

PEER MENTORING: EFFECTS ON NINTH GRADE STUDENT ACHIEVEMENT

by

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Liberty University

A Dissertation Presented in Partial Fulfillment  
Of the Requirements for the Degree  
Doctor of Education

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## ABSTRACT

The purpose of this study was to examine the potential academic impact that a trained peer mentor, would have on first time ninth grade students. Specifically, the study was aimed to measure the academic performance of ninth grade students by focusing on the interim assessment, which is a summative pre and post- test aligned to End of Course Test content weights and is used to assess students at the end of each term or semester. The study addressed whether there is a difference in post-test interim assessment scores, passing rates, and numerical averages in Integrated Algebra I by examining first time ninth grade students who receive assistance from a trained mentors (Group 1) and first time ninth grade students who did not receive peer mentoring assistance. A one-variable chi square, an independent-measures, two-tailed *t*-test, and Mann-Whitney U test was used to determine if there is a difference in the two groups' (test and control) mean scores on the post-test interim assessments that both sets of first time ninth grade students will be taking at the conclusion of the fall/winter semester, as well as to determine if there is a significant improvement in the numerical averages of both test and control groups. Considering the hypothesis that first time ninth grade students will score higher on their interim assessment post-test if they are assigned a peer mentor, than those first time ninth grade students who participate in the interim assessment post-test if they are not assigned a peer mentor, the results will have probable implications for the public school system's leadership training program, as well as other leadership and peer leadership programs around the state of Georgia.

Descriptors: Peer-mentoring, ninth grade transition, leadership training

## **Dedication**

The pathway of my life has had many interesting twists and turns. There have been many doors opened, while at the same time, many doors shut. I acknowledge that Jesus Christ, my Lord and Savior is always responsible for both. I am thankful for His hand on my life, and for the opportunity to complete this great project that has been offered to me.

To Amity,

You have encouraged me to reach higher, inspired me to dig deep within myself to accomplish dreams as a husband, father, and student that would have not been possible without your support.

To Rachel, Grant, and Ella,

The three of you represent the reason why I work hard in all that I do. You each also represent my greatest reward and joy.

To Mom and Dad,

You have provided me with a foundation for success. Thank you for being so supportive and for guiding me during my most influential years.

To Grandparents,

Your lives have served as models for me as I grow. Hard work, honesty, saving money, eating vegetables, and loving family become more important to me daily, and I know from where I gained these values.

### **Acknowledgement**

As I reflect on the pathway of my life to this point, I remember the day that I made the choice to go back to school very clearly. I was intimidated by the coursework, apprehensive about the commitment, and completely unsure where I might find the time to complete such a lofty task amidst my incredibly busy schedule. Valuable time, valuable energy, and many sacrifices have been made to bring this dissertation process to fruition. I could not have done this without my wife Amity. We have been classmates in high school, in undergraduate classes, in graduate classes, and now as Ed.D candidates. You have encouraged me to reach higher, and you have inspired me to become more of a husband, father, and student than I ever would have on my own. Thank you for your support and love.

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## CHAPTER 1: INTRODUCTION

### Background

The transition from the middle school or junior high school setting to the traditional high school setting, for many rising ninth grade students, has proven to be a difficult time period academically. Research studies show, “There are strong pressures on students to find their place in a new schooling system, particularly when a number of schools feed into a single high school” (Schiller, 1999, p. 217). According to Aldine Independent School District superintendent in Houston, Texas, which operates four grade nine centers, “more 9<sup>th</sup> graders drop out of school because of school because they get lost in a large high school setting and have less attention paid to them as individuals” (Reents, 2002, p. 14). As a result of these high demands on ninth grade students, there is an urgency to utilize appropriate strategies to provide academic support. One research-based tool that educational leaders are currently implementing to address poor achievement and prevent grade retentions and dropping out of school is the use of peer mentoring programs. Peer mentoring can be implemented efficiently and “permits the efficient application of the teacher’s and peer tutor’s skills in the process of individualizing instruction and managing student’s classroom behavior” (Kohler & Greenwood, 1990, p. 307). Higgins, Branch and Bussey-Jones (2010) describe peer mentoring as a system that can determine the success or failure of a students’ academic careers. Merrill and Clark (2008) define peer mentor as “a teaching method where faculty designed experiences allows students to teach and learn from each other” (p. 200). While many ninth grade students are successful with teacher-led instruction, within the

same classroom, there are learners who require a variety of differentiated strategies, and even students with special needs who require specially designed instruction before ultimately becoming successful. The strategy of one student aiding another student academically, or even socially, has many different titles: peer mentoring, peer tutoring, peer leaders, cooperative learning pairs. All of these, though they may vary slightly, describe the process of student lead assistance.

The utilization of peer mentoring can be traced back for centuries; however there have been resurgences in recent years as educators strive to obtain tools for academic differentiation within the classroom. Byrd (1990) indicates that the use of peer mentoring techniques has gained popular support as an instructional technique only during the past 20 years; however its roots can be traced to Andrew Bell's system of education based on cross-aged mentoring. Theoretical support for the role of explanation in cooperative learning is provided by socio-cognitive theory, based on the ideas of Piaget (1926). Piaget's theories have emphasized the role of the social context in construction of knowledge and have stressed that peer interactions provide a rich and necessary context for revision of cognitive systems and creation of new meanings (Akker, Denessen, Rijit & Veenman, 2005). The large number of high school students that drop out can be directly linked to the success or failure of students in the ninth grade (Neild & Balfanz, 2006). Typically, algebra one is the mathematics course that freshman are required to enroll in during this year. This course experiences some of the highest failure rates and is typically the first mathematics course that requires mastery before students are promoted to the next grade level (Durwood, Krone & Mazzeo, 2010; Neild, 2009). Because of the increased demands on students to perform at high academic levels in math and other

subjects, the ninth grade school year calls for higher levels of intervention to decrease the number of students who are not academically successful. “Moreover, if the freshman year is a time of increased risk for students, representing a departure from previous patterns of behavior, it may also be a key point for intervention to minimize the risk of dropping out” (Neild, Stoner-Eby & Furstenberg, 2008, p. 544).

With studies showing that a quarter of all American high school students at such a risk of failure during their first year of high school, educators and parents should feel a sense of urgency to assist those who have proven to be susceptible to failure during this transition. Research by Randolph and Johnson (2008) indicates, “School-based mentoring programs have proliferated in the past decade, yet little has been done to systematically assess effective program designs or participant benefits” (p. 183). Studies show that students who participate in a school based mentoring program have increased connectedness at school (Lee & Cramond, 1999; Portwood & Ayers, 2005), and behavior (Dappen & Isernhagen, 2006; Herrera, 2004), however Randolph and Johnson (2008) report, “the findings on the effect of academic performance were mixed” (183). Students that participate in mentoring programs that began with low baseline grade point averages (GPA) indicated marked improvement compared to students who did not participate (Karcher, 2008). However, Portwood, Ayers, Kinnison, Waris and Wise (2005) demonstrate through a quasi-experimental study using a pretest to posttest control group, that students in school-based mentoring demonstrated declining outcomes. While many agree that mentoring is a good idea, little has been done to figure out the best way to train mentors or implement such a program in schools for effective academic improvement. The literature suggests, “Despite the widespread presence of mentoring within schools,

programmatic research that investigates best practices for school-based mentoring is very limited” (McQuillin, Smith & Strait, 2011, p. 846). Researchers such as Dubois (2002), Eby (2008), Karcher (2008), and Portwood and Ayers (2005) indicate that “policies promoting widespread implementation of mentoring have preceded the evidence of effectiveness of school-based mentoring” (McQuillin, Smith & Strait, 2011, p. 846). Therefore, further study is needed in the area peer mentoring to help validate its use in the classroom for the reasons of academic improvement, particularly with subgroups of students who are vulnerable such as those first time ninth grade students. If this does not occur, school systems are at risk of allocating local school funding in unproven methods, wasting precious academic time of both mentor and mentee during the school day and year, and depriving those students who are at the greatest risk for failure an opportunity to improve their academic standing.

### **Problem Statement**

The potential success of the students who enter high school depends much on what occurs in their first year of high school (Fiske, 2006; Garringer & MacRae, 2008). The chance that a high school student will receive a high school diploma on time increases when a first time ninth grade student is successful during year one (McCallumore & Sparapani, 2010). Conversely, first time ninth grade students who are unsuccessful initially, or fail course work during the freshman year are much more likely to not graduate with their classmates on time (Akker et al. 2005). Integrated Algebra I is the mathematics course that most systems required at the ninth grade level, and is one course that many freshmen are unsuccessful passing in their first attempt (Baneijee, 2011; Styron & Peasant, 2010). In fact, in some schools, nearly one half of all students who

attempt Algebra I, do not pass (Neild, 2009). This creates a clear problem for many first time ninth grade students, as this course can create a high risk of failure during their freshman year of high school, ultimately leading to devastating academic results. Research indicates that an unsuccessful 9<sup>th</sup> grade student has a greater chance of not graduating: Students that are unsuccessful in their first year of high school stand a greater chance of falling behind academically and never recovering (Bottoms, 2007). These facts indicate that the potential for first time ninth grade students to face academic problems, particularly in mathematics is very real. Furthermore, a first time ninth grade students who is unsuccessful runs a greater risk of not fulfilling his or her graduation requirements (Banejee, 2011; Styron & Peasant, 2010). Research demonstrates that the introduction of a mentor at the ninth grade level may increase academic enrichment, content knowledge, and educational success (Little, Kearney & Britner, 2010; Roberts & Cotton, 1994). However, Randolph and Johnson's (2008) review of research regarding school-based mentoring programs indicates that mentoring programs do have an effect on student attitudinal and behavioral outcomes, but the effects on academic performance were inconclusive. Therefore, this study investigated the academic effects that a trained peer mentor had on student achievement with first time ninth grade students in Algebra I, and provided further research on the topic of peer mentor and academic performance.

### **Purpose Statement**

The purpose of this study was to explore how an organized peer mentor system can affect the academic endeavors of first time ninth grade students in Algebra I. Research indicates that the use of peer mentor programs can increase school connectedness and decrease behavioral issue; however there is a need for further study in

terms of academic success (Randolph & Johnson, 2008). Because the transitional year from middle school (8<sup>th</sup> grade) to high school (9<sup>th</sup> grade) creates a scenario where “more students fail the 9th grade than any other grade level” (Dedmond, 2006, p.1), there is a clear need for intervention during this critical academic year. In improved understanding a peer mentor will assist educators who are currently seeking to establish a peer mentor system, or those who are considering the many different options that a peer mentor system can offer, particularly at the ninth grade level due to the potential for gains in academic achievement in during the ninth grade year which could lead to better academic outcomes in the later years of high school (Allensworth & Montgomery, 2009).

### **Significance of the Study**

The ninth grade year is a critical transition academically for students in high school (Styron & Peasant, 2010). According to McCallumore & Sparapani (2010), “Ninth graders have the lowest grade point average, the most classes, the majority of failing grades, and more misbehavior referrals than any other high school grade level” (p. 60). Ninth grade students are introduced to a new school environment, a new schedule structure, and new pressures from peers and these changes do affect their academic success. Researchers at Johns Hopkins University record that as many as 40% of ninth grade students in cities with the highest dropout rates repeat the grade, but a mere 10%-15% of these students ever graduate from high school (McCallumore & Sparapani, 2010). Research clearly indicates that first time ninth grade students are at high risk of academic failure; therefore, intervention at this level should be a prime concern of those who teach ninth graders, those who are involved in the development of the ninth grade curriculum, and those who create intervention programs for first time ninth grade students This study

will add to the field of knowledge that exists on potential differentiated instructional practices to aid in the transition and instruction of first time ninth grade students.

### **Research Questions**

This study was designed to answer the following questions:

**RQ1:** What is the impact of ninth grade students receiving assistance from the trained freshman friend mentor versus first time ninth grade students who do not receive peer mentoring assistance (control) on the post-test interim assessment in Integrated Algebra I?

**H<sub>01</sub>:** There will be no significant difference in academic performance of ninth grade students receiving assistance from a trained freshman friend mentor versus first time ninth grade students who do not receive peer mentoring assistance (control) on the post-test interim assessment in Integrated Algebra I.

**RQ2:** Is the distribution of the proportion of passing students for Algebra 1 dependent on whether or not a first time ninth grade student received assistance from a trained freshman friend mentor?

**H<sub>02</sub>:** The distribution of the proportion of passing students for Algebra 1 is independent of whether or not a first time ninth grade student received assistance from a trained freshman friend mentor.

**RQ3:** What is the impact of ninth grade students receiving assistance from the trained Freshman Friend mentor versus first time ninth grade students who do not receive peer mentoring assistance (control) in the numerical averages in Integrated Algebra I?

**H<sub>03</sub>:** There will be no significant difference in numerical averages in Integrated Algebra I of first time ninth grade students participating in the freshman friend mentoring program versus those first time ninth grade students who do not participate in the freshman friend mentoring program.

