special Education subgroup, student scores achieved on the SAT 10 following attendance in the six-week summer program will show a significant difference when compared to student scores achieved following attendance in the four-week summer program.

For this subgroup, the null hypothesis was rejected in favor of the alternative hypothesis. While the Special Education subgroup did not show a statistically significant increase in student achievement on the NCE Reading Comprehension or the NCE Total Math subtests, they did show a statistically significant increase on the NCE Complete Battery subtest. Upon further investigation, the researcher found that the Special Education subgroup also showed a statistically significant increase on the NCE Math Procedures subtest. This data suggests that the six-week summer program implemented in 2008 had a positive effect on student achievement for the Special Education students in some of the sub-categories tested.

Free and Reduced Lunch subgroup. The Free and Reduced Lunch subgroup included students that come from low socioeconomic households. Each fall when the new school year starts, families are given an option to fill out a form describing their socioeconomic situation. If the family qualifies, their children will receive either free lunch each day or lunch at a reduced price. The students that are categorized in this subgroup may also be a part of at least one other subgroup that was analyzed in this study. Each student in this study also fell into either the African-American or White subgroup. In addition, these students may also qualify for Special Education services and have an IEP.

Null hypothesis 4. For the Free and Reduced Lunch subgroup, student scores achieved on the SAT 10 following attendance in the six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program.

The first SAT 10 subtest that was used to analyze the data from the Free and Reduced Lunch subgroup was the NCE Reading comprehension subtest. Table 16 shows the results of the two-tailed *z* test difference between means that compared the subgroups 2007 and 2008 NCE Reading Comprehension SAT 10 scores.

Null hypothesis. For the Free and Reduced Lunch subgroup, student scores achieved on the NCE Reading Comprehension subtest of the SAT 10 following attendance in the six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program.

Table 16

NCE Reading Comprehension F/R Lunch Subgroup

	2008	2007
Mean	39.50333	35.33
Known Variance	330	196
Observations	30	30
Hypothesized Mean Difference	0	
z	0.996669	
P(Z<=z) two-tail	0.318925	
z Critical two-tail	1.959964	

Note. Confidence Level = .95

The results of the two-tailed *z* test show that the *z* test value is 0.996669. This value falls outside the critical region indicated by the critical *z* value of 1.959964. It can then be concluded that the null hypothesis was not rejected and that data supports that the six-week summer program did not significantly increase the student achievement of the Free and Reduced Lunch subgroup.

NCE Total Math was the next SAT 10 subtest to be analyzed. Table 17 exhibits that data that was found when a two-tailed *z* test was calculated using the Free and Reduced Lunch subgroup's 2008 and 2007 NCE Total Math scores.

***Null hypothesis*.** For the Free and Reduced Lunch subgroup, student scores achieved on the NCE Total Math subtest of the SAT 10 following attendance in the six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program.

Table 17

NCE Total Math F/R Lunch Subgroup

	2008	2007
Mean	34.57667	30.70667
Known Variance	111	114
Observations	30	30
Hypothesized Mean Difference	0	
z	1.413124	
P(Z<=z) two-tail	0.157619	
z Critical two-tail	1.959964	

Note. Confidence Level = .95

The Free and Reduced Lunch subgroup did not show a significant increase in student achievement after participating in the six-week summer program. The *z* test value for this two-tailed *z* test was 1.413124. This value falls outside the critical region indicated by the critical *z* value of 1.959964. So, the null hypothesis was not rejected and there is not support for a significant increase in student achievement on the NCE Total Math category for the Free and Reduced Lunch subgroup.

The final subtest that was analyzed was the NCE Complete Battery subtest. Table 18 shows the results when a two-tailed *z* test for the difference in means was performed with the data from the Free and Reduced Lunch subgroup's 2007 and 2008 NCE Complete Battery scores.

***Null hypothesis*.** For the Free and Reduced Lunch subgroup, student scores achieved on the NCE Complete Battery subtest of the SAT 10 following attendance in the

six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program.

