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The Impact of Socioeconomic Status on Achievement of High School Students Participating in a One-to-One Laptop Computer Program

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The Impact of Socioeconomic Status on Achievement of High School Students Participating in a One-to-One Laptop Computer Program

By

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Abstract

The Impact of Socioeconomic Status on Achievement of High School Students Participating in a One-to-One Laptop Computer Program

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University of Nebraska, 2012

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The purpose of this study was to determine the impact of socioeconomic status on the achievement of high school students participating in a one-to-one laptop computer program. Students living in poverty struggle to achieve in schools across the country, educators must address this issue.

The independent variable in this study is socioeconomic status. Students identified low socioeconomic status (n = 21) that received free or reduced priced lunch. Students identified non-low socioeconomic status (n = 21) did not receive free or reduced price lunch. The dependent variables were student achievement on pretest eighth grade EXPLORE and posttest tenth grade PLAN and eleventh grade ACT subtest, and composite scores.

This study may provide insight into combatting the achievement gap of students struggling with poverty. Given the study outcomes, school districts may provide an increase in instructional technology as a way to improve achievement for all students.

Acknowledgements

I must admit, when I began my journey as a doctoral student five years ago, a small part of me doubted I would ever actually complete my dissertation. As my children grew older, family traversed the adoption process, job position changed, and life continued to get busier, there always seemed to be obstacles popping up, delaying the completion of this project. Today, I am proud to say that with the support of many great people I am finally completing my dissertation.

My wife recently told me she had read less than 3% of the world's population completes a doctorate of any kind. Completing a program like this would be impossible if it weren't for the support of colleagues, friends, and most important of all, family. I would like to take a few minutes to thank those people that helped keep me on track as I have traveled this journey over the last five years.

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CHAPTER ONE

Introduction

Despite the best efforts of caring educators across the country, poor and minority students continue to struggle achieving academic success (Coleman, Campbell, Hobson, McPartland, Mood, & Weinfeld, 1966; Morris & Monroe, 2009; Nasir, McLaughlin, & Jones, 2009). Academic success may be extraordinarily difficult for poor and minority students to achieve, due to the many struggles they face (Caldas, Berneier, & Marceau, 2009; Levin, 2007; Sutton & Soderstrom, 1999; Taylor, 2005). Some of these challenges include things like: living in poorer neighborhoods with fewer resources available, attending schools that are inadequately funded to meet their unique needs, living in high crime neighborhoods, lack of family support at home, poor and/or uneducated parents, lack of adequate childcare, poor or inadequate medical care, homelessness, hunger, and more (Aikens & Barbarin, 2008; Murnane 2007). Educators are continually striving to improve achievement of the students they serve, but without unique programs and opportunities the task may be too enormous for some of our neediest students.

As education has evolved, many strategies have been used to improve the quality of education and meet the unique needs of poor and minority students. Things like free and reduced lunches, before and afterschool programs, remedial and tutorial programs are all attempts at meeting the unique needs of the poor and minority students in schools (Aikens & Barbarin, 2008; Murnane, 2007; Taylor, 2005). One recent solution educators are confronting these challenges with are 1:1 laptop computer programs (Campbell & Pargas, 2003; Silvernail & Lane, 2004). As society constantly adds new technology to improve and simplify life, an educator's challenge to successfully prepare students for

21st century life becomes more complex. As mobile technology becomes more accessible to school districts and students, educators have been confronted with preparing students to live with, work on, and use technology in their education and daily lives. Blend with this the challenges faced by educators and students in schools with high concentrations of poor and minority students, and there is a very unique problem (Conger, Iatarola, & Long, 2009; Kulik, Kulik, & Cohen, 1980; Malecki & Demaray, 2006; Sutton & Soderstrom, 1999).

Research has shown students enjoy using technology (Campbell & Pargas, 2003; Inkpen, 1999). Technology is everywhere and has changed the way all of us, especially students, go through life. Students enjoy using the latest technology to perform a simple task and are many times more motivated to complete a task when given the opportunity to use technology (Clark, 1983; Inkpen, 1999). One-to-one laptop programs are spreading across the country and have been implemented from college campuses to elementary classrooms, and more schools consider 1:1 programs every day (Brown, Burg, & Dominick, 1998). In a 1:1 program every student is provided a laptop computer to keep with them twenty-four hours a day throughout the school year. Students in 1:1 programs have proven to be more motivated, regularly engage in higher level thinking skills, improve attendance, have shown improvement on standardized assessments, and increase the amount of time spent on academic projects (Carter, 2001).

The research is clear that poor and minority students continue to struggle in all academic areas (Conger et al., 2009). Research is also equally clear that all students enjoy using and perform better when given the chance to use instructional technology (Carter, 2001). Common sense says educators should look at how these two issues,

instructional technology and the underperformance of poor and minority students relate to each other. If the use of technology improves attendance, engagement, attitude, and performance; educators must consider studying how technology can and will affect the performance of poor and minority students (Carter, 2001).

Purpose of the Study

The purpose of this study was to investigate the impact of socioeconomic status on achievement of high school students participating in a one-to-one laptop computer program on tenth grade PLAN test scores and ACT college entrance exam scores.

Research Question

The following research question was used to analyze student achievement in the Westside High School 1:1 Program.

Research Question #1: Is there a difference between low SES and non-low SES on the eighth grade EXPLORE, tenth grade PLAN, and eleventh grade ACT test for:

a. English
b. Mathematics
c. Reading
d. Science
e. Composite?

Definition of Terms

Achievement Gap. Achievement gap is the gap or difference in academic achievement between poor and/or minority students and their nonminority affluent peers.

ACT Test. ACT test is the college entrance exam taken by approximately 83% of the Westside High School's graduating seniors (ACT, 2011; Westside Community Schools, 2012).

Explore Test. The Explore test is a test given in the eighth grade which predicts what a student should expect to earn on the ACT when taken later in an academic career (ACT, 2011).

High School. High school for the purpose of this study will refer to students completing grades 9-12, in a regular school setting.

Low Socioeconomic Status. Low Socioeconomic status for the purpose of the study will refer to students that receive either free or reduced price lunches through the federally funded lunch program. Families can apply for free or reduced price lunches each school year. Families with an income level at or below 130% of the poverty level are eligible for free lunch. Families with incomes between 130% and 185% of the poverty level are eligible for reduced price lunches. In 2009, the 130% of the poverty level was equal to a family income of about $27,000 for a family of four (Westside Community Schools, 2012).

Minority. Minority students for the purpose of this study will refer to any Black, Hispanic, Asian, or non-Caucasian student. Families report race and demographic information to their child's school at the beginning of each school year. All information related to race of study participants was pulled from powerschool, the district-wide student information system.

Non-low Socioeconomic Status. Non-low Socioeconomic status for the purpose of this study will refer to any student that pays full price for school lunches.

One-to-one. One-to-one (1:1) for the purpose of this study will refer to a program where every student in a school is provided with a laptop computer that they are able to use twenty-four hours a day during the school year. Laptops are distributed to all

students on the first day of school. Study participants had their latptops with them twenty-four hours a day throughout their participation in the one-to-one program.

PLAN Test. Plan test is a test given in the tenth grade year that predicts future achievement on the ACT test (ACT, 2011).

Powerschool. Powerschool is the district-wide student information system Westside Community Schools use to keep track of demographic and academic information.

Assumptions

The study has several strong features including (a) all students participating in the study were housed in the same school building; (b) all students were subject to the same district-approved curriculum/assessments, instruction, and instructional technology; (c) all students had equal access to all materials and resources within the school district; (d) all students participated in the one-to-one laptop program; and (e) all participants were new to a one-to-one program at the beginning of their high school experience. Participating students had access to a laptop computer twenty-four hours a day during their enrollment at Westside High School. This study also assumes one-to-one computers are used extensively in various Westside courses.

Limitations

This study was limited to students in a midwestern, urban school district. The study subjects *(N*=42*)* represent a naturally formed group *(n*=21*)* of students who qualify for free or reduced price lunch and a naturally formed group *(n*=21*)* of students who do not qualify for free or reduced price lunch. Students that transferred in or out of Westside High School during their high school career were excluded from participation in the

study, which could limit the validity of results being generalized to the entire school population. Another limitation of this study is that although all students are provided a laptop computer, we do not know how many of the student participants have access to the internet in their home. Using test results from one urban high school may also skew the statistical results of the study and limit the ability to generalize the findings in other settings.