### **Identification of Variables**

**Independent variable.** The independent variable for this study was the peer mentor program. The peer mentor program involved forty students (experimental) that spend one period per week with a trained freshman friend to assist first time ninth grade students who are at risk of failing Integrated Algebra I. Forty first time ninth grade students (control group) who were equally at risk of failing algebra one did not receive any assistance from a trained freshman friend. Algebra one is essential both in the foundations to other mathematics courses that follow the freshman year, and because it is a course required for graduation. The Interim assessment, or benchmark test, is a summative pre and post- test aligned to the Criterion- Referenced Competency Test and the End of Course Test content weights. The numerical averages of those students in Integrated Algebra 1 of the experimental group of first time ninth grade students who are assigned a freshman friend will be utilized as a dependent variable. The scale used to determine the failure rate will be based on percentage out of 100 percent with score of 69.9 percent and below representing a failing score. This score was incorporated into the dependent variable because no credit is assessed for the course measured (Integrated Algebra I) without such a score being reached. In addition, the pass and failure rates of the first time ninth grade students who are assigned a freshman friend were examined as a dependent variable. Students who do not earn credit in the ninth grade, and fall behind

their peers academically, are statistically less likely to earn a high school diploma (McCallumore & Sparapani, 2010; Neild & Balfanz, 2006; Neild, et al. 2008).

**Dependent variable.** The dependent variables in the study was the student performance on the standardized Integrated Algebra I post test scores, end of course grades (Integrated Algebra I), and the passing rates in Integrated Algebra I for the first time ninth grade students in this study.

### **Research Plan**

This quantitative study implemented a causal-comparative research design. The study used random assignment for both treatment and control groups as the selection of the forty first time ninth grade students, and the forty freshman friends who served as peer mentors were chosen from a large pool of students. The administration of a treatment to an experimental group and an alternative or no treatment to a control group, and a comparison of the groups' performance on a post treatment were measured. A Mann-Whitney U test was used to determine if there is a difference in the two groups' (test and control) median scores on the post-test interim assessments that both sets of first time ninth grade students will be taking at the conclusion of the fall/winter semester. In addition, Mann-Whitney U test was also utilized to determine if there is a significant improvement in the numerical averages of both test and control groups by comparing the median difference of their scores once the mean and standard deviation of the two averages have been determined. If the research indicated that there was a difference between the observed and expected frequencies, utilization of the chi-square formula determined if this difference is statistically significant. By consulting a table of  $\chi^2$  values, the value of the observed number was computed, and the valued of statistical significance

was determined. This value was used in the analyses to determine if the null hypothesis can be rejected or accepted at the conclusion of the study.

## CHAPTER 2: LITERATURE REVIEW

There are many areas of concern for the stakeholders in the process of educating our youth in America. Parent, teachers, school administrators, politicians and local business communities are just some of those who not only have a varied of level interests in how America's students are performing, but in most cases, the future prosperity of our nation can be found in the classrooms in each of our nation's fifty states. For the last three decades, parents, school officials, state and local school leaders, and even American presidents have recognized the need for change and new directions in our educational pursuits (Swartz & Chellman, 2007). Reforms found in political policy have defined many of our country's attempts to improve our educational outlook and future success. Historically speaking, it is important to understand past policy in able to accurately understand the direction that our nation is moving to increase the academic success of American students (Bell, 1993; Ford, Gerstner, & Broad, 2009; Hebel, 2007). Most recently in the year 2001, the Bush administration introduced an Act know as No Child Left Behind, which focused on groups and subgroups of students and their ability to demonstrate academic proficiency. A series of national standardized testing, reported by adequate yearly progress, is the measurement tool utilized to demonstrate proficiency within this act (Springer, 2008). A series of minimum competency performance standards were created and utilized by the Federal government to hold schools,-school districts, and states accountable for their educational standards and performance. Though No Child Left Behind attempted to improve the performance of the American student, and its schools, much research indicates that true academic improvement will not come

from political endeavors, but will actually be found in the innovations and hard work done by teachers and the individual students themselves (Burgess, Propper, Slater & Wilson, 2005; Corno, 1992; Fuchs, Fuchs, Bentz, Phillips & Hamlett, 1994). With this knowledge, local school systems and even individual classroom teachers are constantly seeking innovations within the field of education to help better student achievement. Interestingly the field of education can be quite cyclical; what is considered new or cutting edge today in the way of methodology or policy often quickly become obsolete and replaced with a version that closely resembles an approach that was attempted in the past (Slavin, 2002). The topics range from whether women teachers should be allowed to smoke outside the classroom (asked by Gallup Poll in 1946) to whether the federal government should provide vouchers for parents to send their children to private or parochial schools. In between lie questions about curriculum content, qualifications for teachers, racial desegregation, pedagogical techniques, a huge array of reform proposals, appropriate levels of governance, parental involvement in schools, drugs and crime in schools, the teaching of values, and funding levels and mechanisms, among other issues (Hochschild & Scott, 1998). Adding to the need for innovation, the American public in general has recently recognized that our ailing school systems are a national problem that should be addressed. The U.S. Department of Justice (1997) states:

Until recently, Americans were not especially concerned about public education when they compared it with other national issues. Only 2 percent described it as the 'most important problem facing the nation' between 1988 (when it was first offered as a response option) and 1991. By 1996, however, 13 percent of the

population saw the quality of public schooling as the nation's biggest concern—ranking it with unemployment, above inflation or taxes, and below only crime.

(p. 114)

A survey just before the 1992 presidential election found that 60 percent of Americans deemed education to be an extremely critical issue (Hochschild & Scott, 1998). Interestingly, teachers and school systems do not need to search for strategies that are trendy or in vogue in order to gain higher levels of student achievement. Research indicates that such methods have existed for decades (Carnine, 2000). The process of allowing students to assist students within the classroom setting is far from a new pedagogy, but consistently indicates that certain students benefit from such structure. According to a sociocognitive view of the learning process, learning occurs within a social context (Mungy & Doise, 1978; Rogoff, 1990; Vygotsky, 1978). “When an individual interacts with other individuals, the individual typically will learn, receive feedback, or glean information from something that contradicts the individual's belief or current understanding” (Ismail & Alexander, 2005, p.67). The need for social interaction to aid and improve learning is powerful, and over time has shown to be an effective way to improve student success.

### **Conceptual or Theoretical Framework**

Lev Semyonovich Vygotsky, a Russian who compiled his work during the time period immediately after the Russian Revolution, explored the socio-cultural theory of the mind. Lantolf (2001) describes Vygotsky's most fundamental concept of the sociocultural theory, indicating that the mind can be mediated by the relationships that are encountered with those around us. An explanation of Vygotsky's sociocultural theory

includes the concept that humans do not act directly on the physical world, but rely instead, on tools and labor activity, which allow us to change the world, and with it the circumstances under which we live in the world. Lantolf (2001) believes that Vygotsky argued that we also use symbolic tools, or signs to mediate and regulate or relationships with others and ourselves, and thus change the nature of our relationships. The ability to learn from others, both imitatively and collaboratively, is a central theme in the socio-cultural theory. According to Noddings' (1989) and Vygotsky's (1978) perspectives of social constructivist theories of learning, "learning occurs during such high level interactions because that interaction itself brings about changes in the cognitive structures of those engaged in the interaction" (King at el. 1998 p. 134). Peer interaction in the form of a mentor or mentee engages both participants in such interactions. Ismail and Alexander (2005) contend, "Because interaction can occur only when a person is with other persons, and learning occurs through such interactions, putting learners together can lead to activities that produce knowledge construction or learning" (p. 67). Goldstein (1999) interprets Vygotsky's theory in a manner that acknowledges the concept that if interpersonal relationships exist, built on trust and support, cognitive enhancement will occur. This association of the sociocultural theory has contributed to our understanding of the effectiveness of peer mentoring interventions because it is based within the Vygotskian concept that learners can aide other learners by simply helping each other achieve academic knowledge. Vygotsky (1978) contends that this learning and knowledge can be taken even further with the ability of peer helpers to sequence their questions to their partners in a way that builds on prior knowledge so that a process of scaffolding occurs. The sociocultural or socio-cognitive theory has received support

from both researchers and educators, and can be seen in practice in schools across the country at every level. An experiment by Doise and Mugny (1978) demonstrates that pairs of students perform better on spatial representation tasks than single students do alone. According to the researchers, a conclusion was derived that conflicts of cognitive centralizations, embedded in a social situation, will cause students to coordinate their efforts. This study indicates that students can achieve greater progress when paired with others who possess different cognitive skills or strategy techniques, than when paired with students utilizing the same or similar strategies, when task types are equal. This occurred with student groups who attempt both advanced learning strategies, and less advanced strategies (Mungy & Doise, 1978).

### **Mentor Training**

Vygotsky's sociocultural theory is based on the fact that the study of the relationship between peer mentoring and peer mentees depends on interaction (Carter & Pesko, 2008). First, there is an interest in the peer mentors themselves. How does the training that they receive influence their effectiveness? The success of peer mentoring, as a process, tends to greatly depend on mentor training and preparation (Fulk & King, 2001; Gensemer, 2000). Mentorship training can begin with something simple such as an article by an expert in methods, a motivational speaker on leadership, or a lesson describing the proper concepts behind valuable communication skills. Success or failure of a program can be based on the ability of these skills to be passed down to the mentees in a manner that is usable. The ability to imitate, as Vygotsky (1978) points out, is critical. Those seeking to benefit from this training, and demonstrate cognitive development, will find a strong link between leadership success and the ability to utilize

input from other people (Ary, 2010).

### **The Reform Movements**

It is no secret that America's public schools are failing many students. Since the 1980's, Americans have been deluged with reports and studies, backed by abundant anecdotes, documenting the academic deficiencies of our young people (Fiske, 2006). In the late 1970s and early 1980s, there was a "widespread" public perception that something (was) seriously remiss in our educational system. There was a general concern that the U.S. educational system was falling short of the implicit goal of keeping American students better educated than students in the rest of the world. Longtime U.S. industries were becoming challenged by high quality products that could be produced less expensively overseas. Many believed this was due to American students falling behind their foreign counterparts in learning the skills necessary to keep the American economy afloat (Fiske, 2006). According to Fiske's (2006) book *Smart Schools, Smart Kids*, this particular report led to an attempt by state legislatures and state boards of education around our nation to attempt to aggressively tighten the course requirements for a high school diploma, raise teacher salaries, and set new standards for those entering the teaching profession. This report that consisted of 36 pages of text and 29 pages of appendices created during the Reagan administration resulted in some nominal gains. Standardized reading and math scores were up slightly, yet achievement test results ranging across all major curriculum areas were still considered low and showed that the average American student was still bringing up the rear in science achievement (Bell, 1993).

Interestingly, *A Nation at Risk* actually did not address any of the items on President Reagan's education agenda: vouchers, tuition tax credits, restoring school prayer, and abolishing the U.S. Department of Education (Bracy, 2003). In addition, *A Nation at Risk* did not necessarily upgrade the American educational experience either. Though the awareness was brought forth in our county regarding our system, true effective reform had not been achieved. Fiske (2006) adds:

With wisdom of hindsight, the reason became clear: The reforms inspired by *A Nation at Risk* contained no new ideas, and actually called for more of the same core academic courses, more standardized tests, a longer school year and more money for teachers. (p. 25)

In 2001, a second large-scale national attempt at education reform was created in the form of the No Child Left Behind Act. This was the reauthorization of the nation's omnibus Elementary and Secondary Education Act of 1965 (ESEA) (Kaufman & Konold, 2007; Springer, 2006). As students began to face increased global competition, this act was an attempt to shift the academic perception of the American school system. The central theme of No Child Left Behind was to define student subgroups, as well as traditional public school students. Once this had been established, students were then monitored in their academic growth and measured in their academic proficiency by utilizing Adequate Yearly Progress. A set of minimum competency performance standards were created with the mandate that the standards be met by schools and school districts in order to avoid ever increasing sanctions (Springer, 2008). Current research by Burgess, Propper, Slater and Wilson (2005) provides evidence of such programs being successful. An accountability system implemented by the government of the United

Kingdom in 1988 was found to reduce the educational gains and exam performance of traditionally low-performing students. However, the influence of an No Child Left Behind accountability plan on student test scores indicated there was evidence that failing students in failing schools districts had greater than expected test score gains (Springer, 2008). The further a failing student is from this state's performance threshold, the greater their predicted fall-to-spring test score gain relative to that of similarly situated non-failing students. Yet, greater than expected test score gains by low-performing students do not appear to occur at the expense of high-performing students in failing schools (Springer, 2008). Other problems have also clearly surfaced with No Child Left Behind in regards to the creation of subgroup, particularly in urban and even sub-urban school systems. Kauffman and Konold (2007) indicate the following issues, regarding not only policies behind No Child Left Behind, but also the policy makers:

Before you enact or support a policy, make sure that it is firmly and thoroughly grounded in realities about the world of education. Resist all attempts, for whatever reason, to enact or support policy that you know skirts any reality. Do not succumb to the temptation to engage in rhetoric that does not conform to every known reality about education. Demand of advisors the kind of data and thinking that will convince reasonable skeptics of the policy's workability. (p.77)

What is tested, and how often students are tested have fallen under much scrutiny. Opponents of No Child Left Behind indicate that too much standardized testing has resulted from this policy. Kauffman and Konold (2007) argue, "No Child Left Behind is misguided policy, but not because it requires testing" (p.81). Reading, for example, is

considered a universal benchmark for learning, and research suggests that many children are accomplishing this important goal (Stiefel, Schwartz & Chellman, 2009). One study by Snow (1998) shows that forty percent of fourth grade students read below an established standard on the National Assessment of Educational Progress, and that 4.5 million African-American and 3.3 million Hispanic pupils read, below grade level standards. Do these numbers represent a failing system, policy, or is it deeper rooted? Measurement is needed and measurement in education does require testing. These measurements do help identify failure and success, as well as identify gaps in achievement. However individual differences are genuine occurrences when speaking in terms of students within America. According to Kauffman and Konold (2007), “People differ on so many factors (e.g., interests, attitudes, motivations) that it is difficult to identify invariant characteristics, and student achievement is no different” (p. 83). American education, our students, and possibly the future of our nation all rest on the attempts at reform and the ability of our schools to produce students who can be competitive in the twenty-first century (Hebel, 2007). We live in a world that has been flattened and shrunk by the advent of advanced technology and the internet. While other countries, particularly those in Asia and Europe, continue to increase their gains on test scores, technological advancements, industry, manufacturing, and medicine, American students continue to lose ground in the global race known as education (Friedman, 2006). Is this caused by a failed policy such as No Child Left Behind? Kauffman and Konold (2007) argue that such a policy is just more rhetoric about education that it does not take into account basic realities, and “should be recognized as another example of silly talk about education” (p. 93).