Table 18

NCE Complete Battery F/R Lunch Subgroup

	2008	2007
Mean	38.15333	35.53
Known Variance	101	107
Observations	30	30
Hypothesized Mean Difference	0	
z	0.996282	
P(Z<=z) two-tail	0.319113	
z Critical two-tail	1.959964	

Note. Confidence Level = .95

The z test value of 0.996282 falls outside the critical region indicated by the critical *z* value of 1.959964. Therefore we will conclude that the null hypothesis was not rejected and the six-week summer program did not significantly increase student achievement in the area of NCE Complete Battery for the Free and Reduced Lunch subgroup.

In summary, the Free and Reduced Lunch subgroup was analyzed by running three *z* tests for difference in means in order to see if this subgroup showed a statistically significant increase in student achievement after participating in the six-week summer program.

In the area of the Free and Reduced Lunch subgroup, the following hypotheses were examined:

Null hypothesis 4. For the Free and Reduced Lunch subgroup, student scores achieved on the SAT 10 following attendance in the six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program.

Alternative hypothesis 4. For the Free and Reduced Lunch subgroup, student scores achieved on the SAT 10 following attendance in the six-week summer program will show a significant difference when compared to student achievement scores following attendance in the four-week summer program.

Results for all three *z* tests failed to reject the null hypothesis and verified that the data from the Free and Reduced Lunch subgroup did not support a statistically significant increase in student achievement after completing the six-week summer program implemented in 2008 by the district being studied. Therefore, the null hypothesis was not rejected for this subgroup of students.

Companion Research

A collaborative study was conducted by Brian Koop using the same population and data collection procedures. However, the analysis of student data was completed as a whole population without regard to subgroupings. The same three SAT 10 subtests were analyzed in his study. A randomly selected group of 30 students were selected to represent the 2007, four-week summer program and another randomly selected group of 30 students were selected to represent the 2008, six-week summer program. The results of the collaborative study mirrored those found in the study completed by Alicia Bottorff.

A significant increase in student achievement was documented in only one area, the NCE Total Math subtest. Table 19 shows the calculated data when a *z* test for difference in means was used to compare the 2008 NCE Total Math scores to the 2007 NCE Math Scores.

***Null hypothesis*.** Student scores achieved on the SAT 10 following attendance in the six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program, in the category of NCE Total Math.

Table 19

NCE Total Math

	2008	2007
Mean	37.73333	29.36667
Known Variance	168	87
Observations	30	30
Hypothesized Mean Difference	0	
z	2.869743	
P(Z<=z) two-tail	0.004108	
z Critical two-tail	1.959964	

Note. Confidence Level = .95

The z test value for this test was 2.869743. This value is higher than the *z* critical value of 1.959964 indicating that the null hypothesis was rejected and there was support that the overall population showed a statistically significant difference in NCE Total Math after participating in the six-week summer program. These results support the findings discussed earlier in this study.

Since the six-week summer program showed a significant increase in student achievement, Brian Koop investigated the area of math even further by running a *z* test on the NCE Math Procedures and NCE Math Problem Solving subtests. Table 20 shows the results of the *z* test that was performed on the NCE Math Procedures subtest.

***Null hypothesis 2*.** Student scores achieved on the SAT 10 following attendance in the six-week summer program will show no significant increase when compared to student scores achieved following attendance in the four-week summer program, in the category of NCE Math Procedures.

Table 20

NCE Math Procedures

	2008	2007
Mean	37.91667	31.51333
Known Variance	148.5	115.49
Observations	30	30
Hypothesized Mean Difference	0	
z	2.158604	
P(Z<=z) two-tail	0.030881	
z Critical two-tail	1.959964	

Note. Confidence Level = .95

The z test value of 2.158604 is greater than the *z* critical value of 1.959964. This means that the null hypothesis was rejected and the six-week summer program created data to support a statistically significant difference in student achievement in the area of NCE Math Procedures. This also helps to explain why student data showed a significant increase in student achievement on the NCE Total Math subtest.

The other math subtest that was analyzed was NCE Math Problem Solving. A z-test for difference in means was also run for this test in order to see if the six-week summer program resulted in a significant increase in student achievement. The results are displayed in Table 21.