Delimitations

The study was delimited to students attending an urban school district who were in attendance from eighth grade through grade twelve. The study was delimited to students who completed the Explore test in grade eight, the Plan test in tenth grade, and the ACT test at the end of the eleventh grade year.

Significance of the Study

This study contributes to research, practice, and policy. This study is critical to educators in the Westside Community Schools as there is an increasing number of students in poverty and critical to other educators as instructional technology is and will continue to evolve.

Contribution to research. A review of literature suggests that more research is needed on the connection between the achievement gap of poor and minority students, and the instructional strategies or programs that improve the academic performance of these students. This study contributes to the research related to minority and low socioeconomic status achievement gap issues. This study also contributes to the research on the impact of instructional technology on the achievement of students.

Contribution to practice. As a result of this study, the Westside Community Schools has more data and research to inform future decisions related to the one-to-one program and the achievement of poor and minority students in the district. This study contributes to Westside Community School decisions on policy, practice, and budget related to instructional technology. Results of this study will inform district administrators of the potential impact of one-to-one on students and families in poverty.

Contributions to policy. The results of this study may offer information related to the effect of the one-to-one program on the achievement of poor and minority students. Westside Community Schools will be able to use this information to modify and improve the program to meet the unique needs of all learners in the district. Results of this study will assist district administrators in determining what needs to be done next to reach the needs of poor and minority students in our district.

Outline of the Study

The literature review relevant to this research study will be presented in Chapter 2. This chapter will review the professional literature related to the achievement gap between poor and minority students and their more affluent white peers. This chapter will also review literature related to the use of instructional technology as a potential solution to the underperformance of poor and minority students. Chapter 3 describes the research design, methodology, independent variables, dependent variables, and procedures that will be used to gather and analyze the data of the study. This includes a detailed description of the participants, a complete list of the dependent variables, the dependent measures, and the data analysis used to determine if the null hypothesis is rejected for each research question.

Chapter Two

Review of Literature

To determine the affect of the one-to-one program on the achievement of Westside High School Students by socio-economic-status (SES) it is necessary to discuss an overview of achievement gap issues. The main areas of literature reviewed here are: (1) the discrepancy of performance between high SES students and low SES students, (2) the discrepancy of performance between Caucasian, African-American, Hispanic, and Asian Students, and (3) the difference between factors schools can and cannot influence related to SES and race that may be affecting student performance.

The Discrepancy of Achievement by SES

It is critical for educators and researchers to study the implications of low socioeconomic status on the performance of students when one considers it is estimated by the year 2020 about one fourth of our nation's students will be living in poverty (Malecki & Demaray, 2006; Siren, 2005). This fact is particularly concerning given the number of studies that have linked low socioeconomic status to lower academic performance and ability (Aikens & Barbarin, 2008; Caldas et al., 2009; Campbell & Ramey, 1994; Conger et al., 2009; Malecki & Demaray, 2006; Sutton & Soderstrom, 1999.). Students living in poverty are found to have consistently lower GPA's, standardized tests, reading level, and more (Conger et al., 2009; Malecki & Demaray, 2006; Sutton & Soderstrom, 1999). Contrast these studies and information with information from the National Assessment of Educational Progress that shows students attending schools in more affluent suburban neighborhoods consistently outperform students in schools with higher levels of poverty present (Siren, 2005). In 2005, Murnane

found that only 13% of students that received public assistance scored proficient on standardized tests (2007). Murnane also found that almost half (49%) of the students in poverty scored below what would be considered basic competency (2007). This data was virtually replicated by Ben Levin (2007), who studied students in Canada, and found that over a two year period only 12% of the students on public assistance passed a grade twelve writing exam. If students dealing with poverty are fortunate enough to end up attending a school with a rigorous curriculum the problem persists, as some studies have shown that in these schools as few as 5 to 10% of the student population has access to these courses, with very few of them being students living with poverty (Nasir, McLlaughlin, & Jones, 2009).

The issue of working with students living with lower socioeconomic status can be difficult for educators to plan for and address as it also creates several compounding issues as well. Students living in families with lower incomes are likely to live in homes with less books, have parents that work long hours, and spend less time reading and talking with each other each day (Aikens & Barbarin, 2008). In contrast students living in homes with two parents present did score better, and had a smaller number of students receiving free or reduced price lunch, possibly indicating having two parents may have created more income and/or supports necessary to assist students in their academic work (Bali & Alvarez, 2003). In addition students in poverty are likely to live in developments and neighborhoods that lack other necessary resources. Some of these may include, but are not limited to, neighborhoods that experience higher crime rates, have few quality childcare options, schools that tend to be under budgeted, and lack adequate materials (Aikens & Barbarin, 2008; Murnane, 2007). The lack of resources available to the

schools serving high levels of poverty stricken students is particularly troubling when one considers the fact that in many cases the academic disadvantage or struggle felt by poor students actually increases as students progress through school (Conger et al., 2009). Solutions to this problem seem daunting when the fact is the housing patterns that leave schools dealing with high levels of poverty also result in lower levels of funding for the schools needing the most resources to serve their students (Murnane, 2007). In addition to the budget concerns it has also been noted that many of these schools lack experienced, qualified teachers to work with the neediest students (Levin, 2007; Morris & Monroe, 2009; Taylor, 2005). Research has clearly linked low income to low performance, where families have fewer resources available to them (Dumka, Bonds, Gonzales, & Millsap, 2009). This could be partly due to the fact that a life of dealing with poverty leads many families and students to focus so much energy on meeting physical needs that there is little time and energy left to address academic goals and dreams (Nasir et al., 2009).

Another issue creating difficulty for educators and researchers to address is the issue of academic performance for students living in poverty is the disproportionate number of minority students living in poverty (Malecki & Demaray, 2006). Research has shown that Black and Hispanic students are more likely to be living in poverty than their White peers (Caldas et al., 2009; Conger et al., 2009; Morris & Monroe, 2009; Sanchez, Ehrlich, Midouhas, & O'Dwyer, 2009). This compounds the issue of working with students in poverty when there is also a clear link between race and achievement as well (Coleman et al., 1966; Morris & Monroe, 2009; Nasir et al, 2009). Some research even suggests one possible explanation for some of the achievement gap in socioeconomic

status may be related to the achievement gap in race, and the number of minority students also dealing with poverty (Bali & Alvarez, 2003).

The Discrepancy of Achievement by Race

David P. Gardner and the rest of the committee completing *A Nation at Risk: The Imperative for Educational Reform,* said,

> All, regardless of race or class or economic status, are entitled to a fair chance and to the tools for developing their individual powers of mind and spirit to the utmost. This promise means that all children by virtue of their own efforts, competently guided, can hope to attain the mature and informed judgment needed to secure gainful employment, and to manage their own lives, thereby serving not only their own interests but also the progress of society itself (Gardner, 1983, p.9).

Educators have known for a long time there is a discrepancy in achievement between minority and Caucasian students. Unfortunately the achievement gap exists, is growing, and still thrives today. A large achievement gap between minority students and their White counterparts is still well documented today (Caldas et al., 2009). Researchers have shown the average scores in reading and math of schools heavily populated with Black, Hispanic, and poor students are consistently lower than schools predominately White and affluent (Conger et al., 2009). A study commissioned by the Civil Rights Act of 1964, discusses at that time, most minority students were out-performed by White students the same age (Coleman et al., 1966). This study along with the Elementary and Secondary Education Act of 1965 demonstrate the idea of improving education for minority students has been a focus of education reform for many years (Murnane, 2007). Coleman and his

colleagues (1966) go on to point out in some areas the achievement gap among students actually grows as students progress through school (1966). Minority students scored lower than their White peers in all regions of the country and on all subtests. The only exception to this was with Oriental students performing well in mathematics and nonverbal ability (Coleman et al., 1966). Coleman and his colleagues go on to document the performance of students by race fell into the following order in 1966: Whites performed best, followed in order by, Orientals, Indians, Mexican Americans, Puerto Ricans, and Negroes (1966). This problem persists today as it has been documented approximately 75% of White students earn a high school diploma with the corresponding number of African American and Hispanic students earning diplomas on time being about half what their White peers achieve (Murnane, 2007). Coleman and colleagues in their 1966 study explained for some minority students the achievement gap not only existed, but grew as students progressed through school (Colemen et al., 1966). Unfortunately this problem persists today as minority students continue to perform below their White peers in areas such as: standardized test, grades, and graduation rate (Morris & Monroe, 2009). Discrepancies also exist in the percentage of students taking AP level courses and exams, which further puts minority students at risk to lag behind (Conger et al., 2009).