Outside of political reform(s), our students, teachers, and classrooms need measurably superior intervention strategies that result in greater academic and social gains than current, ineffective approaches being used in education. One research-based tool that current educational leaders are implementing to address poor achievement and prevent grade retentions and dropping out of school is peer mentoring or peer tutoring programs. Peer tutoring can be implemented efficiently and “permits the efficient application of the teacher’s and peer tutor’s skills in the process of individualizing instruction and managing student’s classroom behavior” (Kohler & Greenwood, 1990, p. 307). Prior research indicates that peer tutoring is an effective method to increase the academic achievement of both the tutee and tutor (Greer & Polirstok, 1982; Scruggs, Mastropieri, & Richer, 1985). Furthermore, the use of a mentor for academic purposes can increase the learners’ time on task, which will result in more opportunity for learning, and “the additional assistance and support, with frequent and immediate feedback on academic performance, and provides a positive learning environment” (Spencer, 2006, p. 204).

### **Development of Peer Mentoring**

The concept of the utilization of peer mentoring within the classroom setting is far from a new, or even trendy, educational technique. According to Spencer (2006), “Research exploring peer tutoring with students who have emotional or behavioral disorders covers a period of 30 years” (p. 204). Byrd (1990) adds that “although the peer tutoring technique has gained popular support as an instructional technique only during the past 20 years, its roots delve as far back as 1797 with Andrew Bell’s system of education based on cross-aged tutoring” ( p. 115). Andrew Bell, an Anglican cleric based

his model around the ancient Hindu system of mentoring to develop the monitorial system (Paolitto, 1976). However, Paolitto (1976) actually takes the history of cross-age teaching back to what is described as the cultural transmission model, which was recorded as being used “as early as the first century A.D. by Quintilian in his *Institutio Oratoria*, and demonstrates the notion of younger children learning their lessons from older children” (p.216). Benefits of children learning from other children are found again in the 1530’s in the country of Germany where a “teacher in Goldberg, Silesia, Valentin Trottezenndorf, employed the method of ‘olders’ helping ‘youngers’ (Paolitto, 1976, p. 216). In the United States, cross-aged mentoring became evident in the twentieth century, but due to the “increased allocation of public money to education” (Paolitto, 1976, p. 21) this decreased the practical need for such a program. Benjamin Wright (1960) renewed educators’ interest in the tutorial concept with his concern about an impending teacher shortage, and for practical reasons, the cross-aged mentoring concept “was steeped in the practical, with the added component of training students for an accepted societal contribution” (Paolitto, 1976, p. 219). Since this time period, research has validated that peers working together to increase academic success within an instructional system is an effective way to learn school related material (King et al. 1998).

Cross-aged tutoring or mentoring pairs a student with either higher grades or simply greater age or maturity with a younger student who may have a lesser degree of academic success for the purpose of academic development (Garringer & MacRae, 2008). Spencer (2006) describes the cross-aged process as an older student serving as the expert to provide assistance in the mentoring process. Though the ability to naturally

create the atmosphere of cross-aged mentoring has been defeated to a certain degree by the now traditional educational setting that includes both self-contained students, as well as age separated classrooms (Osguthorpe & Scruggs, 1986), the use of mentors to assist in pursuit of academic success has been proven to increase the achievement levels of both regular and learning disabled students (Ehly, 1987; Osguthorpe & Scruggs, 1986).

Another approach is referred to as same-age peer mentoring. Same-age peer mentoring pairs students of similar or same age and ability level to work together (Spencer, 2006). Because of the potential success that research has demonstrated can exist when students work together cooperatively as learners over the past three decades (Cohen, 1994), such techniques are now regarded in countries such as the United States, Australia, and Israel as an essential part of primary school instruction to increase student engagement and learning (Veenman, Denessen, Akker & Rijt, 2005). Interestingly, this instructional technique mounts much of its cognitive developmental framework around the theoretical support of developmental psychology, rather than other teaching programs (Paolitto, 1976).

“Vygotsky argued that just as humans do not act directly on the physical world but rely, instead, on tools and labor activity, which allows us to change the world, and with it the circumstances under which we live in the world, we also use symbolic tools, or signs, to mediate and regulate our relationships with others and with ourselves and thus change the nature of these relationships” (Lantolf, 2001, p.1). Relationships are a part of the system of the peer mentoring program which is ultimately used as an instructional system to aid students in learning school related material (King et al., 1998). Kutnick and Kington (2005) indicate that recent literature “has identified that children’s performance

on cognitive (or problem-solving) tasks can be enhanced when undertaken as a joint activity among pairs of pupils” (p. 521). Interestingly, research not only demonstrates that there are numerous benefits for students who work together toward achieving higher academic gains, but according to Byrd (1990), “with proper introduction and training, there are no apparent negative effects (p.115).

An effective mentoring process can be implemented to reach a variety of age and grade levels, and it encourages higher levels of thinking among students. This can be explained by the fact that, “interaction that promotes such constructive activity must be of a comparably high cognitive level; that is, it needs to include the mutual exchange of ideas, explanations, justifications, speculations, inferences, hypotheses, conclusions, and other high-level discourse” (King et al., 1998). Byrd (1990) explains that, “results from previous studies have focused, to a large extent, on the effects of peer tutoring using regular-education students as both tutors and tutees” (p, 115). Byrd (1990) goes on to explain however that because students with special needs “have higher needs in self-esteem, responsibility, social skills, and attitudes toward school than do their regular-education peers, the benefits could be great because empirical research supports its use with LD and other mildly handicapped students within a regular and special education setting” (p. 115). Outside of the distinction of the learners that the peer mentoring process is targeting, regarding both mentor and mentee, there are several other factors to consider when determining both the range and variation of such an implementation. Hanham and McCormick (2009) describe group work in school as a “complex phenomenon” (p. 214), and go on to include group size, group composition, prior training in group and communication skills, the nature of the group task, and the role of the

teacher, as factors that have been clearly identified as important in the context of group work in the classroom.

Additionally, in times of economic cutbacks, the use of peer mentors within the field of education can be considered a cost-effective approach to a school system (Rode & Kubic, 2002). How a mentoring program is designed can and will be different in every school and with each group of students. Each program can vary in its structure, populations, procedures, settings and designs, as well as its delivery, methodology, variables, limitations, and even cost.

### **Populations**

The variety of individuals and groups that can utilize a mentoring process is diverse. There is research that suggests that students who are considered economically disadvantaged can benefit from participating in such a program (Neild et al. 2008), as well as students who are considered an ethnic minority (Western & Pettit, 2002). In addition, mentoring programs are sometimes used for students who are receiving special services. Research indicates that students with learning disabilities, students who spend time in a resource room, and students who are mildly handicapped who obtain consultative services within the regular educational setting are all using some form of peer mentorship to improve academic achievement (Byrd, 1990; Stenhoff & Lignugaris/Kraft, 2007). Students at both the secondary level and the elementary levels of education have proven to be positively affected by use of peer mentoring, and there is much research to indicate that the students who are in the transitional year of the ninth grade are greatly impacted by the inclusion of a mentoring program (Kerr, 2002; Neild et al. 2008).

## Procedures

Research studies indicate that there are a variety of procedures that have produced positive academic outcomes by incorporating some form of peer mentorship (Manning, 2000). King et al. (1998) state that there are four specific interactions between mentor and mentee when regarding the pursuit of academic gains. They include the engagement of higher order cognitive processes, the ability to ask appropriate questions by the mentor, providing sufficient time for the partner to think and respond, and for the mentor to be both supportive and encouraging in all feedback provided. Different procedures have been introduced, many of which are dependent on the participants and the outcomes sought after. Scripted peer mentoring sessions, in which the use of teacher designed scripts and leading questions by students within the class room, is one method. According to Ismail and Alexander (2005) when individuals interact with other individuals in a scripted manner that provides the opportunity for forethought, feedback, and even contradiction, the mentorship creates interaction that can be the “catalyst for cognitive growth” (p. 67). These processes are often accompanied by the use of sequencing questions from a lower order to a higher order to assure such cognitive growth. This process is designed to help students “move beyond knowledge-level questions and answers, to more ‘thinking’ or higher order questions and answers” (Ismail & Alexander, 2005, p. 68). This same type of process is also referred to as guided peer questioning. “Guided Peer Questioning occurs when students are trained to ask specific thought provoking questions and to be prepared to provide elaborate responses. When they used this procedure to study teacher presented material, their learning was significantly enhanced” (King et al. 1998, p. 135). The use of pretest and posttest

treatments and the measurements thereof are commonly used to provide procedural results. In addition, Hanham and McCormick (2009) suggest that questionnaires can be used to determine qualitative effects of the mentoring.

### **Setting**

Though the number of participants and the types of procedures vary, most peer mentoring appears to occur in a broad range of classroom settings. These settings typically include general education classrooms, remedial special education classrooms, and resource and special education classrooms (Stenhoff & Lignugar/Kraft, 2007). In research conducted by Stenhoff and Lignugar/Kraft (2007) of 20 peer mentoring studies, researchers reported:

“Five of the 20 studies (25%) were conducted in a general education setting, and 13 of the 20 studies (65%) were conducted in a remedial classroom, resource classroom, or self-contained special education classroom” (p. 10).

Within the types of classrooms, regular education students participate in a setting that include pairs, or dyads, groups of three, or triads, and small groups of 3 or more (Byrd, 1990). For those students with special needs, Byrd (1990) indicates that the use of the peer mentoring technique “presents a solution to the problem on how to address individualized instruction to children with diverse needs in a large classroom setting” (p. 116).

### **Design Types**

Beyond the use of dyads, triads and small group settings, there are many different types of designs that are implemented to create successful academic gains via the use of a mentor and a mentee. All such designs are created with the intent to aid student learning.

Kutnick and Kington (2005) note, “Recent literature has identified that children’s performance on cognitive (or problem-solving) tasks can be enhanced when undertaken as a joint activity among pairs or groups of students” (p. 521).

Many designs use either a same-age mentoring approach, or a cross-age mentoring approach. The same-age approach is fairly straight forward; students within the same age bracket or the same cognitive levels are used to assist each other academically. However, there are other terms used to describe this design. Stenhoff and Lignugaris/Kraft (2007) refer to the structure of students being taught by other students with similar skills and age as homogeneous mentoring. Cross-age designs involve using “an older or younger student as the ‘expert’ to provide assistance in the tutoring process” (Spencer, 2006, p. 205) or the groups may be heterogeneous (Stenhoff & Lignugaris/Kraft (2007). In addition, Spencer (2006) points out the process referred to as reverse-role academic mentoring, where students are given the opportunity to serve as both the mentor and the mentee, regardless of age or cognitive levels. Adding to that approach, Stenhoff and Lignugaris/Kraft (2007) indicate that students with special needs have found success teaching regular education students in a tutoring setting as well. According to Ismail and Alexander (2005), the use of reciprocal or mutual peer mentoring diminishes the problems associated with ability based tutoring and it allows for the equal nature of the learning process that helps foster an equal state of learning. This dynamic of equal learning, in turn helps to create “social support between students, which helps participating students reduce academic stress or pressure that might otherwise exist within the tutoring environment” (Ismail and Alexander, 2005, p.68). As for the earlier mentioned triads, the use of three students can also be referred to as a peer

trio technique. Developed by Harris and Aldridge (1983), the peer trio technique indicates that three students are more productive than two students when attempting to reach socialization, responsibility, cooperation, and learning. Research into the considerations of design also indicates that the closeness of mentors (friends), prior to the assignment of mentor and mentee, can have an effect on the productivity of the design. Hanham and McCormick (2008) has investigated friendships and their research indicates that students engage with each other very differently depending on the level of friendship that exists. “For example, meta-analysis on children’s friendship relationships indicated that friends are more likely than non-friends to cooperate, communicate, and engage in positive affective exchanges” (Hanham & McCormick, 2008, p. 214). The concept of pairing friends is studied further by Kutnick and Kington (2005), when the researchers examine the effects of taking friendships to a different level for the purpose of learning, and also considers the effects of conducting research prior to pairing students together. The Class wide Peer Tutoring (CWPT) and Class wide Student Tutoring Teams (CSTT) are both programs that have proven to be successful (Byrd, 1990), utilizing many of the individual factors that have been listed.