***Null hypothesis*.** Student scores achieved on the SAT 10 following attendance in the six-week summer program will show no significant difference when compared to student scores achieved following attendance in the four-week summer program, in the category of NCE Math Problem Solving.

Table 21

NCE Math Problem Solving

	2008	2007
Mean	39.06333	30.33667
Known Variance	209.3	107.81
Observations	30	30
Hypothesized Mean Difference	0	
z	2.684133	
P(Z<=z) two-tail	0.007272	
z Critical two-tail	1.959964	

Note. Confidence Level = .95

Data from this final math test suggested support that the six-week summer program did show a statistically significant increase in student achievement in the area of NCE Math Problem Solving. The z test value was 2.684133 which is above the *z* critical value of 1.959964. So, the null hypothesis was rejected and there is support for an indication from the data that there was a significant difference in achievement on the

NCE Math Problem Solving subtest following the six-week summer program. This increase in student achievement also supports the increase in student achievement on the overall NCE Total Math subtest.

The study that Brian Koop conducted did not show a statistically significant increase in student achievement in the area of NCE Reading Comprehension which is consistent with this study. He also did not find a statistically significant increase in student achievement in the area of NCE Complete Battery which is inconsistent with the findings in this study. The Special Education subgroup did show a statistically significant increase in student achievement on the NCE Complete Battery subtest. However, the study performed by Brian Koop supported the findings for the NCE Total Math subtest. He also found that the six-week summer program supported an increase in student achievement. When investigated further, his results indicated that the data from the overall population showed an increase in student achievement for both the NCE Math Problem Solving and NCE Math Procedures subtests. Overall, the study performed by Brian Koop showed almost identical results found in this study.

Summary

This study was conducted using data collected from a large suburban school district in the Midwest in order to see if an increase in student achievement was achieved due to the implementation of their new six-week summer program. SAT 10 scores were used in order to determine if four different summer school subgroups showed a statistically significant increase in the area of NCE Total Math, NCE Reading Comprehension, and NCE Complete Battery. The four subgroups analyzed were African-American, White, Special Education, and Free and Reduced Lunch. The researcher found

that the data from the African American subgroup showed statistically significant gains in NCE Total Math and the data from the Special Education subgroup showed statistically significant gains in the area of NCE Complete Battery. When these tests were investigated further the researcher found that both the data from the African-American and Special Education subgroups showed statistical gains on the NCE Math Procedures subtest.

This study showed some statistically significant gains in the data for the African-American and Special Education subgroups after they participated in the six-week summer program. It was discovered that these statistical gains could be pinpointed to the area of mathematics. The next chapter further discusses these results and offers recommendations to the school district and for possible future studies.

Chapter 5: Discussion

This study analyzed a school district that made a change from a four-week summer school program to a six-week summer school program to see if student achievement would increase and if learning loss would decrease. Previous to designing the six-week program, the district initiated a study committee to research various summer programs throughout the nation and decided make changes to their four-week program based on these results. These changes included adding meal times, enrichment classes, and increasing the time spent in the summer school program. The two mean scores were compared to determine if a six-week summer school program increases language arts, math, and complete battery SAT 10 test scores more than a four-week summer school program. The independent variable was a six-week summer school program compared to a four-week summer school program. The dependent variable was the test data from the 2007 and 2008 language arts, math, and complete battery SAT 10 standardized tests. By calculating whether or not there was a statistically significant increase in student achievement using the SAT 10, district officials will be able to evaluate whether the changes made were effective.

After analyzing the data from the SAT 10 and running several two-tailed *z* tests for comparison of means, the researcher determined that the six-week summer program did make a statistically significant increase in the following subgroups' scores: African-American – NCE Total Math and NCE Math Procedures; Special Education – NCE Complete Battery and NCE Math Procedures. This complements the findings from Brian Koop, the companion researcher, as the NCE Total Math component, which includes NCE Math Procedures and NCE Math Problem Solving, of the SAT 10 was the only area

that showed a statistically significant increase after student participation in the six-week summer program. However, there was an inconsistency in the researcher and companion researcher's studies; while the researcher found a statistically significant increase in the NCE Complete Battery for the Special Education subgroup, the companion researcher did not find a statistically significant increase on the NCE Complete Battery after the six-week summer program as a whole.