One potential reason for the poor performance of African American students could be society and school factors that cause African American students to disidentify with school and academics (Osborne, 1997). This phenomenon is seen where even African American students with the highest levels of academic preparation and abilities to succeed, still drop out at rates higher than their comparable White peers. Many of

these same African American students show poorer performance on Grade Point Average than their White counterparts (Osborne, 1997). Some studies have shown as African American students increase their identity with their race, achievement tends to decrease; while other studies have shown if students tie academic success to their racial identity performance has increased (Nasir et al., 2009). Researchers have found that students' perceived or actual experiences with discrimination may also be affecting their academic achievement and performance (Alfaro, Bamaca, Gonzales-Backen, Umana-Taylor, & Zeiders, 2009). One interesting point researchers have found is that many minority students have high academic desires, sometimes even greater than their White peers, but still consistently score lower then their White peers (Coleman et al., 1966; Morris & Monroe, 2009; Nasir et al., 2009). It seems schools and communities must find a way to incorporate academic success with racial identity to make positive gains (Morris & Monroe, 2009).

Unfortunately the achievement gap is not just limited to African American Students. Hispanics have been outperformed by their White peers at an increasing rate for the last ten years (Bali & Alvarez, 2003; Osborne, 1997; Sanchez et al., 2009). Latino students currently rank lower than their peers in the academic measures: grades, high school graduation, and college enrollment (Wilkins & Kuperminc, 2010). Despite the fact that Latino students account for over 40% of the nations' dropouts, Latino students only account for 17% of the school population (Dumka et al., 2009; Wilkins & Kuperminc, 2010). This problem has major ramifications for the future of many Hispanic students documented by the fact that in 2009, over 40% of Hispanics over the age of 25 did not have a high school diploma (Alfaro et al., 2009). This problem also

extends to post-secondary education where only one-third of Hispanic graduates attend post-secondary school compared to 46% of their White peers (Wilkins & Kuperminc, 2010).

One factor hindering the achievement of Hispanic and minority students may be that these students tend to live in and attend schools in areas highly concentrated with other minority students (Morris & Monroe, 2009). This would not be a problem, except many of these areas are also high poverty areas and thus end up with schools that are poorly funded, with inexperienced, undertrained staff, which of course leads to continued academic struggle (Murnane, 2007).

Research has clearly shown the achievement gap continues to be a major concern for minority families today. Minority students continue to perform below their White peers in academic performance (Siren, 2005). Minority students fortunate enough to attend a highly performing school still test at academic levels below that of their peers (Morris & Monroe, 2009). White students continue to account for disproportionate numbers of students participating in gifted and talented programs, while minority students continue to score lower than their White peers at all levels of education (Bali & Alvarez, 2003; Morris & Monroe, 2009). Unfortunately it appears the underperformance of minorities that Coleman and his colleagues studied in the mid 1960's still exists today with White students consistently performing better than minority students on academic measures (Coleman et al., 1966; Morris & Monroe, 2009).

The academic performance of students in poverty is widely documented, and must be continually studied. Students living in poverty has been proven to be a leading predictor of academic struggle or success (Caldas et al., 2009; Levin, 2007; Sutton &

Soderstrom 1999; Taylor, 2005). In addition, it has been proven schools with large numbers of students living in poverty consistently score lower than other schools working with more affluent students (Sutton & Soderstrom 1999). The struggle of students with lower SES has shown they are more likely to score lower in math, reading, acquire language skills more slowly, and have lower GPA's as they progress through school (Aikens & Barbarin, 2008; Malecki & Demaray, 2006). It seems the struggle of students in poverty is not limited to any particular course or area as it has been reported, students from lower socioeconomic status tend to score lower in all academic areas (Conger et al., 2009; Malecki & Demaray, 2006). The trend is that the academic disadvantage poor students experience increases as they progress from primary to elementary school and on into middle school. At high school this trend levels off some, possibly due to the number of students in poverty that drop out before completing high school (Murnane, 2007; Siren, 2005). The trend of underperformance of students in poverty has proven consistent from early education all the way through college entrance exams (Taylor, 2005).

Another very challenging aspect of working with families and students struggling with poverty is the cyclical nature of poverty. It is well-known that graduates earn more than non-graduates. Researchers have found that 25% of low SES families are led by at least one parent that did not graduate, and over 30% of these families struggle with unemployment (Englund, Collins, & Egeland, 2008). This is particularly troubling when it is paired with the fact that students in poverty are twice as likely to drop out of school as their affluent peers (Englund et al., 2008). Educators know the variables that predict dropout include poverty, academic achievement, behavior, and social skills (Englund et

al., 2008). The sheer lack of resources available to a family in poverty puts their students/children at risk for struggle in all of these areas (Aikens & Barbarin, 2008; Dumka et al., 2009; Murnane, 2007). Educators also know the chances for success with students in poverty are greatly increased with early intervention (Campbell & Ramey, 1994). The problem with this is that most families of poverty do not have access to the resources necessary for this early intervention, so the cycle of poverty continues (Aikens & Barbarin, 2008; Dumka et al., 2009; Murnane, 2007).

Some officials say low socioeconomic status is too extraordinary of a challenge for schools to overcome, that schools alone will not be able to help these students and families (Levin, 2007). It is true, students in poverty are at risk to be behind and lose ground on their affluent peers as they progress through school. It is also true, that higher SES students test higher and make gains faster than their poor peers (Aikens & Barbarin, 2008). Non-poor students are three times more likely to take advanced placement and honors level courses (Conger et al., 2009). Schools serving students with a large percentage of middle to high income families are twenty-two times as likely to achieve high performance consistently (Harris, 2007). All of these facts considered, educators have a responsibility to students. Educators know the problems students of poverty face. Teachers see the daily struggle of these students, as Ben Levin said, "schools did not create these problems, and on their own they cannot solve them" (2007). Schools cannot do it on their own, but research has shown schools must address the issue.

Factors Outside School Influence Related to Race and SES

Researchers have known for decades that minority and poor students are at a disadvantage. Sometimes this disadvantage even increases as students travel through

school (Coleman et al., 1966; Sutton & Soderstrom, 1999). David Gardner and his colleagues that completed the *Nation at Risk* report discuss the complexity of this issue when they say,

> The commission was impressed during the course of its activities by the diversity of opinion it received regarding the condition of American education and by conflicting views about what should be done…Schools are routinely called on to provide solutions to personal, social, and political problems that the home and other institutions either will not or cannot resolve. We must understand that these demands on our schools and colleges often exact an educational cost as well as a financial one (Gardner, 1983, p.7).

It is an unfortunate truth that many poor and minority students begin school with a disadvantage not felt by their affluent or White peers (Conger et al., 2009). It is important for educators to know even in the best circumstances the school may not be able to overcome the challenge they face related to the underperformance of minority and poor students (Harris, 2007). In some situations family/home environment may even contradict many pieces of the education system (Wilkins & Kuperminc, 2010). In situations like this, no one is saying kids cannot learn. This situation is more about the conditions they live and grow in not allowing them the freedom to focus on education (Harris, 2007). Some issues that may distract a student from education include but are not limited to: family concerns, cultural differences, job opportunities, mobility, low income level, and the affordability/availability of higher education (Sutton & Soderstrom, 1999; Wilkins & Kuperminc, 2010). Schools must plan to work with a variety of family, social, cultural, and economic backgrounds. This is particularly challenging for schools

considering the fact that variables related to family dynamics and living situations have shown drastic impact on achievement for years (Coleman et al., 1966). Many researchers even point out that our current system of accountability, NCLB, is significantly off the mark, holding schools accountable for many factors they cannot manage (Harris, 2007). One example of this would be the high concentration of minority and poverty students attending some schools (Caldas et al., 2009; Conger et al., 2009; Morris & Monroe, 2009; Sanchez et al., 2009). It is important for educators, politicians, and researchers today to know that these powerful variables outside the influence of educators have an enormous impact on academic achievement (Sutton & Soderstrom, 1999).