### **Dependent Variables Found In Peer Mentoring**

Tim Elmore (2009) contends that mentoring is a relational experience through which one person empowers another by sharing wisdom and resources, as well as creating a positive dynamic that enables people to develop potential. The variables that can dependently measure such success can be considered tangible, or can be based on feelings or perceptions. Academic achievement, and even time on task can be used as dependent variables, as indicated by Byrd (1990): “The achievement outcomes and

student engaged times are obviously in support of this instructional technique (mentoring) with normal- and lower achieving students” (p. 116). In addition to academic gains, measurements in attitude towards school itself, self-esteem needs, the enhancement of interpersonal skills, and feelings of competence at school can be affected by the presence of a mentoring program (Byrd, 1990; Ismail & Alexander, 2005; Spencer, 2006). Peer mentors can serve as the liaison in today’s educational system between the learner and the instructor (Rode & Kubic, 2002). Greer and Polirstok (1982) state, “teaching (students) to use social reinforcement techniques for tutees on-task behavior might have the potential for developing new social behaviors for tutors” (p.123-124). This study examines the effects of peer mentoring in a remedial reading course for low achieving 7<sup>th</sup> and 9<sup>th</sup> grade students that created greater rates of academic success, an increase in use of social approvals, and a decrease in social disapprovals measured by on-task behaviors and reading scores. One consistent theme that is found in a peer mentoring program and study is that mentor training is very crucial to the ultimate gains that a mentee achieves while receiving help, regardless of the chosen program (Maheady, Mallette, & Harper, 2006; Orten & Stokes, 2005; Robets & Cotton, 1994).

### **The Ninth Grade Transition**

One of the most difficult transitions in the current American school systems is the transition of 9<sup>th</sup> grade students, which involves both social and academic adjustments to a new and often larger school environment. For young adolescents, there are many new freedoms that were not available in 8<sup>th</sup> grade, including social distractions and usually a larger campus with many more classes from which to choose (Manning, 2000). This is evident in the statistical data of failure rates that exist regarding students’ first year in

high school. Dedmond (2006) claims, “More students fail the 9<sup>th</sup> grade than any other grade level K-12” (p. 1). This claim is backed by the 2005 report found in *High Schools That Work* indicating, “15 states had a ninth-grade failure rate exceeding 10%, nine states had a failure rate exceeding 15 %, and two states had a failure rate exceeding 20%” (Bottoms & Timberlake p.1, 2007). The turbulence that often characterizes the first year in high school includes overcrowded classrooms, insufficient textbooks, incomplete rosters, schedule changes and a revolving door of teachers, particularly in urban school districts (Riehl, Pallas & Natriello, 1999). The simple disorganization of the start of a school year may be responsible for the higher than normal absenteeism rate found in the first few weeks of school which can also increase the likelihood that ninth graders may fall behind and inevitably fail one or more courses (Weiss, 2001). Cognitively, students who are in the age range of 13 to 14 years of age are at a disadvantage according to Bottoms and Timberlake (2007). According to these authors, the adjustments of adolescents who are involved in the transition from middle school to high school, who experiencing a change in a sense of autonomy, social support, school membership, and perceived stressor can be impacted in a manner that ultimately affects grades (2007).

A particularly disturbing additional factor regarding this transitional time period is that even prior academic success can be dismissed. In other words, the achievements that students obtain and demonstrate in junior high school may not translate over to a student’s first year in high school (Neild & Balfanz, 2008; Neild, Stoner-Eby & Furstenberg, 2008). The academic difficulty that students experience in ninth grade is not simply a reflection of what students bring with them when they enter high school. Rather, the experience of the ninth grade year contributes substantially to the probability

of dropping out, despite “controls for demographics and family background characteristics, previous school performance, and pre-high school attitudes and ambitions” (Neild & Balfanz, 2008, p. 547).

### **Algebra I and High Failure Rates**

The entrance to ninth grade marks one such critical juncture in American schooling. For 80 percent of ninth graders attending public schools in the United States, the eighth- to ninth-grade move is a literal one, involving the switch from an elementary or middle school to a high school with a 9-12 grade structure (Neild, 2009). “Regardless of whether a change of school occurs, ninth grade is widely understood to mark the beginning of the high school years and to usher in a new set of academic expectations” (Neild, 2009, p. 54). Not all ninth grade students are scheduled to take the exact same classes, however there are many courses that are designed to be completed within the first year of high school. Much of this course work is designed to serve as the building blocks for further high school studies (McLure, 1998). Those ninth grade students who are on a college preparatory track are required to take Algebra I, and for those students who are not successful in this class, additional problems may arise, endangering the ultimate goal of graduation. “This more rigorous coursework begins with Algebra I, the gatekeeper course, which students must pass to continue taking subsequent advanced math courses” (Durwood, Krone & Mazzeo, 2010, p. 2).

There is literature to suggest that students enter high school unprepared for the rigors that Algebra I presents. In Chicago, all students are required to complete a college preparatory curriculum. In the subject area of mathematics, students enroll in Algebra I. “However, many Chicago students entered high school with math skills well below grade

levels, and failure rates in ninth grade algebra were high- nearly one quarter of ninth-graders failed this first year math course” (Durwood et al., 2010, p. 4). In fact, the number of students who are not successful in their first year, or even more importantly, their first semester of mathematics is alarming. “In many schools, it is not unusual to find up to 40 percent of the students who experience early failure in Algebra I” (Rettig & Canady, 1998, p. 57). This high failure rate in the subject of mathematics, and Algebra I in particular, is an important factor in the number of students who are not successful academically at the ninth grade level. Research at the Center for Social Organization of Schools at Johns Hopkins University introduced data substantiating the fact that it is the ninth grade when students often fall off course (Balfanz, Herzog & MacIver, 2007). Within the study at Johns Hopkins University, “17 of the 22 districts participating in the conference lose twenty percent or more of their students after the freshman year” (Balfanz, et al., 2007, p. 224).

The high number of failures at the ninth grade level is not a new phenomenon, and this includes that large percentage of students who fail math during this school year. “Concerns about the lack of math preparation and achievement in our schools (American) have been around for decades and with good reason” McLure, 1998, p. 110). However, there is current research that acknowledges the extent and affect that these high failure rates in math, at the ninth grade level cause for this age group in their future academic endeavors. Research shows that the success achieved in the freshman year of high school follows students throughout the course of their education as students who struggle in the freshman year transition tend to struggle throughout high school (Blankstein, 2004, Fields, 2005).

## **Training New Peer Mentors**

The ability of an individual to become a successful peer mentor is determined by the training that he or she receives. According to Jeske & Rode (1999), proper training is essential to the success and over all experience of becoming a student peer mentor, and this proper training will also allow for intellectual, as well as the social, growth of the mentee. According to the Hamilton Fish Institute on School and Community Violence and The National Mentoring Center at Northwest Regional Educational Laboratory, “All mentors need thorough training if they are to possess the skills, attitudes, and activity ideas needed to effectively mentor a young person” (*Training New Mentors*, 2007, p. 8). This center offers strategies to properly recruit and train peer mentors to effectively assist in needed areas within a school setting. A generic peer mentor orientation is suggested to introduce organizational goals and requirements of a peer mentor. This time also gives the school leaders an opportunity to determine if there are potentially any individuals who might not fit the desired profile for their school. The institute makes several suggestions on initial peer mentor training, also known as pre-service training, which should be a required training for all mentors and can last from a few hours to several days depending on the amount of relevant material to cover and the number of mentors being trained (*Training New Mentors*, 2007). During training, peer mentors should strive to obtain three essential concepts. First, individuals should be introduced to the level of learner that they will work with, along with the potential areas of assistance that they might provide. Next, peer mentors should develop a realistic understanding of their goals and outcomes. Finally, during training, new peer mentors should begin to extensively explore effective approaches to mentoring. (*Training New Mentors*, 2007). According to

the guidelines set forth in *Training New Mentors: Effective Strategies for Providing Quality Youth Mentoring in Schools and Communities* (2007), peer mentors should be asked to do the following: (a) Identify one person, preferably someone who is not a relative, who served as a role model or mentor for them; (b) Think about why that person was important to them and the results of the relationship, and (c) Recall the qualities of that person that made her or him so valued. These are fundamental questions that will help new peer mentors understand and develop the characteristics of a successful peer mentor, regardless of the situation(s) that they might face.

Garringer and MacRae (2008) center a mentoring program around training older students to assist younger students, using the term cross-age peer mentoring to describe the process and program designed to introduce successful students in higher grades to students in lower grades who might be struggling one or any number of areas related to school. Cross-aged peer mentoring refers to the programs in which an older youth mentor is matched with a younger student mentee for the purpose of guiding and supporting the mentee in many areas of his or her academic, social, and emotional development. These programs are considered “cross-age” because there is a gap between the age of the mentor and the mentee, which allows for effective role modeling and positions the mentor as a wiser and older individual, as with adult-youth mentoring. However, these programs are also “peer” programs because they focus exclusively on youth-youth relationships (Garringer & MacRae, 2008).

According to Garringer & MacRae (2008), mentor/mentee relationships are designed to last a whole school year. When possible, programs include summer break activities to help with transitions, and ideally these matches would continue across

multiple school years. Benefits to the younger student include an accelerated connectedness to the school, and a positive benefit towards grades and academic achievement, and pro-social behaviors and attitudes. Garringer and MacRae (2008) list the five C's in which all young people need to develop: competence, confidence, connection, character and compassion. Peer mentoring can help achieve these important areas of student development.

Orten and Stokes (2005) describe the success that one school experienced using a peer mentoring approach. At Trenton Central High School in New Jersey, where the dropout rate was over 50 percent of the school's 1200 freshman, only 300 to 400 graduate annually, with most dropouts occurring during or after the ninth grade year. Trenton Central trained members of their senior class, through the AmeriCorps Bonner Leaders corps, and formed the Summer Bridge program. After proper training, senior peer mentors at Trenton Central offer a free program from 9 a.m. to 1 p.m. for six weeks during the summer, offering academic support and enrichment activities to ninth-graders. Trenton Central seniors assist in curriculum readiness skills in math, English, and science courses, which are taught by public school teachers. At the conclusion of the summer, these same mentors continue their work in after-school tutoring programs. This program offers conclusive results as to the positive effects of peer mentoring:

In the 2001-2002 school year, of the 150 ninth-graders who participated in the Summer Bridge program, none dropped out of school. Only two had to repeat ninth grade, and one transferred to an alternative high school. Many ninth-graders reported that they did much better in math because of the program. (Orten & Stokes, 2005)

There are many different training methods and programs in the realm of peer mentoring; however, there is insufficient data available to determine which training methods are the most effective and efficient. Many of the peer mentoring programs actually attempted to promote a service for a monetary gain. Though the research does not show that particular training method is superior, the evidence does point to the effectiveness of properly trained and utilized peer mentors.

### **Peer Mentors and Students With Special Needs**

There are many students in regular education classrooms that receive special educational services. McDuffie, Mastropieri, and Scruggs (2009) indicate:

Recent Federal legislation, specifically including the reauthorization of Individuals With Disabilities Education Improvement Act (IDEA) 2004 and the No Child Left Behind Act of 2001 (NCLB), shifted the instructional focus with regard to students with disabilities from where they are educated to how they are educated. (p.1)

No longer are students necessarily separated via either special education or regular educational classrooms. Today, with the onset of the Individuals with Disabilities Education Act (IDEA), classrooms now contain both regular education students and students with special needs (Gensemer, 2000). The goal is to introduce all students, regardless of placement, into academic classes, specifically content area classes where a student with disabilities can receive instruction that is a collaborative effort between both a special education and general education instructor. This is accomplished by having a special needs student placed in a general educator's content area classroom setting in which a special education teacher works side by side with the general education teacher

(Cawley, 1994, Weichel, 2001). The typical model that is used in the classroom today is referred to as co-teaching. Co-teaching is generally defined as two educators, one regular teacher and one special education teacher delivering substantive instruction to a diverse group of students within the same classroom setting (Friend & Cook, 2003). According to McDuffie, et al (2007) the co-taught classrooms can be set up using several identified models including: (a) one teach, one assist; (b) station teaching; (c) parallel teaching; (d) alternative teaching; and (e) team teaching. Gensemer (2000) points out that both low achieving older students as well as mainstreamed special needs students can improve their self-esteem as younger mentees both rely on and learn from them as mentors. Gensemer (2000) also adds that “students should not be automatically disqualified from becoming a tutor because of poor grades or special needs status” (p. 7). This concept indicates that both regular education and students with special needs can benefit from becoming either a peer mentor or mentee.