The two following research questions were presented in the researcher's study:

1. Do any of the subgroups of students perform better on the SAT 10 test after completing the six-week summer program when compared to their scores following their previous participation in a four-week summer program?

2. Do any of the subgroups of students show a significant gain in the SAT 10 sub categories of Reading Comprehension, Total Math, or Complete Battery following participation in the six-week summer program?

To answer research question one, the researcher found that the Special Education subgroup had the best performance on the SAT 10 test after completing the six-week summer program. This subgroup did not only demonstrate statistically significant gains on the NCE Math Procedures subtest, but this group also made significant increases in the NCE Complete Battery scores. A second subgroup, the African-American subgroup also showed a great increase in performance. After the six-week summer program, this subgroup made statistically significant gains on not only the NCE Math Procedures subtest, but also on the NCE Total Math subtest.

Answering research question two, two subgroups showed significant gains on the SAT 10 subtests following participation in the six-week summer program. The African-

American subgroup showed a statistically significant increase on the NCE Math Procedures and NCE Total Math subtests and the Special Education subgroup showed a statistically significant increase on the NCE Math Procedures and NCE Complete Battery subtests following participation in the six-week program..

Implication for Effective Schools

This study showed that after analyzing the SAT 10 scores, students showed a gain in student achievement after completing the six-week summer session. There was a statistically significant increase in student achievement in the area of NCE Total Math for the African-American and Special Education subgroups, and an increase in NCE Complete Battery for the Special Education subgroup. This information should be considered when making decisions or modifications to the district summer program.

The review of literature discussed school districts nationwide and the different formats and structures of successful summer school programs. The literature also stated that most districts saw an increase in the area of math, which also supports the data found in this study. Because the SAT 10 is a nationally normed test, the district can be assured that this study is an accurate and reliable form of evaluation for student achievement.

According to the data from this study and from the literature review, productive and effective school districts should have summer school programs in place to not only ensure that student learning loss is limited, but to also ensure that student achievement increases. The gains made in this study were statistically significant just looking from the 2007 summer program to the 2008 summer program. If multiple years of SAT 10 data and summer programs were analyzed, it can only be assumed that the gains would

continue to increase from year to year. This could mean strong academic gains for the students involved in the summer programs.

An unexpected finding in the study was the fact that SAT 10 scores only increased in the area of math and not in the area of reading comprehension. This implies that reading comprehension instruction needs to be more of a focus in the communication arts classrooms in the summer program. Teachers may be focusing on other areas of communication arts, such as grammar or writing, while comprehension skills and decoding should be the main area of focus for student achievement to rise. Districts may consider streamlining the communication arts curriculum for the summer program, creating a common curricular program that enables all teachers to teach identical curriculum, and/or providing specialized staff development for the communication arts teachers.

Based on the SAT 10 achievement data analyzed in this study, some stakeholders may not see a reason to continue the summer program based on the SAT 10 achievement data only increasing scores in the achievement area of math. However, the survey data presented in the companion research by Brian Koop indicates that the overall perception from parents, students, and staff was a positive one and those groups saw the program as beneficial.