Socioeconomic status is one issue consistently linked to lower academic performance that schools cannot influence (Caldas, et al., 2009; Harris, 2007; Levin, 2007; Siren, 2005). Families with lower income levels have fewer resources available to them, parents are usually less educated and the physical and emotional interactions they have with children are not as beneficial as more affluent families experience (Aikens & Barbarin, 2008; Dumka et al., 2009; Harris, 2007). In addition children living in poverty frequently experience poorer nutrition, which can lead to illness and absences adding up, putting some of the neediest children at further academic risk (Harris, 2007; Nasir et al., 2009; Sutton & Soderstrom, 1999). An additional challenge faced by many families in poverty is mobility. Financial strain causes many families to move frequently, which lead to absences from schools and gaps in the curriculum children are exposed to as they move from home to home with their family (Sutton & Soderstrom, 1999).

Interactions among family members are another area linked to achievement that schools have a difficult time influencing (Dumka et al., 2009). Some researches go as far

as saying family characteristics have the largest impact on student performance, as much as two-thirds of the achievement gap may be credited to family environment (Aikens & Barbarin, 2008; Bali & Alvarez, 2003). Inexperienced and/or uneducated parents and their often unintentional poor quality parenting leads to an increased likelihood of students developing antisocial, uncooperative behaviors, which of course also lead to lower academic performance (Dumka et al., 2009). Without parental support in the home even an academically gifted student can quickly begin to flounder (Englund et al., 2008). Conversely a positive relationship with parents has proven to have a positive correlation on academic performance for all students (Aikens & Barbarin, 2008; Bali & Alvarez, 2003; Dumk et al., 2009; Malecki & Demaray, 2006). Research is consistent that higher levels of parent involvement leads to success for all students (Englund et al., 2008).

Community environment is another issue schools have little influence on. Many times minority and poor students attend schools that are underfunded due to low tax revenue, live in poor quality housing, live in high crime neighborhoods, have few quality childcare options, and have inadequate access to medical services (Aikens & Barbarin, 2008). The effects of these situations on attendance and performance is obvious, children attending these schools continue to struggle academically (Aikens & Barbarin, 2008). Another issue compounding the performance of students in these neighborhoods and schools is the fact that across the country there tends to be high concentrations of poor and minority students attending the same schools, creating additional strain on the educators serving them (Morris & Monroe, 2009; Murnane, 2007; Siren, 2005; Taylor, 2005). Siren (2005) goes on to say, "Even when the current school financing system achieves its goal of financial equity between poor and wealthy school districts, it does not

necessarily achieve a comparable ecological equity because students in poor and wealthy schools districts do not enjoy comparable living circumstances" (446).

Factors Schools Can Influence Related to Race and SES

Schools cannot overcome all the obstacles they face on their own, but progress can be made (Bali & Alvarez, 2003). Poverty, frequent behavior problems, and low academic readiness and/or ability all predict achievement struggle. Schools must use the data they have to identify and work with these families (Englund, Collins, & Egeland, 2008). To improve academic performance and reduce achievement gaps, educators must work toward leveling the playing field with all students, "Policy decisions at the local, state, and federal levels must aim at leveling the playing field" (Siren, 446, 2005). For this to be successful all constituents: schools, parents, students, governments, educators, and tax payers need to collaborate on high quality programs and services (Harris, 2007).

One area schools can easily program for increased achievement among all students is teacher training and diversity. Schools that have experienced success with minority and poor students have been able to consistently staff their classrooms with teachers highly qualified, and trained to meet the needs of the neediest students (Aikens & Barbarin, 2008; Murnane, 2007; Taylor, 2005). Schools able to provide this have consistently scored better with poor and minority students (Aikens & Barbarin, 2008). Some schools have had success with providing incentives for both students and teachers to participate in AP/Honors level courses (Conger et al., 2009; Taylor, 2005). Diversity among staff was also found to increase achievement for all students as a diverse staff lowers the likelihood minority students perceive being discriminated against (Alfaro et al., 2009; Bali & Alvarez, 2003). Students attending schools with a diverse staff, well

trained in working with poor and minority students have been proven to be more likely to see themselves and their race as academically able to succeed (Nasir et al., 2009). When schools are staffed with diversity, trained to work with challenging situations, and high academic standards including skills like: oral communications, problem solving, critical thinking, and teamwork are used, achievement increases (Harris, 2007; Morris & Munroe, 2009; Murnane, 2007).

Another area schools can influence is developing an environment where students and staff build meaningful relationships. Students do better when they feel their teachers value their effort, especially if they have a relationship with their teacher (Englund et al., 2008; Wilkins & Kuperminc, 2010). Students will connect with some peer or community group. It is critical schools connect them with groups and build relationships that will foster academic success (Nasir et al., 2009). Students that have strong relationships with teachers are more motivated, encouraged, and responsive to the guidance of their teachers, which of course leads to more academic success (Englund et al., 2008). Parent and teacher support or strong relationships with caring adults have proven to increase achievement. Schools must program and plan for caring relationships that will create academic success (Englund et al., 2008; Malecki & Demaray, 2006).

Regular attendance and access to supports in the school, community, and the home has also proven to raise achievement and is an issue schools have some level of responsibility for (Bali & Alvarez, 2003; Malecki & Demaray, 2006). All students must have equal access to qualified teachers and a rigorous curriculum for optimal results (Morris & Monroe, 2009; Nasir et al., 2009). To do this programs may need to be used where students in need are dispersed to other schools creating a more equitable

distribution of the most at risk students (Aikens & Barbarin, 2008). When programs are funded, educators and policy makers need to consider the difference between adequate and equitable funding. A high poverty, high minority school may need more than equitable funding to meet the needs of the community they serve (Morris & Monroe, 2009; Siren, 2005). For any program to be successful and improve achievement students need to attend on a regular basis (Sanchez et al., 2009). Schools must focus on ways to improve the attendance rates of minority, poor, and at risk students (Sutton & Soderstrom, 1999). One researcher found the lack of supports available to poor and minority students led to African-American Kindergarteners beginning school significantly underprepared when compared to peers. The best results for increasing the achievement of these students come when they are identified early and educators, community professionals, and families can all intervene early (Campbell & Ramey, 1994; Conger et al., 2009).

One final factor schools have some influence over when it comes to working with poor, minority, and at risk students is smaller class size and access to instructional technology (Bali & Alvarez, 2003). Research has shown keeping class sizes down makes issues more manageable and increases all students' access to direct instruction, support, and technology (Bali & Alvarez, 2003). Decreasing the class sizes of students with high levels of poor and minority students increases the amount of interaction all students have with adults, which creates stronger relationships, less confusion, and better achievement (Englund, Collins, & Egeland, 2008). Finally research has shown decreasing class size and increasing the amount of computer technology available to students raised achievement for all students fortunate enough to participate (Bali & Alvarez, 2003).

High stakes assessment and performance are not the answer. These programs only lead to a decline in achievement and an increase in resentment toward school (Wilkins & Kuperminc, 2010). It is obvious, we have all known for a long time poverty, school readiness, and race have been a solid predictor of academic success (Englund, Collins, & Egeland, 2008). To address these complex issues everyone will need to work together (Harris, 2007).

1:1 Technology Improving Achievement

Research has shown students enjoy using technology (Inkpen, 1999). From cell phones to laptop computers, students are surrounded with technology in many aspects of their lives. Students enjoy using the latest technology to perform a simple task and are many times more motivated to complete a task when given the opportunity to use technology (Campbell & Pargas, 2003; Inkpen, 1999). One example of an increasingly popular technology program is a one-to-one (1:1) laptop program. One-to-one laptop programs have been implemented from college campuses to elementary classrooms, and more schools consider 1:1 programs every day (Brown et al., 1998; Musselwhite, 1999). In a 1:1 program every student is provided a laptop computer to use during the school year. Students in 1:1 programs are more motivated, regularly engage in higher level thinking skills, improve attendance, have shown improvement on standardized assessments, and increase the amount of time spent on academic projects (Carter, 2001; Siegle & Foster, 2001). One-to-one programs foster collaborative learning. This collaboration occurs on many levels. Collaboration from teacher to student as well as student to student is increased when students and teachers have access to laptop computers (Silvernail & Lane, 2004). When implemented correctly a 1:1 program

creates a collaborative learning environment where students and teachers work together to enhance learning opportunities (Windschitl & Sahl, 2002).