Clearly, American education must build on diversity as a strength, and use the differences between students to help them learn from each other. America has been described as a melting pot of many cultures since the late 1700’s. Yet, it may be a surprise to some to see how much our nation has changed recently. According to the National Center for Education Statistics (NCES) the demographics of America’s population is shifting with an increase in racial and ethnic diversity in the number of school- aged children. Public school enrollment is estimated at 48.7 million, and is projected to increase to 51.2 million by the year 2015. The number of white students continues to decline steadily, while other ethnic groups such as Hispanic students increasingly make up more and more of the growth that America experiences (NCES,

2006). The facts regarding a shift in the American student population should cause all those in the field of education to consider new strategies for academic success. This consideration should be a direct result of the increase in the number of students who are considered ethnically diverse and the fact that these students are statistically at a higher risk of academic failure, particularly in the 9<sup>th</sup> grade (U.S. Department of Education, National Center for Education Statistics, 2002; Weiss, 2001). In addition, the number of students who have been identified with disabilities continues to increase as well. “The number of students who receive special education services in 2004 under federal law is estimated at 6.6 million children, which is up from 3.7 million in the year 1977” (Clark, 2009, p. 1). Educators with the responsibility of educating students with special needs such as emotional or behavior disorders can utilize peer tutoring as an effective tool to help differentiate instruction for a diverse group of learners (Blake, Wang, Cartledge & Gardner, 2000; Harrigan, 1994; Spencer, Scruggs & Mastropieri, 2003).

Another resource that is often over looked in the educational process is the counselor. Outside of the classroom teacher, the school counselor can have an impact on an individual student’s academic achievement. Often, it may be a student’s counselor who pairs the individual up with a mentor based on content needs, scheduling requirements, or graduation requirements. Research supports the concept that those who serve as counselors also see the positive effects of student mentoring. Clark (2009) indicates that school counselors can coach student mentors in the areas of success skills in the classroom with regard to organization, listening and responding in appropriate ways, cooperating with peers and completing class work and home work in a timely

manner, these students are more likely to experience success in these areas with both general education students, and students with special needs.

McDuffie, et al (2009) examined the effects of peer mentoring intervention on the academic achievement of middle school science students with and without disabilities, and the extent to which value would be added when a peer mentor was added to the context of a co-taught classroom. Their findings indicated that students in the peer mentoring condition performed better than students receiving traditional instruction on unit tests, though the authors were surprised to find that this was evident in both co-taught classes and non-co-taught classes. The explanation provided indicated that both co-taught classes and peer mentoring extended the amount of time students were engaged, with both approaches resulting in improvements academically.

### **Variations of Peer Mentoring Programs.**

There are a variety of mentoring models that can be utilized within a classroom, school, or school system. Those considering implementing a mentoring system to improve student achievement have multiple models that have proven positive results. The Juniper Gardens Children's Project (CWPT), the Ohio State University (START) model, and the Class wide Student Tutoring Teams (CSTT) are all models that have been successfully implemented, evaluated, and refined to varying degrees across a range of age and grade levels within both general and special educational settings (Maheady, Mallette, & Harper, 2006). Each model has similarities and differences such as the number of students that would be included in a mentoring group, the extent of implementation whether it is class wide or small group, the specific roles of the mentor, the amount of instructional assistance that the classroom teacher provides, and the degree of a

controlled or uncontrolled environment. CWPT and START utilize a pattern of a whole class being divided into competing team dyads or triads. The START program, developed by The Ohio State University to engage five different tutoring formats for students in academic related activities (i.e. one-to-one, small group, cross age, home-based, and class-wide) divide the whole class into four-member heterogeneous teams (Maheady, et al., 2006). The CWPT uses mentors to present material evaluate mentee performance, and provide feedback and pointers in a reciprocal manner in which both students serve as mentor and mentee. Research indicates that CWPT is effective in improving academic gains. For example, a 1989 study by Greenwood, Dequadri, & Hall “showed that, among nondisabled, low-socioeconomic status, urban, at-risk children in Grades 1 through 4, class-wide tutoring dramatically increased long-term reading achievement” (Fuchs, Fuchs & Kazdan, 1999, p. 309). Another study by Maheady, Sacca & Harper, (1988) provides empirical support that “CWPT has proven to be a powerful intervention resulting in reading, mathematics, and spelling improvements in LD students” (Byrd, 1990, p. 116).

Maheady et al. (1988) implemented the CWPT program with 20 secondary resource room students. Students in classroom 1 showed an immediate increase in social studies quiz scores. The scores were 11 to 29 percentage points above the baseline mean, causing one third of the class to earn an A grades. Classroom 2 students also reversed a declining trend in their scores to establish a mean increase of 3 to 16 points following CWPT. As evidenced by students and teacher evaluations of the program on a three-point Likert scale, both the students and teachers enjoyed and benefited from the CWPT program (Byrd, 1990).

CSTT, reported by Maheady et al. (1987) used in six mainstreamed mathematics classes achieved increase of 20 percent on quiz scores for regular education students, and a near equal increase in quiz scores for students who were considered mildly handicapped. “The data, along with the quality of the research design, provided support for the use of the CSTT model in mainstreamed secondary classes” (Byrd, 1990, p. 117). The peer trio technique developed by Harris and Aldridge (1983) was an alternative to both CWPT and CSTT, as this program demonstrated results that indicated that three students working together are better than two students for the purposes of remediation, cooperation, and responsibility. Under the PALS mentoring program, one student serves as a coach evaluating critical reading behaviors, evaluating mentor performance and providing positive or negative reinforcement in a manner that could be reciprocal in nature. Fuch et al. (1999) examined students and teachers, both versed in the PALS methodology, and found that this program increased academic gains in reading and literacy.

Results from this study suggest the promise of PALS as one important means for addressing the serious reading problems that many adolescents still demonstrate. Findings indicate that among high school students reading at grade levels two through six, PALS enhances reading comprehension growth more than conventional high school programming and that, as a function of PALS, these students report working harder to improve their reading performance (Fuchs, et al. 1999). START utilizes a pretest to present stimulus materials, prompts responses and charts mentee performance. The CSTT program is reciprocal in nature as the member of the small heterogeneous groups rotate role as “teacher” and “pupil”, presenting test items, evaluating performance and

providing feedback (Maheady, Mallette, & Harper, 2006). According to Maheady, Mallette, and Harper (2006);

Each program can be used to actively engage all pupils within the classroom simultaneously, an aspect that should make them particularly appealing to general education teachers and that each program also contains highly structured and evidence-based instructional components that are delivered by well-trained peers and monitored by diligent teachers. (p. 70)

Another example of simple, but effective results can be found in a study by Greenwood, Delquadri, and Hall (1989), which shows the use of class wide peer tutoring pairs consisting of higher and lower performing students using simply who, what, where, when, and why questioning dramatically increased long-term reading achievement. Prior to determining which particular strategy or program may assist a school teacher or administrator, the desired goals or outcomes, as well as the actual types of learners should be evaluated (Stader & Gagnepain, 2000). Different goals or outcomes will be best accomplished by different techniques. To help improve students' note taking skills or to encourage students to engage with new material, a co-operative note taking pairs approach could prove useful. If the goal is to develop lower level cognitive skills such as learning definitions, memorizing concepts or vocabulary words, flashcard tutoring can easily be implemented in the classroom. To strengthen collegial relationships, to increase participant confidence, or to foster individual growth in student participants, peer coaching could be examined. In order to increase the levels of performance in large classes, or to investigate the effects of a group contingency procedure on academic performance, a teacher could utilize peer monitoring. Peer monitoring is defined as

classroom management technique that can be achieved through carefully developed routines with clear instructions paired with peer-managed or self-managed points for compliance and understanding (Fowler, 1986). To enable students to encourage each other to discuss their personal responses to provided questions, which will in turn encourage student participation, a think-pair-share technique may be considered. A think-pair-share technique is defined as the classroom leader asking a question, then giving the students a minute to two (longer for more complicated questions) to discuss the question and work out an answer, and finally asking for responses from some or all of the pairs (Fowler, 1986).

To provide opportunities for cooperation, improved social outcomes, and encouragement for modeling of an effective practice, the three-step interview process, in which students are charged with a 3 part questioning and answering session may be used (Falchikov & Blythman, 2001).

The effects that the PALS program had on high school students with problematic reading skills demonstrates the capacity for students to lend academic aid to fellow students. At both the high school and elementary levels, PALS promoted varying levels of higher reading comprehension. This was credited to both the student training process, the training of the particular teachers who participated in the training process, as well as the fidelity of the observations that were derived from the study (Fuchs, Fuchs, & Kazadan, 1999). This study showed positive growth in student work habits, study diligence, and even signs that the instructors who were involved in the research worked harder in their pursuit of solid academic instruction, “Interestingly, in comparison to control peers, PALS students also reported that their teachers worked harder because

within the peer –tutoring format, the teacher’s role was to monitor rather than serve as an instructor” (Fuchs, Fuchs, & Kazadan, 1999, p. 312). This serves as an interesting side note to the introduction of peer mediation even within a classroom with an actively functioning teacher. Fulk and King (2001) point out the need for simple, yet effective, classroom differentiation strategy that would appear to be utilized in every classroom today. The authors note the need for an effective instructional method for heterogeneous groups of students who function at highly varied skill levels. The method must be cost-effective and user-friendly and must keep my students actively involved. Although no one method can address all instructional needs, strong research regarding PALS reading results support exists for class wide peer tutoring. According to Fulk and King (2001) the following is a descriptive list of a CWPT implementation guideline for enacting student lead and student centered learning for teachers seeking a methodology that is based in research backed findings:

1. Explain the purpose and rationale for the technique. Stress the idea of increased opportunities for practice and “on-task” behavior;
2. Stress collaboration and cooperation rather than competition;
3. Select the content and instructional materials for tutoring sessions;
4. Train students in the roles of *tutor* and *tutee*. Include specific procedures for (a) feedback for correct responses, (b) error correction procedures, and (c) score-keeping;
5. Model appropriate behaviors for tutor and tutee. Demonstrate acceptable ways to give and accept corrective feedback;

6. Provide sample scripts for student practice of roles. Divide the class into practice pairs and teams;
7. Let pairs practice roles of tutor as teacher circulates, provides feedback, and reinforcement;
8. Conduct further discussion regarding constructive and non-constructive pair behavior. Answer questions and problem-solve as needed; and,
9. Let pairs switch roles and practice new roles as teacher circulates and provides feedback, and reinforcement. Repeat step 8. (2001).

Fulk and King provide additional suggestions for implementing peer mentoring and include: Partner reading, where the more-proficient reader begins oral reading for 5 minutes. The less-proficient reader performs as tutor or "coach." The students then switch roles. The less-proficient reader has heard the material read, and should have less difficulty now with the material. The tutor may assist the reteller as necessary. After two minutes, the students switch roles. Ten points are awarded if the partners believe they put forth a good effort. Paragraph shrinking which is a strategy used to improve reading comprehension where students are instructed to identify who or what the paragraph is about (subject) and summarize the main idea (e.g., What happened to the important who or what) in ten words or less. Next included is a prediction relay where students take turns predicting what will likely happen in the next half-page of text. After the text is read, the student summarizes the half-page using the "ten word rule" and predicts what the next half-page will be about. Students switch roles after five minute blocks, and the responsibilities of the tutor are the same as for the first two activities. One point is awarded for each correctly completed activity. These strategies can not only allow an

instructor to break up his or her daily approaches within the classroom, but also potentially increase student achievement.

Another study by Egolf, Gelormo, Lademan, Russo, and Schray (2002) returned interesting results in the comparison of in-class peer leadership compared to a peer-led team. The study measured students in an organic chemistry class at three post-secondary institutions; Lehigh Valley College, Northampton Community College, and Penn State University. The study examined whether or not a qualified peer-led team represents a prohibitive monetary cost versus the low cost of the use of an in-class peer mentor. The peer leaders in both groups received an equal amount of training (nine hours), provided equal group session time (one and a half hours per week). Both of the peer group leaders received payment for their services. The results of the study were reported in two separate end-of-course evaluations. These were categorized as academic performance and student attitudes towards their leaders. The researchers found that in-class peer leaders are as effective as standard peer leaders, though they have slightly different modes of operation. In addition, the in-class peer mentors were considered more available. Though there were differences noted which included that the standard peer leaders “teach” more and have better control of the group, the academic performance and student satisfaction are virtually identical (Egolf, Gelormo, Lademan, Russo, and Schray, 2002). This study indicates that training is a greater factor in the success of a mentoring program than payment for peer mentoring sessions. The following tables summarize a sampling of often referenced studies in the field of peer assistance in regards to academic achievement.

The outcomes of peer assistance on student achievement, according to Stenhoff & Lignugariw/Kraft (2007) are measured by calculating the size of effect for a the primary dependent variable in the group design studies, or the percentage of non-overlapping data points for the primary dependent variables in single subject design studies. The effect sizes for each study's primary dependent variable were averaged into a weighted mean. The effect sizes were listed as followed: 0.20 to 0.49 was considered small, 0.50 to 0.79 was medium, and all effect sizes over 0.80 were considered great. "The homogeneity of the overall weighted- mean effect size distribution was assessed using the Q statistic" (Stenhoff & Lignugariw/Kraft, 2007, p, 15). Within each participant in single subject studies the number of data points or PND, "was computed by dividing the number of data points exceeding the highest (in studies in which an increase in the dependent variable was expected) or lowest baseline data points (in studies in which a decrease in the dependent variable was expected) in the expected direction by the total number of data points" (p. 15). Stenhoff & Lignugaris/Kraft (2007) report that "mean PND scores greater than 90% indicate that the intervention was very effective, scores falling between 70% and 89% indicate that the intervention was effective, scores falling between 50% and 69% indicate that the intervention was minimally effective, and scores falling below 50% indicated that the intervention was ineffective" (p. 15).