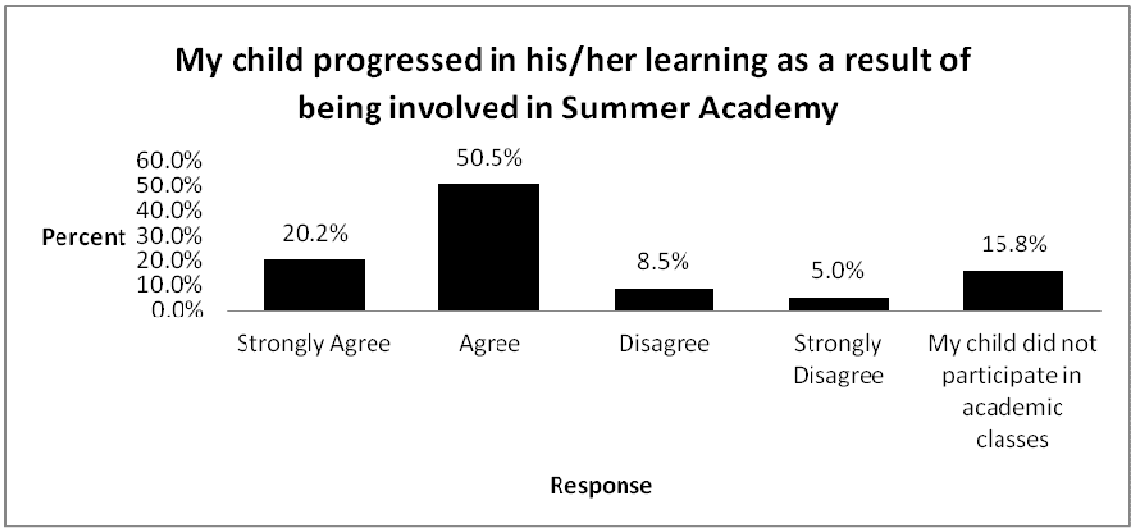

Figure 1. Parent Perception - Progression in Learning

Parent perception of the program was positive as 70.7% of the parents that took the survey indicated that their child showed progression as a result of attending the academy. This supports the data from this study and from the literature review. Attending school during the summer increases student learning.

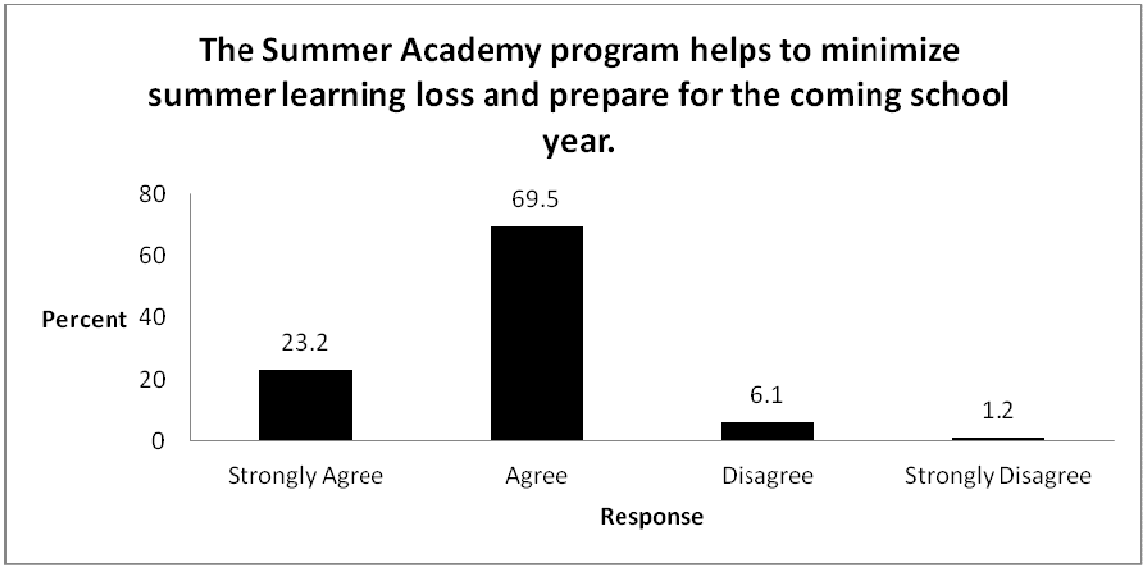

Figure 2. Staff Perception - Minimize Summer Learning Loss

Staff perception of the program was positive as 92.7% of the staff that took the

survey indicated that summer learning loss was minimized and students were prepared for the upcoming school year. This supports data from this study and from the literature review. Attending school during the summer keeps students immersed in instruction and helps learning.