In a 1:1 program where students are allowed to take computers home with them the limitations related to the hours in a school day, availability of necessary resources, and even access to the teacher are removed. Students with internet connections have instant access to unlimited amounts of resources at any time of day. From teacher websites, to simply being able to e-mail other students or teachers a laptop computer can remove limitations on a student being able to access the material or resources necessary to complete assignments (Lowther, Ross, & Morrison, 2003). Deborah Lowther, Steven Ross, and Gary Morrison even explain, "implementation of an effective lesson can be hindered when each computer has to be shared" (2003, p. 24). This research makes it clear every student should have access to computer technology to improve the learning environment (Lowther, Ross, & Morrison, 2003).

Students in 1:1 programs have improved attendance, demonstrated better organization, report spending more time working on assignments, and have increased their achievement on standardized assessments as well as teacher grades (Carter, 2001; Siegle & Foster, 2001). Seventy percent of students in the state of Maine where every seventh and eighth grade student was given a laptop report they do more school work because of having a laptop (Silvernail & Lane, 2004). Over 70% of teachers in the state of Maine report the laptops provide great motivation for at-risk students. Teachers from Maine report observing behavior, attendance, and performance all improving (Silvernail & Lane, 2004). Ninth grade students in Maine who no longer have laptops provided report, "they did more work, quicker, and of higher quality when they had laptops"

(Silvernail & Lane, p. 25). Research is clear. Students enjoy working with computers and complete more, higher quality work, when given the chance to use a computer. We have known for a long time one-on-one tutoring is the best model of education. If one-on-one tutoring, where students have unlimited access to teachers and instruction is the best model of education, one-to-one (1:1) computing, where students have the same access to mobile technology, is logically the best educational use of instructional technology (Koschmann, 1996). In a study comparing the performance of students given twenty-four hour access to laptops with students in a traditional classroom setting where computers had to be shared, teachers reported effective lessons were hindered and instructional time was lost in situations requiring students share computers (Lowther, Ross, & Morrison, 2003). In addition to the collaboration created, students perform better when given access to 1:1 technology. Students participating in 1:1 programs have performed better than other students on standardized assessments, report card grades, class rank, and GPA after using laptop computers (Gulek, 2005).

1:1 Laptop Program At Westside High School

Westside High School began our 1:1 story on September 15, 2004. On that day, approximately 1800 students became the first public school 1:1 program in Nebraska. In the seven years since the first batch of laptops were distributed many lessons have been learned, programs modified, awards won, and lessons learned. Students and staff have cried together when laptops were lost, damaged, stolen, or destroyed, and celebrated together as everyone has gained new insight into how innovative technology can change, when, where, and how learning takes place. In the Fall of 2011 Westside High School distributed a brand new batch of laptops for the third time, with the old student computers

being refurbished and sent to the middle school and elementary buildings for continued use. Students at Westside High School are given a laptop on the first day of school and they keep it with them twenty-four hours a day, seven days a week until the end of the school year. Teachers have used blackboard, wiki sites, google docs, student email, itunes, imovie, and many more hardware and software programs and webased resources to change when, where, and how learning takes place. Over the last seven school years the 1:1 program at Westside has changed how teaching and learning look. Westside Community School's dedication to being an innovator and providing the best for students is proven by the continual support of this 1:1 program.

In addition to the change in teaching and learning Westside High School has had the opportunity to host visitors from across the world studying the implementation of 1:1 technology. These presentations and collaboration opportunities have provided the chance for teachers to collaborate and share what they have learned related to instructional technology, which has only helped us improve the program at Westside. Westside has earned a school record ACT composite score, and been recognized as one of a few schools in the nation as an Apple Distinguished school five years in a row. In 2012, fifty-six schools across the nation were recognized as apple distinguished schools.

Before 1:1 was implemented at Westside affluent students with access to technology in the home were able to collaborate and create great projects and assignments. Providing all students a laptop computer has created an environment where all students can and should be held accountable to the same bar of excellence.

Chapter 3

Methodology

This chapter outlines the participants, procedures, independent variable descriptions, dependent measures, instrumentation, research questions, and data analysis.

Purpose of the study

The purpose of this study was to investigate the effect of socioeconomic status of students completing a 1:1 laptop computer initiative on student achievement as measured by tenth grade PLAN and eleventh grade ACT test scores. The results were drawn from the following assessments: EXPLORE, PLAN, and ACT tests.

Research Design

This study is a two-group pretest posttest exploratory comparative efficacy study. The study examines achievement on the eighth grade EXPLORE test, tenth grade PLAN test, and eleventh grade ACT test. Sub-test scores in English, Mathematics, Reading, Science, and total test composites scores were analyzed for all three assessments.

All student achievement data is retrospectively archival, and routinely collected school information. Permission from the appropriate school research personnel was obtained. Non-coded numbers were used to display individual de-indentified achievement data. Aggregated group data, descriptive statistics, and inferential statistical analysis were utilized and reported with means and standard deviations on tables. Raw scores were converted to percentile ranks.

Research Question

The following research question was used to analyze student achievement in the Westside High School 1:1 Program.

Research Question #1: Is there a difference between low SES and non-low SES on the eighth grade EXPLORE, tenth grade PLAN, and eleventh grade ACT test for:

a. English

b. Mathematics

c. Reading

d. Science

e. Composite?

Participants

Students participating in this study are enrolled in an Omaha area urban high school during the 2008-2009, 2009-2010, 2010-2011, and 2011-2012 school years. Each of the students participated in the school-wide 1:1 laptop computer initiative.

Forty-two students were selected for this study by identifying students that had been enrolled in the school all four years and participated in the EXPLORE, PLAN, and ACT tests. The forty-two students were divided into two groups. A naturally formed sample of low socioeconomic status students, and a randomly selected sample of non-low socioeconomic students. The naturally formed sample (n = 21) of low socioeconomic status students consists of students that have been enrolled in the school all four years, qualify for the free or reduced price lunch program, and participated in the EXPLORE, PLAN, and ACT tests. The randomly selected group of non-low socioeconomic status students (n = 21) was selected from the students enrolled in the school all four years and participated in the EXPLORE, PLAN, and ACT tests.

The gender of participants was congruent with the enrollment patterns for the school, where approximately 48% of students enrolled are female and 52% are male. The ethnicity of participants also follows the pattern of the school where approximately 15% of the participants are an ethnic minority.

Data Collection Procedures

Students were grouped into two groups based on socioeconomic status. Twenty-one students receiving free or reduced priced lunches were placed in the low socioeconomic status group. Twenty-one students were randomly selected for placement in the non-low socioeconomic status group. All of the participants in this study were enrolled in the school for all four years of high school, and have scores recorded in their cumulative file for the eighth grade EXPLORE, tenth grade PLAN, and eleventh grade ACT tests.

Achievement scores on the eighth grade pretest EXPLORE for subtests English, Mathematics, Reading, Science, and a total test composite score were compared to achievement on posttest scores for the tenth grade PLAN and eleventh grade ACT subtests English, Mathematics, Reading, Science, and total test composite score to determine if socioeconomic status had an impact on achievement.

Instruments

The EXPLORE Test

The EXPLORE test is a norm-referenced assessment taken by eighth grade students, across the nation, to assist in planning for high school courses and to assist in prediction of performance on the ACT college entrance exam. The EXPLORE test gives standardized data for the following areas: English, Mathematics, Reading, Science, and a composite score for the exam. Both raw scores and national percentile rank scores are reported for the EXPLORE test. The national percentile rank score, tells how many students scored at or below the level of the test score being examined. The exam consists of four multiple-choice sections students complete in the required time. Students are

given 30 minutes to complete 40 questions in English, 30 questions in Mathematics, 30 questions in Reading, 28 questions in Science (EXPLORE, 2011).