### **Outcomes/Findings**

Early research is limited on the effects of peer mentoring and academic achievements. Paolitto (1976) notes the beginning of research in the field of peer mentoring: "The first book on cross-age teaching, *Children Teach Children: Learning by Teaching* written by Gartner, Kohler, and Riessman, emerged in 1971 to bolster full

recognition of this field as a legitimate area of research, though this pioneer work is more of an administrative manual than a focus of inquiry and evaluation” (p. 215). This author indicates four decades ago that students helping other students achieve academic knowledge began as a method to assist the overburdened classroom teacher, and that “the researcher who investigates cross-age teaching as an effective experience on adolescent development will make a significant contribution to both psychology and education” (p. 235). It is true that in the last 40 years significant research has validated such a prediction. Students who work with other students can obtain higher academic achievement (Byrd, 1990; Ismail & Alexander, 2005; Stenhoff & Lignugaris/Krafft, 2007). The reason for this finding is based in Vygotsky’s cognitive theory and that “Peer tutoring influences learning because it fosters positive intrinsic motivation and enhances cognitive skills within participating peer interaction and, therefore is the catalyst for cognitive growth” (Ismail, 2005, p.67).

### **Limitations**

There are several limitations that are cited in the reviews of recent studies involving peer-mentoring programs. According to Spencer (2006) students who may be labeled special needs in a particular study, may not be identified as emotionally disturbed, and many studies do not provide enough information to calculate an effect sized. Ismail and Alexander (2005) indicate that any ability based mentoring program may cause problems with natural achievement gains, as well as possible perceptions issues with some public school students identified as higher level and lower level learners. Kutnick and Kington (2005) indicated that though a higher level of cognitive performance can be a result of mentoring pairs created via friendship levels, past

experiences and culturally based experiences can create unexpected results even when students are paired based on friendship factors.

### **Treatment Integrity**

Studies by Greenwood et al. (1988) and Maheady et al. (2006) utilized and analyzed the CWPT technique and, “have used high-quality research designs, thereby lending further support to the validity of their positive outcomes (i.e., achievement increases) with learning disabled tutors and peers” (Byrd, 1990, p. 117). Researchers found that within their research studies students could be consistently counted on to follow directions, and that overall, students were consistently on task. The authors state, “observations of students during their tutoring sessions revealed that students were typically actively engaged in tutoring in the manner in which they had been trained” (King et al., 1998, p. 140).

### **Future Studies**

Current research indicates there are multiple areas for future studies in the field of peer assisted learning. Because studies indicate that peer mentoring can produce superior weekly outcomes in comparison with typical teacher lead instruction (Greenwood, Dinwiddie, Terry, Wade, Stanly, Thibadeau and Delquadri, 1984) this type of differentiated learning should be explored. If school systems are experiencing budgetary problems, these types of programs should be considered alluring because peer mentoring is considered simple, economically less demanding than many programs, and effective (Byrd, 1990). As America increases its number of multicultural students, there is a need to determine the possible positive effects on such learners. Presley and Hughes (2000) indicate that out of the 11 studies that they reviewed, only 2 provided disaggregated data

involving participants' ethnicity. Stenhoff and Lignugaris/Kraft (2007) note that "due to the dearth of evidence no inferences regarding the efficacy of using peer tutoring with multicultural students or English-language with disabilities can be made at the secondary level" (p. 24). Stenhoff & Lignugaris/Kraft (2007) also indicate that there is very little research that observes whether or not the effects of a mentoring program designed to achieve academic improvements is continual over a long time period, or simply a one-time, or short interval event, and therefore the longevity of effects is certainly worthy of further study.

Hanham and McCormick (2009) call for an investigation into the measurements of self-efficacy for motivations (academically) of those students who are involved in peer mentoring programs, because self-efficacy is widely acknowledged as an important predictor of performance and may be important when students work in groups together. Ismail and Alexander (2005) pose the question, "At what point should a teacher interfere with the work of a student pair to correct a misunderstanding or to dispel a misconception?" (p. 75) and indicate that there is need for research into the amount of teacher interaction within a peer-mentoring program, even if it appears to be effectively working. Beyond academic achievement, there remains the need for further studies regarding the behavioral and social benefits for students, both regular education and special needs, involved in mentoring programs. "Hopefully, future research will continue to explore the social and interpersonal benefits for these populations of students" (Spencer, 2006, p. 211).

In looking at the research, educators should be encouraged to continue to explore activities "that require students to work on tasks that are highly collaborative in nature

teachers should consider using activities that help students develop a sense of interdependence with classmates” (Hanham & McCormick, 2009, p. 226). As such, the understanding that the knowledge and confidence gained from successful mastery experiences of peers who are working together as friends calls for further research into the concept of friendship itself. Hanham and McCormick (2009) indicate that further study is needed to determine what constitutes true friendship. Regardless of the specific calls for additional research, the fact that peer mentoring is considered cost effective, is easy to learn, and is proven a pedagogically successful approach is reason enough to explore further (Ismail & Alexander, 2005).

### **Peer Mentoring and The “Friendship” Factor**

At the heart of peer mentoring is the ability of one student to assist another student either academically or socially. One factor found in research that can determine the effectiveness of peer mentoring is the depth of the relationship between mentor and mentee. Because the use of peer mentoring can be considered a relationship, and indeed social interaction, the composition of the peer mentoring relationship is of value. Kington and Kutunick (2005) suggest that children who know each other well will prove to be more successful when placed in a mentor / mentee relationship. “Performance on this ‘social’ activity will require quality relationships between pupils, leading some researchers to argue that friendships are characterized by these quality relationships and, therefore, that friendship grouping should be used more frequently within classrooms” (Kington & Kutnick, 2005, p. 521). In social settings, it is natural for individuals to have the opportunity to communicate, and therefore, become more productive, with those they either have experience with, or feel comfortable and confident working with.

A classroom setting proves to be no different in the area of teaching and learning involving peer work. “For example, meta-analysis on children’s friendship relationships indicated that friends are more likely than non-friends to cooperate, communicate, and engage in positive affective exchanges” (Newcomb & Bagwell, 1995). Hanham and McCormick (2008) examined the difference between peer groups that are considered “friends” versus peer groups that are considered acquaintances. Five hundred and sixty three 10<sup>th</sup> and 11<sup>th</sup> grade students from nine high schools in Sydney, Australia were assessed via a questionnaire to determine the attitudes towards working with a friend versus working with a mere acquaintance. The study had the following multiple acknowledged limitations: first, the data was from self-reports, which further insight could have been established had observational data been utilized; second, the research examined how students approach group work at the individual level, and did not take into account the attitudes towards friendship, as they may not be consistent with their behaviors. Because the measured activity was collaborative in nature, teachers should have considered using activities that helped students develop a sense of interdependence with other classmates prior to the experiment (Hanham & McCormick, 2008). The results from the questionnaire indicated that students would perform at a higher level when paired with a friend over an acquaintance, but possibly more important is the finding that “knowledge and confidence gained from successful mastery experiences working with friends may transfer to group work with acquaintances” (Hanham & McCormick, 2008, p. 217).

The research model provided in Kington and Kutnick ((2005) cognitive enhancement through social interaction involved 72 peers paired to undertake science

reasoning tasks. “This study questions whether classroom-based friendship pairing will perform consistently better on a cognitive task than acquaintance pairing, taking into account gender, age, and ability level of children” (Kington & Kutnick, 2005, p. 521). The results determined that using friendship can increase learning in some groups, but detract in others. The girl friendship pairing performed highest on science reasoning tasks (SRT), while the boy and girl acquaintance pairings performed at mid-SRT levels. Interestingly, boys’ friendship pairing performed at the lowest levels (Kington & Kutnick, 2005).

How well an individual knows the partner whom he or she is working with appears to be an important factor in peer partnership. Socially, this would be a natural norm; however determining at what level, and at what point a friendship could be constituted would present a problem in the attempt to create peer partnership for positive academic, or even social mentoring. In addition, according to the Kington and Kutnick (2005) study, the only group who might benefit from friendship grouping attempts would be female students. Allowing male students to group in such a manner might prove to be detrimental due to behavior issues.

### **The Problem-Centered Strategy with Scaffolding**

Research indicates that there is a clear benefit in allowing students (peers) to engage one another academically and socially either in-class or through a designated peer-mentoring program (King, Staffieri & Adelgais, 1998). Exactly how to form peer mentoring partnership is debatable, but research does indicate that creating a problem-centered strategy with scaffolding is an effective way to achieve results, regardless of how the partnerships are created. “Literature suggests that peer-instruction is most

effective when there is some form of peer-scaffolding, which can take the form of worked problems, structured questions, and even evaluation rubrics” (Gilbert & Merrill, 2008, p. 200). Problem-centered learning, as opposed to learning-centered instruction has the benefit of internal structure, process, and even desired solutions created by an instructor or teacher. “Contrary to common perceptions, this definition (problem-centered peer learning) implies that that faculty are not only involved in the process, of enabling peers to learn from each other, but that faculty design a reasonable degree of direction and structure in the peer-learning process itself” (Gilbert & Merrill, 2008). By allowing peers to work together, and providing structure and guidance, a teacher can create a setting in which goals can be reached and problems solved. Furthermore, by introducing the problem-centered approach to peer mentoring, peer-telling can be avoided.

Peer telling is defined by Gilbert and Merrill by the use of examples such as “when learners are asked to read papers and present them to the rest of the class or when learners are asked to each select a chapter and present the information to a study group” (2008, p. 203). “Peer-telling may help learners remember the information, but does little to help them learn to solve problems or complete complex tasks” (Gilbert & Merrill, 2008, p. 203). In addition to creating a setting that avoids peer-telling and engages students in problem-centered strategies, instructors should attempt to create a scenario that allows learners provide scaffolding for each other in order to reach higher levels of learning and thinking. Researcher King, Staffieri, and Adelgais (1998) designed a study to measure the effects of training students to not only explain material to partners when acting as a tutee, but to also ask comprehension and thought-provoking questions on the

described material. Three mutual peer mentoring conditions were created: explanation only (E), inquiry plus explanation (IE), and sequenced or scaffold plus explanation (SIE).

King et al. (1998) explains:

Tutorial sessions followed teacher-led science lessons over a 5-week treatment. IE and SIE students were trained to ask comprehension and thought-provoking questions on the material when in the tutor role and to explain material to partners when acting as tutee. SIE students received additional training in asking their questions in a particular sequence. E students explained material to each other. SIE students outperformed IE and E students on ability to construct knowledge both during their tutorial interaction and on written measures. (p. 134)

A prevailing concern with designing models for peers to engage together is the degree to which interaction among students can be structured. The design of peers working together is to promote discussion and thinking. Yet, without proper structure the system can be counterproductive in nature. The responsibility of creating a model should be placed on the teacher. Students should not be given the responsibility, or the opportunity, to work together without guidance, instruction, and a proper setting. In addition, students should be trained to scaffold or sequence inquiry, and not be expected to perform academic mentoring without instruction on how to do so. Unfortunately, many teachers, and even schools do not present proper training for mentor / mentee or tutor / tutee programs, while at the same time, expect high levels of outcomes from such programs. Many school-based studies have shown that cognitive development can be enhanced when children work on problems in pairs, as opposed to working individually (Kington & Kutnick, 2005). However for this differentiated instructional strategy to be most

successful, the instructor, administrator, or teacher must provide responsible for the training and structure of the strategy.

### **Benefits of Becoming a Mentor**

Much is covered about the educational benefits of creating a mentoring program that allows peers to assist one another at school or in the classroom. Most of the benefits are focused on how this type of relationship, regardless of age or grade level, can increase higher order thinking and learning with a proper methodology and specific training. The assumption is that the positive returns will be for the individual who is receiving the instruction, not the peer who is trained and is providing the instruction. However, there is evidence that a trained peer mentor receives much in the way of intrinsic and even extrinsic rewards. Karcher (2009) identifies the different positive outcomes that a high school student may encounter as a result of serving others at his or her school in the areas of academic connectedness, attachment, and self-esteem. Forty six teen mentor high school age students in the 10<sup>th</sup> and 11<sup>th</sup> grade, were trained in cross-age mentoring programs (CAMPs), and compared to 45 comparison classmates. After CAMP mentor training, weekly meeting between mentor and mentee took place once a week after school, one Saturday a month, from September to May. Mentors assisted younger mentees in both academic, social, and decision making activities. The results were favorable for the mentee, but interestingly for the mentor as well. The students who participated as cross-age peer mentors in the CAMP reported gains in the areas of academic connectedness, and self-esteem that did a comparison group of peers (Karcher, 2009). Garringer and MacRae (2008) reported much of the same evidence, stating that: “For mentors, there have been reported improvements in connectedness to school, self-

esteem, empathy and moral reasoning, intrapersonal communication and conflict resolution skills, and even a improved relationship with parents” (p. 2).