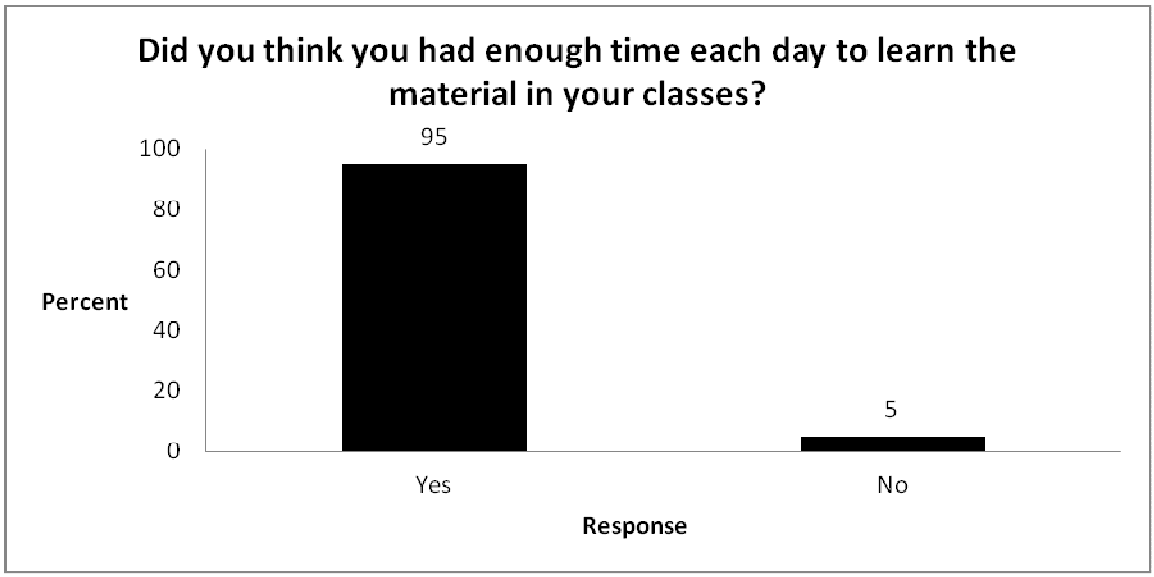

Figure 3. Student Perception - Adequate Amount of Instructional Time

Student perception of the program was positive as 95% of the students that took the survey indicated that enough time was given in class for material to be mastered and for learning to take place. This supports data from this study and from the literature review. Attending school during the summer gives the opportunity for curriculum concepts to be mastered.

Recommendations

Factors to include in future studies. One item to consider regarding this study is the student population data that was analyzed. Although a random sample of summer students were studied, students attending the program were invited to attend based on academic achievement or lack thereof. Parents and students then had the choice to accept

the invitation or decline. This study and the review of literature demonstrates that students with lower-socioeconomic backgrounds suffer greater from summer learning loss and consequently benefit the most from a summer program. It is recommended that districts deliberately select students to participate in the summer program based upon many forms of standardized data to help those students' scores increase to a proficient level. Several different methods of communication should take place with parents and students such as meetings, open forums, town hall meetings, emails, letters, etc. to explain the importance of student participation in the program.

A second item to consider is that the SAT 10 is administered in the fall, shortly after the completion of the summer program. Students may score well on this test but then experience regression as the school year goes on, and further assessments are given on new concepts and material. It is recommended that students that participate in the summer program be assigned a mentor from the summer program faculty and have opportunities for extra help sessions or support conversations with that mentor. It is also recommended that common assessments be analyzed and assessed throughout the year, and that curriculum is possibly modified and students are allowed to be taught and assessed again based on the student data from these assessments. This will help stop the gap from continuing to increase throughout the year.

Another item to consider is how the district can focus on the other area of the SAT 10 and make changes in the summer communication arts curriculum to allow for statistically significant gains in the NCE Reading Comprehension areas of the test. The review of literature supports that districts all over the country are struggling with successful ways of increasing student achievement in this area. It is recommended that

various communication arts curriculums are analyzed and piloted to assess if reading comprehension is a focus. It is also recommended that summer program teachers should have planning time included in the summer schedule and a chance to collaborate so common curriculum and common assessments can be created, modified, discussed and analyzed during this common planning time.