The PLAN Test

The PLAN test is a norm-referenced assessment taken by tenth grade students, across the nation, to assist in planning coursework for the semesters of high school, and to assist in preplanning of post-secondary options. The PLAN test gives standardized data for the following areas: English, Mathematics, Reading, Science, and a composite score for the exam. Both raw scores and national percentile rank scores are reported for the PLAN test. The national percentile rank score, tells how many students scored at or below the level of the test score being examined. The exam consists of four multiple-choice sections students complete in the required time. Students are given 30 minutes to complete 50 questions in English, 40 minutes to complete 40 questions in Mathematics, 20 minutes to complete 25 questions in Reading, and 25 minutes to complete 30 questions in Science (PLAN, 2011).

The ACT Test

The ACT test is a norm-referenced assessment taken by students across the nation to assess general education and ability to perform college level work. The ACT test gives standardized data for the following areas: English, Mathematics, Reading, Science, and a composite score for the exam. Both raw scores and national percentile rank scores are reported for the ACT test. The national percentile rank score, tells how many students scored at or below the level of the test score being examined. The exam consists of four multiple-choice sections students complete in the required time. Students are given 45 minutes to complete 75 questions in English, 60 minutes to complete 60 questions in

Mathematics, 35 minutes to complete 40 questions in Reading, and 35 minutes to complete 40 questions in Science (ACT, 2011).

Data Analysis

Dependent and Independent Measures. One dependent variable evaluated for this study is student achievement. The dependent variables are the scores on the pretest eighth grade EXPLORE sub-scores in English, Mathematics, Reading, Science, and Composite scores. Other dependent variables are posttest scores on the tenth grade EXPLORE and eleventh grade ACT sub-scores in English, Mathematics, Reading, Science, and Composite scores. The independent measure for this study include the indentification of students as either low socioeconomic status, receiving free or reduced priced lunches or non-low socioeconomic status.

Analysis. Data was analyzed using two-way analysis of variance (ANOVA). ANOVA is a parametric test of significance used to determine whether a significant difference exists between two or more means at a selected probability level. This test determined if the differences among the means represent true, significant differences or chance differences due to sampling error (Gay, Mills, & Airasian, 2006). An ANOVA was used as it is efficient and keeps the error rate under control (Gay et al., 2006). A follow-up test was completed if significance was found between groups. Due to small sample size, the significance level was .05.

The purpose of this two-group exploratory comparative efficacy study was to investigate the effect of socioeconomic status of students on student achievement over a four year period on the eighth grade EXPLORE test, tenth grade PLAN test, and eleventh

grade ACT test. Results of the study examined sub-test scores in English, Mathematics, Reading, Science, and total composite test scores for all three assessments.

Chapter 4
Results

The purpose of this two-group exploratory comparative efficacy study was to determine the effect of socioeconomic status on the achievement of students participating in a one-to-one laptop computer program. The results were drawn from the following assessments: eighth grade EXPLORE, prior to participation in the one-to one program, tenth grade PLAN test given two years into high school, and ACT test taken at the end of the eleventh grade year.

Research Question

Is there a difference between low SES and non-low SES students on eighth grade EXPLORE, tenth grade PLAN, and eleventh grade ACT?

English. There was a statistically significant main effect for time $F(2, 80) = 6.21$, $p = < .01$, $\eta^2 = .13$. Post hoc analysis indicated that EXPLORE (M = 75.50, *SD* = 22.14) was significantly higher than PLAN (M = 65.76, *SD* = 24.82) and significantly higher than ACT (M = 68.76, *SD* = 25.70) for English. There was no significant interaction between time and SES, $F(2, 80) = 2.00$, $p = .14$. There was no significant main effect for SES, $F(1, 40) = 0.09$, $p = .77$.

The means and standard deviations for English are displayed in Table 1. The ANOVA for English is displayed in Table 2.

Math. There was a statistically significant main effect for time $F(2, 80) = 6.21$, $p = < .01$, $\eta^2 = .18$. Post hoc analysis indicated that EXPLORE (M = 84.88, *SD* = 18.10) was significantly higher than PLAN (M = 79.05, *SD* = 19.04) and significantly higher than ACT (M = 77.26, *SD* = 21.15) for math. There was no significant interaction

between time and SES, $F(2, 80) = 2.00$, $p = .14$. There was no significant main effect for SES, $F(1, 40) = 0.09$, $p = .77$.

The means and standard deviations for math are displayed in Table 3. The ANOVA for math is displayed in Table 4.

Reading. There was a statistically significant main effect for time $F(2, 80) = 6.21$, $p = < .01$, $\eta^2 = .26$. Post hoc analysis indicated that EXPLORE (M = 80.86, *SD* = 19.07) was significantly higher than PLAN (M = 71.05, *SD* = 22.92) and significantly higher than ACT (M = 68.98, *SD* = 22.01) for reading. There was no significant interaction between time and SES, $F(2, 80) = 2.00$, $p = .14$. There was no significant main effect for SES, $F(1, 40) = 0.09$, $p = .77$.

The means and standard deviations for reading are displayed in Table 5. The ANOVA for reading is displayed in Table 6.

Science. There was no statistically significant main effect for time $F(2, 80) = 6.21$, $p = < .01$. There was no significant interaction between time and SES, $F(2, 80) = 2.00$, $p = .14$. There was no significant main effect for SES, $F(1, 40) = 0.09$, $p = .77$.

The means and standard deviations for science are displayed in Table 7. The ANOVA for science is displayed in Table 8.

Composite. There was a statistically significant main effect for time $F(2, 80) = 6.21$, $p = < .01$, $\eta^2 = .29$. Post hoc analysis indicated that EXPLORE (M = 82.17, *SD* = 18.73) was significantly higher than PLAN (M = 75.74, *SD* = 20.99) and significantly higher than ACT (M = 71.86, *SD* = 24.10) for composite. PLAN was significantly higher than ACT. There was no significant interaction between time and SES, $F(2, 80) = 2.00$, $p = .14$. There was no significant main effect for SES, $F(1, 40) = 0.09$, $p = .77$.

The means and standard deviations for composite are displayed in Table 9. The ANOVA for composite is displayed in Table 10.

Table 1

Descriptive Statistics for EXPLORE, PLAN, and ACT English

	EXPLORE		PLAN		ACT	
	M	SD	M	SD	M	SD
Group 1 Low SES	72.14	20.83	67.90	24.72	67.00	27.84
Group 2 Non-low SES	78.86	23.39	63.62	25.35	70.52	23.92
Total	75.50	22.14	65.76	24.82	68.76	25.70

Table 2

ANOVA for EXPLORE, PLAN, and ACT English

Source of Variation	*df*	*MS*	*F*	*p*	η^2
Between Subjects					
SES	1	124.01	0.09	.77	ns
Error	40	1454.29			
Within Subjects					
English	2	1044.63	6.21	< .01	.13
English*SES	2	326.29	2.00	.14	ns
Error	80	168.29			

ns = not significant

Table 3

Descriptive Statistics for EXPLORE, PLAN, and ACT Math

	EXPLORE		PLAN		ACT	
	M	SD	M	SD	M	SD
Group 1 Low SES	84.48	20.83	77.62	19.67	75.38	21.09
Group 2 Non-low SES	85.29	15.39	80.48	18.75	79.14	21.57
Total	84.88	18.10	79.05	19.04	77.26	21.15

Table 4

ANOVA for EXPLORE, PLAN, and ACT Math

Source of Variation	*df*	*MS*	*F*	*p*	η^2
Between Subjects					
SES	1	193.14	0.19	.66	ns
Error	40	1006.98			
Within Subjects					
Math	2	666.87	8.74	< .01	.18
Math*SES	2	24.02	0.32	.73	ns
Error	80	76.30			

ns = not significant

Table 5

Descriptive Statistics for EXPLORE, PLAN, and ACT Reading

	EXPLORE		PLAN		ACT	
	M	SD	M	SD	M	SD
Group 1 Low SES	79.24	19.50	72.05	22.66	67.19	21.59
Group 2 Non-low SES	82.48	18.97	70.05	23.70	70.76	22.80
Total	80.86	19.07	71.05	22.92	68.98	22.01