A study by Thompson (1991) in the state of Vermont, that was designed to ease the transition from one level of schooling to the next (middle to high school), indicated that not only did the freshman class improve in areas of absenteeism, GPA, and extra-curricular activities, but those peer mentors also had an increase in their grade point average. Those mentors also stated that they felt good about helping someone younger than them.

There are obvious gains that will be expected when peers receive assistance and guidance. However, the gains that are evident and reported by those providing the service are surprising. Many would expect the students receiving the service to experience gains, but it also appears that those students who are either chosen or volunteer their time, energy and effort also receive by giving, which is not as commonly found today in our country. The apparent training that a mentor must complete is in part responsible for these gains, since before a mentor can become active in serving other students, he or she must truly get to know their own strengths and weaknesses. Proper training techniques in preparation for mentorship actually benefit the mentor as well. Mentoring also engages students in practice of academic help and counsel. Again, research shows that, with proper training techniques, a student peer mentor will exit a program a much stronger and more knowledgeable student themselves after assisting others in academic content (Gensemer, 2000, Karcher, 2009, Little, Kearney, & Britner, 2010).

## Summary

Those involved in the education of students today, ranging from teachers to administrators, have a wide variety of instructional methods to choose from when considering academic strategies. While many students are successful with teacher-led instruction, there are those learners who require a variety of differentiated strategies before ultimately becoming successful. One such method of instruction is allowing students to assist students in-class or after school. The simple strategy of one student helping another student academically or even socially has many different titles: peer mentor, peer tutor, peer leader, cooperative learning pairs, and a variety of creative acronyms all describe such a process. The concept of positive interaction for education benefit is far from a new or cutting edge idea. Theoretical support for the role of explanations in cooperative learning is provided by socio-cognitive theory, based on the ideas of Piaget (1926) and socio-cultural theory, based on the ideas of Vygotsky (1978). Both theories have emphasized the role of the social context in construction of knowledge and have stressed that peer interactions provide a rich and necessary context for revision of cognitive systems and creation of new meanings (Akker, Denessen, Rijt & Veenman, 2005).

Though the peer mentoring strategy is not a new strategy, there is much to be found and much to be understood about the effectiveness of proper training. Simply grouping students in hopes that higher order thinking will occur is not acceptable policy. If a teacher or a school is going to utilize peer mentoring as an established program for a certain grade level, or if a teacher is planning on pairing up students as a differentiated instructional strategies, proper training must take place first. Without sufficient training,

students should not be expected to assist in the educational process. Along with proper training, setting and structure must also be considered. Egolf, et al. (2004) indicated that in-class training can be as effective as a peer-led team. In other words, a school should be able to effectively utilize the classroom in order to provide peer leadership. This may be true, but according to Egolf, et al. (2004), both in-class peer leaders and out-of-class peer leaders received equal training. This finding indicates that it is not the setting that is crucial to success, but the training the students received prior to the mentoring opportunity. In addition, the school official in charge of creating a program, or the teacher deciding a classroom strategy, must also structure how the mentor process will actually be enacted, and how peer partnerships will be decided. Research indicates that creating a problem-centered approach is most effective in reaching higher order results; likewise initiating the process in a manner that allows and expects scaffolding to occur encourages higher levels of thinking and learning. Elements of effective scaffolding include students' engagement in higher order cognitive processes such as elaborate explanations, appropriate questioning, and sufficient time for partners to think before responding, and positive feedback and encouragement (Adelgais, et al., 1998). There is also surprising research that points to gender considerations when pairing or grouping peers. Girl pairs are actually more successful than boy pairs due to behavioral issues when both groups considered themselves friends (Kington & Kutnick, 2005).

The process of choosing a mentoring program has a large range of methodology, both in process and theory. However, because the transition from middle school to high school can create a time period of loneliness, isolation, and academic disconnect for some students, providing an opportunity for a first time ninth grade students to connect with a

mentor can prove to make a lasting impact of this at-risk age group both socially and academically (McCallumore & Sparapan, 2010).

## CHAPTER 3: METHODOLOGY

### Introduction

This quantitative study examined the effects of a peer-mentoring program on first time ninth grade students who were struggling academically. The study will help determine the effectiveness of peer-mentor training and the use of such programs to successfully help ninth grade students' academic transition into high school.

### Participants

Though the use of mentors at the high school level are useful in all grades 9-12 (Carter & Pesko, 2008) this study concentrated on a defined population of first time ninth grade students. This experimental group of students was introduced to a freshman friend mentor. The selection of the students was censured by using only students who are in their first attempt at the ninth grade, and did not include repeat ninth grade students. There were forty students within the test and controlled group. The use of forty students helped to determine the relationship between the independent and dependent variables, as well as limiting the bias within the study.

A random sampling of participants was chosen utilizing a large public school system within the metro Atlanta area. This system was chosen because it's high representation of all types of learners from the state of Georgia. With 133 separate schools serving over 162,000 students, 54 schools operate a Title 1 program, with over 60 percent claiming minority status; this school system serves all levels and types of learners (Gwinnett County Public Schools, 2011). In addition, all high schools in this district have equal access and receive peer mentoring training that is utilized at the local school level. The random sampling of students was chosen utilizing the system's curriculum

and scheduling program (SASI). The researcher conducted this query, pulled all first time ninth grade students who completed the first six weeks of academic study during the 2010-2011 school year, and received a average grade between 50 % and 69% in their required math course at the high school chosen to represent the school system (Integrated Algebra I), a accredited high school in the state of Georgia. This data was compared to the control group, whose number consisted of random sampling of first time ninth grade students who completed the first six weeks of academic study during the 2010-2011 school year, received an average grade between 50 % and 69% for their required math course, and did not participate in the freshman friend mentoring program. The control group was an equal number to the experimental group. The students that represent both the control and experimental groups in this study were assigned however there will be students who did and did not receive a peer mentor. Peer mentors were limited in number, and all first time ninth grade students did not receive a peer mentor. In addition, there were first time ninth grade students who did receive a peer mentor that are not included in the study, therefore there should have been no impact regarding which first time ninth grade students were, or were not involved in this study.

### **Treatment**

First time ninth grade students met once per week over a twelve week time period with a randomly assigned trained freshman friend mentor during the second and third six-week grading period during the first semester of the 2010-2011 school year. First time ninth grade students had access to their assigned peer mentor for thirty eight minutes per session. The first time ninth grade students in the experimental group met with a trained freshman friend mentor one period (38 minutes) of the five-day school week. This

meeting took place in the participants' ACT (Academic Content Time) class. The course period is designed into the school system's daily schedule for three reasons: (1) remediation, (2) advisement, (3) intervention. The use of the freshman friend for mentoring purposes did meet all 3 requirements for first time ninth grade students. The experimental group was chosen by cross referencing the students that are assigned to a freshman friend, and also failing the described math course. The meetings between the freshman friend mentor and the first time ninth grade students mentee were monitored, but not controlled by the ACT instructors' who will manage the ACT classroom in a manner that did provide a quiet classroom environment needed for individualized communication between first time ninth grade students and the freshman friend. Only those freshman friends who did completed the training provided by the SLT (Student Leadership Team) will be permitted to serve in this study. The ACT classrooms also had active peer mentors who are not participating in the study. The freshman friend mentors utilized their training as a cross-aged peer mentor. The benefits to the younger student included an accelerated connectedness to the school, a positive benefit towards grades and academic achievement, and pro-social behavior and attitude (Garringer & MacRae, 2008). The control group did not receive the treatment of a freshman friend mentor during their ACT class, however would participate in school a school-wide advisement program approved as a system-wide program and implemented by the ACT teacher independently. The high school in which the study did take place is an accredited high school in the state of Georgia. All high schools in this particular school system are equipped with trained peer mentors. Each school utilizes the same selection process to choose six students to receive peer mentoring training typically held at the local county

Chamber of Commerce. This systematic training occurs once a month during the school year, and twice during the summer. These six individual students disseminate these training practices to peer mentors chosen at each local school to represent each school's peer mentoring program respectively. The school system in this study serves 162,000 plus students, and each high school within the district serves a freshman class of 800 to 1100 plus students annually. The projected freshman enrollment for the 2010-2011 school year was 1056 students.

### **Research Questions and Hypotheses**

This study is designed to answer the following questions:

**RQ1:** What is the impact of ninth grade students receiving assistance from the trained freshman friend mentor versus first time ninth grade students who do not receive peer mentoring assistance (control) on the post-test interim assessment in Integrated Algebra I?

**H<sub>01</sub>:** There will be no significant difference in academic performance of ninth grade students receiving assistance from a trained freshman friend mentor versus first time ninth grade students who do not receive peer mentoring assistance (control) on the post-test interim assessment in Integrated Algebra I.

**RQ2:** Is the distribution of the proportion of passing students for Algebra 1 dependent on whether or not a first time ninth grade student received assistance from a trained freshman friend mentor?

**H<sub>02</sub>:** The distribution of the proportion of passing students for Algebra 1 is independent of whether or not a first time ninth grade student received assistance from a trained freshman friend mentor.

**RQ3:** What is the impact of ninth grade students receiving assistance from the trained Freshman Friend mentor versus first time ninth grade students who do not receive peer mentoring assistance (control) in the numerical averages in Integrated Algebra I?

**H<sub>03</sub>:** There will be no significant difference in numerical averages in Integrated Algebra I of first time ninth grade students participating in the freshman friend mentoring program versus those first time ninth grade students who do not participate in the freshman friend mentoring program.

### **Instrumentation**

**Grades.** The math grade at the end of the first six weeks in Integrated Algebra I was used as the dependent variable to provide: (1) a baseline and (2) a quantitative measurement of the results in the research. The math grade at the end of the first six weeks in Integrated Algebra was used to randomly identify first time ninth grade students for the independent variable. Grades in Integrated Algebra I was also used to test the hypothesis of the study. Though grades do not accurately measure all academic indicators, it is a common scale utilized to measure academic competency (Trautwein, 2009). The researcher utilized the school system's grading scale to pull first time ninth grade students with a grade of 50 % and 69% in Integrated Algebra I. For purposes of computing the grades, the grade scale recorded in the syllabus was used as reference. The grading scale consisted of 90-100% of points, A; 80-89% of points, B; 75-79% of points, C; 70-74% of points, D; and all scores 69% of points and under, F. For the data analysis of the post-test interim assessment scores and scale of 0-100% was measured to determine a raw score.

**Interim assessment.**

The interim assessment or benchmarking test is a summative pre and post- test aligned to the End of Course Test content weights. The interim assessments are aligned to the school system's Academic Knowledge and Skills and instructional calendars and serve as a tool to assist in finding gaps in students' conceptual knowledge as related to the End of Course Test, Gateway and Georgia High School Graduation Test. Interim assessments provide opportunities for teachers and administrators to analyze classroom data, and use it for instructional planning in order to maximize teaching and learning. This assessment is developed by the school system's office of student accountability in collaboration with core curriculum directors to ensure alignment, validity, and reliability of the assessed standards to the school system's instructional calendars. The post-test will consist of 100 multiple choice questions, and will be graded departmentally on a scale of 0-100. The formative pre and post assessments are developed collaboratively among content area teachers and content literacy coaches within the school system. A 70,000 question bank is accessed and items are chosen based upon performance standard correlation and content validity measurement assigned by the providing vendor (Testgate). These system pre and post test assessments are created using Testgate's online system labeled Thinkgate. Each assessment item that is chosen from is compared to the content that is measured by those within the GPS (Georgia Performance Standards). Thinkgate provides item data in the form of p-values for each item. If a value of .2 is assigned to an item, fewer students answered the test item correctly, while a value of .9 assigned indicated that more items were correctly answered by students. These items are aligned to a state of Georgia standard, and this review process created

test items that reviewed for content validity and standard alignment within the state of Georgia, and the school system used for this study. Assessments are multiple choice by design. Each assessment chosen will typically consist of 50-100 questions, and questions are comprehensive in regards to the standards that are designated for the measurement time period, which depends of the use of quarter or semester systems, as well as block or traditional schedule. The grades will be delineated utilizing the school system's grading scale listed prior. The raw score on the interim assessment post-test will be used by the researcher in data analysis. Permission will be obtained by the school system, as well as the administrative leader of the local school, in order to utilize this assessment for such research purposes.