A fourth item to consider is implementing a common pre and post assessment for the courses offered in the summer program. This would give all stakeholders the opportunity to see immediate results regarding the impact of the summer program. It would also provide data to the staff teaching these students in the fall and give them a starting point to continue to enhance and improve student achievement in those areas.

For future studies, it may be valuable to use a quasi-experimental design to compare the growth of the students in the summer school program with similar students who did not participate in the program. This may be a better measure of growth.

Summary

The six-week summer program did show an increase in student achievement based on the SAT 10 scores, specifically in the area of mathematics. Before making any changes to the summer program, the district may want to include some of the recommended options such as deliberately inviting students to attend the program based on standardized test data, assigning students a mentor from the summer faculty, implementing common curriculum and common assessments, including common planning time during the summer program, creating a standardized pre and post test to assess the current student achievement of the participating students, and comparing the results to students not participating in the summer program. Implementing some or all of

these recommendations and assessing current data each summer may give the district a more clear direction of how it wants to continue to enhance and grow the six-week summer program.

Appendix A
Statistical Tables

Descriptive Statistics

Table A1
NCE Reading Comprehension Results

	2008	2007
Mean	40.34	34.87
Known Variance	283	237
Observations	30	30
Hypothesized Mean Difference	0	
Z	1.313852	
P(Z<=z) two-tail	0.188896	
z Critical two-tail	1.959964	

Note. Confidence Level = .95

Table A2
NCE Complete Battery Results

	2008	2007
Mean	39.40333	36.04333
Known Variance	149	82
Observations	30	30
Hypothesized Mean Difference	0	
Z	1.21086	
P(Z<=z) two-tail	0.225949	
z Critical two-tail	1.959964	

Note. Confidence Level = .95

Appendix B
Approval Forms

09-05
IRB Project Number

Lindenwood University
Institutional Review Board Disposition Report

To: **Brian Koop and Alicia Bottorff**
CC: Dr. Vitale

Congratulations! I have reviewed this revised proposal for research and it has been accepted. Thank you for the hard work that has gone into this proposal and good luck with your data analysis.

Dr. Colleen Biri 12/10/2008
Institutional Review Board Chair Date

ROCKWOOD SCHOOL DISTRICT

Growing Together, Learning for Life

Administrative Center
500 North Central
Eureka, MO 63025

(636) 938-2214
(636) 938-2347 FAX

doarbertha@rockwood.k12.mo.us

Bertha Doar, Ph.D.
Director of Data Analysis and
Quality Management

MEMORANDUM

September 5, 2008

Brian Koop / Alicia Norman
Rockwood Valley Middle School
1220 Babler Park Drive
Wildwood, MO. 63038

RE: Request for Research within the Rockwood School District
Project Title: Will the New Rockwood Summer Academy Format Increase Student Achievement?
Institutional Affiliation: Lindenwood University

I have reviewed your research request, and I see no harm in your project. You are aware of the student and staff confidentiality issues. There is little to no interference with the normal instructional time offered student participants. Since I will be providing you with the information needed student and staff privacy will be protected.

As always we would be very interested in your research results. Your research may be helpful in illuminating areas for improvement for our students. If I can be of further assistance, please let me know. Good luck in your research investigation.

Sincerely,

Bertha Doar Ph.D.
Director of Data Analysis and Quality Management
c: Dr. Carrie Luttrell, Executive Director of Curriculum, Instruction & Assessment

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Vitae

Alicia Kaye Bottorff currently serves as the Assistant Principal at Pond Elementary in the Rockwood School District and is a member of the Rockwood Summer Academy District Study Committee. Teaching experiences have included seventh and eighth grade Language Arts in the Rolla Public Schools and Rockwood School District. Specific areas of interest are in Summer School Programs, Curriculum & Instruction, and Backwards Design/Standards-Based Grading.

Educational studies have resulted in a Master of Science degree in Educational Administration from Southwest Baptist University, and a Bachelor of Science in Education degree from Missouri State University. Alicia anticipates a Doctor of Education degree from Lindenwood University in the fall of 2010.