Table 6

ANOVA for EXPLORE, PLAN, and ACT Reading

Source of Variation	*df*	*MS*	*F*	*p*	η^2
Between Subjects					
SES	1	80.96	0.70	.79	ns
Error	40	1162.41			
Within Subjects					
Reading	2	1691.72	14.20	< .01	.26
Reading*SES	2	102.53	0.86	.42	ns
Error	80	119.14			

ns = not significant

Table 7

Descriptive Statistics for EXPLORE, PLAN, and ACT Science

	EXPLORE		PLAN		ACT	
	M	SD	M	SD	M	SD
Group 1 Low SES	77.95	21.92	77.10	21.54	71.24	26.06
Group 2 Non-low SES	81.00	19.58	76.71	22.73	75.29	25.89
Total	79.48	20.59	76.90	21.87	73.26	25.74

Table 8

ANOVA for EXPLORE, PLAN, and ACT Science

Source of Variation	*df*	*MS*	*F*	*p*	η^2
Between Subjects					
SES	1	157.79	0.13	.72	ns
Error	40	1189.99			
Within Subjects					
Science	2	56.64	0.28	.76	ns
Science*SES	1	966.27	3.56	.07	ns
Error	80	203.47			

ns = not significant

Table 9

Descriptive Statistics for EXPLORE, PLAN, and ACT Composite

	EXPLORE		PLAN		ACT	
	M	SD	M	SD	M	SD
Group 1 Low SES	81.29	18.53	75.52	21.33	69.43	24.79
Group 2 Non-low SES	83.05	19.34	75.95	21.17	74.29	23.74
Total	82.17	18.73	75.74	20.99	71.86	24.10

Table 10

ANOVA for EXPLORE, PLAN, and ACT Composite

Source of Variation	*df*	*MS*	*F*	*p*	η^2
Between Subjects					
SES	1	173.84	0.14	.71	ns
Error	40	1259.48			
Within Subjects					
Composite	2	1138.72	16.28	< .01	.29
Composite*SES	2	54.20	0.78	.46	ns
Error	80	69.97			

ns = not significant

Summary

There was no statistically significant difference in achievement between groups on English, Mathematics, Science, Reading, and Composite score for the EXPLORE test given in eighth grade. There was no statistically significant difference in achievement between groups on English, Mathematics, Science, Reading, and Composite score for the PLAN test given in tenth grade. Finally, there was no statistically significant difference in achievement between groups on English, Mathematics, Science, Reading, and Composite score for the ACT test given in eleventh grade.

There was statistically significant difference in achievement within both groups on English subtest from EXPLORE to PLAN, and PLAN to ACT scores. National percentile rank scores dropped significantly for the English subtest. There was statistically significant difference in achievement within both groups on mathematics subtest from EXPLORE to PLAN, and PLAN to ACT scores. National percentile rank scores dropped significantly for the math subtest. There was statistically significant difference in achievement within both groups on reading subtest from EXPLORE to PLAN, and PLAN to ACT scores. National percentile rank scores dropped significantly for the reading subtest. There was statistically significant difference in achievement within both groups on composite score from EXPLORE to PLAN, and PLAN to ACT scores. National percentile rank scores dropped significantly for the composite score. Finally, there was not a statistically significant difference in achievement within either group on science subtest score from EXPLORE to PLAN, and PLAN to ACT.

Analysis of results from the EXPLORE, PLAN, and ACT tests indicates a gradual decline in national percentile rank scores for both groups in subtests English,

Mathematics, Reading, and Composite score. National percentile rank scores for the science subtest did not show a statistically significant drop.

Chapter 5

Conclusions and Discussions

Educators across our country have prided themselves for years on helping every student grow and achieve on the next level. Whether it's helping an AP/honors student score a 3, 4, or 5 on the AP exam, or simply helping a struggling student to pass a challenging test, educators continually do what-ever it takes to help students learn. As long as educators have been working, schools have known about the challenges faced by many poor and minority students (Coleman et al., 1966). Poor and minority students face many challenges, and often times enter school with significant disadvantages not felt by affluent peers (Aikens & Barbarin, 2008). Poor and minority students face the difficult challenge of trying to navigate their way through the educational system when many basic needs for health, safety, and security are not being met (Aikens & Barbarin, 2008; Murnane 2007). Educators must ask themselves, "how am I reaching the needs of the students, families, and communities that need the most?"

The challenge of working with students in poverty is one every educator must address. The need to address this challenge is apparent when one considers the way poverty is spreading in some communities across our country (Malecki & Demaray, 2006; Siren, 2005). Knowing that poverty is spreading in many communities, and that students entering school in poverty begin behind, and often times actually loose ground with their peers makes the issue of improving education for families of poverty critical to every educator (Conger et al., 2009).

One potential solution for mitigating the needs of students struggling with poverty is the use of instructional technology (Silvernail & Lane, 2004). At Westside High School, we have been using our one-to-one laptop computer program as one of many efforts to improve education for all students. The research is obvious, students enjoy technology (Inkpen, 1999). Students participating in one-to-one programs have proven to improve attendance, engage in higher level thinking skills, and report working with academic content longer, and enjoying the learning process more, when they are given the chance to use instructional technology (Carter, 2001). A recent study conducted by the Westside Community Schools, the University of Nebraska at Omaha, and Dr. Neal Grandgenett found a correlation between the amount of time students spend on their computer and achievement at Westside high school (Grandgenett, 2008). In other words, Westside students are doing better, when they spend time using their school-provided laptops.

The purpose of this two-group exploratory comparative efficacy study was to determine the effect of socioeconomic status on the achievement of students participating in a one-to-one laptop computer program. The results were drawn from the following assessments: eighth grade EXPLORE, prior to participation on the one-to one program, tenth grade PLAN test given two years into high school, and ACT test taken at the end of the eleventh grade year. Study conclusions are presented for English, Mathematics, Science, Reading subtests as well as Composite scores on all assessments.

Conclusions

English

All study participants took the EXPLORE in eighth grade, PLAN in tenth grade, and ACT in eleventh grade. English subtest scores were analyzed from each of these tests.

Although there was not a statistically significant difference in achievement between groups (Free and Reduced lunch, and non Free and Reduced lunch students), there were multiple noteworthy findings. There was a statistically significant main effect for time $F(2, 80) = 6.21$, $p = < .01$, $\eta^2 = .13$. Post hoc analysis indicated that EXPLORE (M = 75.50, *SD* = 22.14) was significantly higher than PLAN (M = 65.76, *SD* = 24.82) and significantly higher than ACT (M = 68.76, *SD* = 25.70) for English. A decrease in national percentile rank scores from EXPLORE, to PLAN, and on to ACT test scores was not predicted and can be discouraging, but it should be noted that both percentile rank scores and raw scores on ACT test scores are consistently higher than local, state, and national averages on the ACT test (ACT, 2011). It should also be noted that there was no statistical difference in English scores between groups.

Math

All study participants took the EXPLORE in eighth grade, PLAN in tenth grade, and ACT in eleventh grade. Math subtest scores were analyzed from each of these tests.

Although there was not a statistically significant difference in achievement between groups (Free and Reduced lunch, and non Free and Reduced lunch students), there were multiple noteworthy findings. There was a statistically significant main effect for time $F(2, 80) = 6.21$, $p = < .01$, $\eta^2 = .18$. Post hoc analysis indicated that EXPLORE (M = 84.88, *SD* = 18.10) was significantly higher than PLAN (M = 79.05, *SD* = 19.04) and significantly higher than ACT (M = 77.26, *SD* = 21.15) for math. A decrease in

national percentile rank scores from EXPLORE, to PLAN, and on to ACT test scores was not predicted and can be discouraging, but it should be noted that both percentile rank scores and raw scores on ACT test scores are consistently higher than local, state, and national averages on the ACT test. It should also be noted that there was no statistical difference in math scores between groups.

Reading

All study participants took the EXPLORE in eighth grade, PLAN in tenth grade, and ACT in eleventh grade. Reading subtest scores were analyzed from each of these tests.

Although there was not a statistically significant difference in achievement between groups (Free and Reduced lunch, and non Free and Reduced lunch students), there were multiple noteworthy findings. There was a statistically significant main effect for time $F(2, 80) = 6.21$, $p = < .01$, $\eta^2 = .26$. Post hoc analysis indicated that EXPLORE (M = 80.86, *SD* = 19.07) was significantly higher than PLAN (M = 71.05, *SD* = 22.92) and significantly higher than ACT (M = 68.98, *SD* = 22.01) for reading. A decrease in national percentile rank scores from EXPLORE, to PLAN, and on to ACT test scores was not predicted and can be discouraging, but it should be noted that both percentile rank scores and raw scores on ACT test scores are consistently higher than local, state, and national averages on the ACT test. It should also be noted that there was no statistical difference in reading scores between groups.

Science

All study participants took the EXPLORE in eighth grade, PLAN in tenth grade, and ACT in eleventh grade. Science subtest scores were analyzed from each of these tests.

There was no statistically significant difference in achievement between groups (Free and Reduced lunch, and non Free and Reduced lunch students). It should also be noted national percentile rank and raw scores on ACT test scores are consistently higher than local, state, and national averages on the ACT test.

Composite

All study participants took the EXPLORE in eighth grade, PLAN in tenth grade, and ACT in eleventh grade. Composite scores were analyzed from each of these tests.

Although there was not a statistically significant difference in achievement between groups (Free and Reduced lunch, and non Free and Reduced lunch students), there were multiple noteworthy findings. There was a statistically significant main effect for time $F(2, 80) = 6.21$, $p = < .01$, $\eta^2 = .29$. Post hoc analysis indicated that EXPLORE (M = 82.17, *SD* = 18.73) was significantly higher than PLAN (M = 75.74, *SD* = 20.99) and significantly higher than ACT (M = 71.86, *SD* = 24.10) for composite. PLAN was significantly higher than ACT. A decrease in national percentile rank scores from EXPLORE, to PLAN, and on to ACT test scores was not predicted and can be discouraging, but it should be noted that both percentile rank scores and raw scores on ACT test scores are consistently higher than local, state, and national averages on the ACT test. It should also be noted that there was no statistical difference in composite scores between groups.

One possible explanation of the gradual decline in scores could be attributed to an increase in rigor related to the content of the EXPLORE, PLAN, and ACT tests. As students progress through school the rigor of the academic content covered on these exams increases. It is worth noting that although a statistically significant drop was noted for every test except Science, in many cases a students percentile rank may have dropped from the mid to high 90s to mid to high 80s. Although this reflects a drop, the percentile ranks are still relatively high.

Academic rigor may also explain why the Science subtest was the only category to not reflect a decline in national percentile rank scores. The graduation requirement at Westside High School is for students to take three years of Science including: Biology, Chemistry, and Physics or Natural Science. The vast majority of Westside High School graduates complete Physics, which is often times an elective course in high schools with similar demographics. In addition to the three years of required classes students also have the opportunity to take a wide variety of Science elective courses including: Earth and Space, Ecology, Forensic Science, Physiology, Zoology, Independent study, and honors/AP offerings of Biology, Chemistry, and Physics. It is common for many students to take four plus years worth of Science courses with the wide variety of options and unique opportunity of modular scheduling (Westside, 2011).

Another possible explanation relates to the percentage of students participating in the ACT test at Westside High School. In 2011 about 50% of high school graduates across the nation took the ACT test compared to Westside, where approximately 83% of students consistently participate in the ACT test (ACT, 2011). The decline in percentile

ranks scores could be attributed to the abnormally high percentage of Westside High School students taking the ACT.

The dip or drop on the PLAN test could be related to how seriously students take the PLAN assessment in their tenth grade year. This group of students participated in the PLAN test divided over two days. Students took part of the test on back-to-back school days, due to scheduling constraints. This put these students in the situation to take standardized tests two school days in a row. These students also consistently report they are not interested in this assessment as it does not affect quarter and/or semester grades, and it does not directly affect their scholarship and/or college prospects.

Discussion

Poverty

To effectively improve the education and performance of students in poverty, educators must know which families are struggling with this issue. This study examined the performance of students in poverty identified by their participation in the Westside Community Schools free or reduced price lunch program. This creates the possibility that families living in poverty may not be in the program if they have not applied for participation in the program. It also creates the possibility of families living with little expendable income that technically do not qualify for free or reduced lunch due to extreme family or financial circumstances. It should be noted this study revealed Westside students in poverty are learning at the same rate as students not in poverty, when some literature suggests students in poverty are at risk to lose ground throughout an educational career (Conger et al., 2009).

Although there was no statistically significant difference between low socioeconomic status students and non-low socioeconomic status student achievement on the national percentile ranks, there was a consistent pattern of lower mean national percentile rank scores in all tests for the low socioeconomic status students. English reflected an average mean difference of about 6%, Math 3%, Reading 3%, Science 3%, and Composite scores 2% difference. Although these differences are not statistically significant, educators at Westside must consider what we will do to address the performance of our students in poverty.

Students and families struggling with poverty will continue to have a tremendous impact on achievement at Westside and throughout the country (Aikens & Barbarin, 2008; Caldas et al., 2009). Research suggests family issues such as supportive two-parent homes, access to adequate resources to meet physical needs, and education level of parents and families members are one area schools and communities could increase programing to improve achievement (Aikens & Barbarin, 2008; Bali & Alvarez, 2003; Caldas et al., 2009). Programs that involve students and families early and look at social and community programs to meet physical, emotional, and academic needs have proven to get results and must be considered as Westside moves forward. The best results for increasing the achievement of students in poverty comes from early identification and intervention from educators, community professionals, and caring families (Campbell & Ramey, 1994; Conger et al., 2009).

Connectivity

This study focused on achievement of students in poverty and participating in a one-to-one laptop computer program. As the one-to-one program at Westside High School has evolved more and more content is available to students online every day. Although every student in this study and at Westside High School is provided a laptop computer for use twenty-four hours a day, how many of these students have access to internet in their home? As twenty-first century education continues to evolve, access to online resources is an area all educators must consider. This is an area Westside, and schools across the country can help with. Educators must identify families and students struggling with poverty and implement social, community, and academic programs that will support the needs of students (Malecki & Demaray, 2006). Wi-fi internet is available in places like: public libraries, Starbucks, schools, McDonalds, and more, but how many families take advantage of these locations when they have a device such as a laptop provided for by the school district. Providing a laptop for all students to use may level the playing field for students being able to use the same tool in all classes. If educators in one-to-one environments really want to ensure they are leveling the playing field and not just changing the look of the playing field, they must remain aware of how students access necessary resources and information.

One-to-One Implementation

This research study focused the effect of socioeconomic status on achievement of students participating in a one-to-one laptop program. Westside High School has implemented a one-to-one laptop program for eight years. Laptop computers, ipads, ipods, smartboards, wireless slate technology have become an integral part of the average

school day at Westside High School. Whether students enter the school as laptop/computer rookies or veterans, they leave with a wealth of experiences. Post-graduate survey information gathered by Westside High School consistently reports that over three-fourths of graduates feel having a laptop in high school was significantly important in their preparation for work and/or college. As we continue to move forward and lead other schools in their implementation of one-to-one technology Westside teachers must maintain a clear focus on quality teaching, exciting lessons, and unique ways to use the technology tools available to improve our program and achievement results.

Recommendations for Further Research

Educational researchers have written numerous articles related to technology improving motivation, attendance, behavior, collaborative opportunities, critical thinking, achievement, and more (Carter, 2001; Silvernail & Lane, 2004). This study adds to this research. Few studies have evaluated how internet access affects these issues in a one-to-one environment. This study supports the idea that one-to-one laptop programs assist all learners in gaining information equally, but does not examine differences between families that may or may not have internet access in the home. This study also does not consider a student's previous experiences with technology in the classroom and home. An examination of student's previous experiences with laptop technology in school and the home is worthy of further study.

This study was also conducted on a small sample of low socioeconomic and non-low socioeconomic status students as identified by participation in a free and reduced price lunch program. Students were selected from a Midwestern, urban school district. It

would be worth studying achievement of students in suburban, and rural settings as well as considering other ways to identify students as low or non-low socioeconomic status.

Summary

Every educator will tell you that they want to see students experience success, learn new things, and challenge themselves to do better than they are currently doing. Educating poor and minority students can produce some unique challenges. Educators must have a clear picture of what some of our poor and minority students are facing in their home environment. When a caring educator has a clear picture of the challenges faced by a student, and then has the privilege to provide resources and opportunities to meet those challenges, great learning can take place. As more families struggle with poverty every day, and twenty-first century education continues to evolve, educators must find a way to reach the students and families that need us most.

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