**Validity and reliability.**

The Georgia Department of Education (GaDOE) serves as the oversight function for the development of the Georgia End of Course Test to which the post-test used in this study was aligned. This adheres to the Standards for Education and Psychological Testing as established by the American Educational Research Association (AERA), the American Psychological Association (APA), and the National Council on Measurement in Education (NCME) (Georgia Department of Education, 2011). These assessments yield information on academic achievement at the student, class, school, system, and state levels and the evidence for the validity relies primarily on how well the assessment instruments match the intended curriculum, as well as how well the score report inform the various stakeholders (Georgia Department of Education, 2011). Construct validity is described by McMillan (2001) as to the degree in which a test score can measure the psychological characteristic on interest, and must be assumed to exist in order to explain

some aspect of behavior. For this assessment construct validity is determined by the utilization of point-biserial correlation. Point-biserial correlation measures the correlation between an item and the total test score. On this assessment, 0.30 or above indicates that “students who performed well on the test overall answered items correctly and students who performed poorly on the test overall answered the items incorrectly (Georgia Department of Education, 2011, p. 5). Two reliability indices are reported. The first index is Cronbach’s alpha reliability coefficient (1951) and SEM. Cronbach’s alpha measures the internal consistency over the response to a set of items measuring an underlying one-dimensional trait (Crocker & Algina, 1986). The internal consistency index alpha values are in the range of 0.85 to 0.92. In the winter administration (2010) of Integrated Algebra I, the value was 0.90 (Georgia Department of Education, 2011). SEM is utilized to help quantify the extent of errors that occur within a test, as determine the range within which a student’s true score is likely to fall. “The true score may be expected to fall within one SEM of the observed score 68% of the time” (Georgia Department of Education, p. 8, 2011). The SEM values range from 3.26 to 3.75 for the winter (2010) administration of the test, with the Integrated Algebra I value being 3.29 (Georgia Department of Education, 2011). According to the Georgia Department of Education (2011) this test has a high degree of validity and reliability because it serves the purpose of measuring student mastery of the state’s curriculum in a manner that provides consistent results.

### **First time ninth grade students.**

Participation in the freshman friend mentoring program by first time ninth grade students was used as the independent variable. For the causal-comparative design, first

time ninth grade students were chosen based on a random assignment from SASI. The number of participants in the experimental group correlated to the number of trained freshman friend available during the research time period. That number was projected to be forty students. The number of students who are not participating in the freshman friend mentoring program (G2) will equal that of G1. There is typically an average of sixty freshman friend mentors available, but in order to maintain a random selection, as well as to allow for additional freshman friend to enter the classroom that are not participating in the study, only forty were included.

**Freshman friends.** Students included in this study as peer mentors are referred to as freshman friends. These students are upper classmen (eleventh and twelfth grade) students who apply through an application process (resume, teacher recommendations, reference letters, etc...) and are selected by school officials and staff during the 2009-2010 school year and participate in peer mentoring training. The selection process includes the applicant's academic standing, standardized test scores and potential for academic assistance based on personality traits and content knowledge. In addition, attendance and discipline records are considered before any student is selected. These students are trained by the SLT (Student Leadership Team), which is a county-wide initiative to promote student leadership and mentorship at the local school level. The system-wide program is taught in a module format. The lessons that are taught to the SLT students are derived from Dr. Tim Elmore's (2009) book series *Habitudes* and a workbook created specifically for the SLT team titled *LeaderNext* (2005). The following is a list of lessons that are utilized as the center point of instruction at SLT sessions for a calendar year: Module one: Fight the fuzzy. This module develops personal and

organizational direction through the application of personal mission, vision, and core values. Module two: Developing dynamic habits. This module develops the core principles of time and life managements. Module three: Communication in 3D. This module examines interpersonal, intrapersonal, and public speaking skills. Module four: Cooking up positive change. This module demonstrates to school leaders effective methods to both design and lead change within a school, or workplace culture. Module five: Know yourself. Within this module, students within the program practice developing their own personal leadership styles. Module six: Shape the invisible forces. This particular model examines the building of organizational culture, climate, and community. Module seven: Creating turbo teams looks at the proven methods that can best lead a team based organization. Module eight: strength from within examines the practical side learning both ethical and moral leadership. Tim Elmore is the founder and president of Growing Leaders, Inc. Mr. Elmore has worked directly with, and has been mentored by bestselling author and renowned speaker Dr. John C. Maxwell, and has authored twenty one books, including the series utilized by the school system in this study. The series is titled *Habitudes*. Tim Elmore describes himself as a people developer who is committed to his passion of developing young leaders all around the globe (Elmore, 2009). To gain a sense of the type of training and message that the student mentors representing all schools within the system were receiving, the researcher visited the training session. The researcher sat in on a lesson titled “Self Leadership”. Dr. Tim Elmore was the speaker. The training included break-out and report-back sessions, virtual scenarios and hypothetical situations for the student leaders to consider and work through.

## Procedures

The researcher gained IRB approval prior to gathering any data or conducting any research. At the end of the first six week grading period during the 18 week fall/winter semester of the 2010-2011 school calendar year, 40 first time ninth grade students were randomly designated and categorized by ACT teacher and classroom. These students attend the high school representing the school district examined in this study, with the appropriate grades for the experiment (50-69%) in integrated algebra. The researcher randomly chose forty trained freshman friend who have been assigned a first time ninth grade students as a result of the first time ninth grade students academic progress during the first six weeks of the 2010-2011 school year. An equal number of first time ninth grade students with grades between 50-69% in Integrated Algebra I during the same grading period, who were not assigned a freshman friend were categorized as the control group. At the end of the research period (12 weeks), data was extrapolated from the grades of the experimental groups' post-test interim assessment scores to determine if the introduction of a freshman friend to a first time ninth grade students increases the academic achievement. A raw score of 0-100% was utilized as the assessments are 100 questions, and each question counts one point. A causal-comparative ex post facto design used the interim assessment post-test of first time ninth grade students to determine if there was a significant difference in the pass and failure rates of those students who are introduced to a trained freshman friend mentor (G1), in comparison to Group 2 (G2) who received no treatment. Quantitative data from the interim assessment post-test of both the experimental and control groups provided insight to hypothesis of the research. In addition, the researcher examined(G1) and (G2) to determine if there was

a significant difference in the passing and failure of the course (Integrated Algebra I) at the end of the 3<sup>rd</sup> six weeks for those students with (G1), and without (G2) a freshman friend mentor assigned at the end of the first six weeks. Finally, the researcher also compared the average difference at the end of the 3<sup>rd</sup> six weeks of study in Integrated Algebra I of (G1) and (G2) to determine if there is significant improvement in the numerical grade within and between both groups of students. First time ninth grade students were not notified of the research, and to avoid experimental treatment diffusion, freshman friends were also assigned to first time ninth grade students who have both a higher and lower grade than the experimental group.

### **Research Design**

This study implemented a causal-comparative research design. Eighty ninth grade students who were failing Integrated Algebra I with a range of 50% to 69% average at the end of the first six weeks were chosen to participate. Of the eighty first time ninth grade students, forty were randomly selected to participate in the treatment group and the remaining forty first time ninth grade students served as a control group, as they were not be assigned a freshman friend. The forty first time ninth grade students who were assigned a freshman friend were randomly selected by the following method: Each first time ninth grade students will have the described Integrated Algebra I score, and be eligible to receive freshman friend assistance in their ACT class. After a period of 12 weeks, all (eighty) students were administered a post test. A Mann-Whitney U test was used to determine if the Median score of the students who had a freshman friend was significantly greater than the median score of the control group. The significance level was set at  $\alpha = < .05$ . A second measurement of the success of the freshman friend

program was to compare the pass and failure rates of those who were assigned a freshman friend and those who were not assigned a freshman friend. A chi-square test was used to determine if there is an association between the designations of a freshman friend to a first time ninth grade students and receiving a passing score in Integrated Algebra I. Data was aggregated into a two by two table. Observed counts were compared with expected counts. The significance level was set at  $\alpha = < .05$ . A final analysis measuring the effects of the access of a first time ninth grade students to a freshman friend will use a Mann-Whitney U test based on the differences of first time ninth grade students scores prior the introduction of a freshman friend and afterwards. For each of the eighty first time ninth grade students, the difference in their grades from the end of the first six week grading period and the end of the semester was computed. The average of the differences was computed for treatment and control groups, and then compared. A Mann-Whitney U test was used to determine if the median difference in the treatment group is significantly higher than what would have been expected without the introduction of a freshman friend as determined by the median difference in the control group. The significance level was set at  $\alpha = < .05$ .

In order to test hypotheses one, a Mann-Whitney U test was used. This was an appropriate test because the researcher compared the median post-test score of the mentored students to the median post-test score of the control group. Both groups were independent. Normality of the sampling distributions was assumed since each group has at least forty members. Students were randomly assigned to each group to eliminate bias. Once the median of each group was determined, the test statistic and p-value for the a Mann-Whitney U test were computed to determine if there was a significant difference in

the median scores of the two groups. If the p-value was less than .05, then the null hypothesis was rejected in favor of the alternative hypothesis.

In order to test hypotheses two, a Chi-square test was used. Data was compiled into a two by two table. The rows were labeled as “tutored” or “not tutored.” The columns were labeled “pass” or “fail.” Appropriate counts were tallied within each cell.

Assumptions for the appropriateness of the test were checked and met. The data was categorical, and all expected counts were at least five. Observed counts were compared with the expected counts of each cell by using the Chi-square formula. Once computed, an  $X^2$  table was used to find a corresponding p-value. If the p-value was less than .05, then the null was rejected in favor of the alternative hypothesis.

In order to test hypothesis three, a Mann-Whitney U test was used. A Mann-Whitney U test compared the median difference of the mentored students to the median difference of the control group to determine if those who were mentored significantly improved more than those who were not. Assumptions for the appropriateness of the test were met. Both groups were independent. Normality of the sampling distributions was assumed since each group has at least forty members. Once the test statistic and p-value had been calculated, it was compared to  $\alpha = < .05$  significance level. If the p-value was less than .05, then the null was rejected in favor of the alternative hypothesis.

### **Summary**

This study examined whether the introduction of trained peer mentor to a treatment group of first time ninth grade students, who are struggling in Integrated Algebra I, can make a statistically significant academic impact. Research indicates that first time ninth grade students experience high failure rates while taking this introductory

and required mathematics course (Bottoms & Timberlake, 2007). Research also indicates that academic failure during this grade level can highly increase the odds that a first time ninth grade students will not graduate on time, or at all. The forty participants in this study were randomly chosen from a pool of first time ninth grade students who are identified as at risk for failing Integrated Algebra I and who had been assigned a trained peer mentor. A control group of forty first time ninth grade students who are at risk of failing Integrated Algebra I was chosen based of the fact that they did not receive any peer mentoring from a freshman friend. The grades, post test scores, and the difference in the passing and failure rates within Integrated Algebra I was examined using a causal-comparative design. The data analysis included a Mann-Whitney U test to examine hypotheses one. A Chi-square test was compiled into a two by two table to test hypotheses two, and a Mann-Whitney U test was used to test hypothesis three.

## CHAPTER FOUR: RESULTS OF THE STUDY

### Introduction

Many first-time ninth grade students experience academic difficulty in the transition from middle school to high school. The impact can be significant and often occurs in the mathematics course that first-time ninth grade students are enrolled (Neild et al. 2008). Without intervention, first-time ninth grade students run the risk of not performing well on standardized tests and the course work itself. Dedmond (2006) indicates that more students fail the ninth grade than any other and this fact immediately puts these students at risk of not earning a high school diploma. The creation of an intervention program such as peer mentoring can assist these students during this transitional time period.

The purpose of this study was to explore how an organized peer mentor system can affect the academic endeavors of first-time ninth grade students in Algebra I. Post-hoc power analysis revealed that in order to detect an effect size of 0.101 (the largest found in this study, for the post-test analysis) with a power of 0.8 and a significance level of 0.05, the number of subjects required would have been 1540 per group. The implementation of this study was conducted utilizing a quantitative casual-comparative research design, and it examined 80 ninth grade students who were failing Integrated Algebra I with a range of 50% to 69% average at the end of the first six weeks of the 2010-2011 school year.

Table 1 provides frequencies and percentages of demographic characteristics of the 40 students in each group. While race appears to be roughly similarly distributed

between the two groups, those in the control group are more likely to be female (63%) while those in the experimental group are more likely to be male (55%). Additionally, there are a lesser percentage of special education students in the experimental group, when compared to the control group (10% versus 25%).

Table 1

*Demographic Frequencies and Percentages by Group*

		Control		Experimental	
		Frequency	Percent	Frequency	Percent
Race	White	21	53%	16	40%
	African-American	7	18%	13	33%
	Asian	4	10%	5	13%
	Hispanic	4	10%	5	13%
	Multi-Race	4	10%	1	3%
Gender	Male	15	38%	22	55%
	Female	25	63%	18	45%
SpEd	Yes	10	25%	4	10%
	No	30	75%	36	90%

Because the students were to be compared on the basis of achievement, it was of interest to learn whether the two groups were similar in their six-week numerical grade average. These scores indicate that the two groups, though randomly chosen, did have slightly different averages at the beginning of the study. Summaries of the six-week numerical grade averages are presented in Table 2.

An independent measures, two-tailed *t*-test of the six-week numerical grade averages was conducted, and the results are provided in Table 3. Note that Levene's Test for Equality of Variances indicated homogeneity of the two groups ( $F = 0.558$ ,  $p = 0.457$ ). The test indicates that students in the experimental group had a six-week numerical grade average that was 3.425 points lower ( $M = 58.85$ ,  $SD = 5.072$ ) than the

control group ( $M = 62.28$ ,  $SD = 5.533$ ); this difference is significant ( $t_{78} = -2.886$ ,  $p = 0.005$ ). This indicates that the two groups did not have equivalent course grades at the six-week mark, and may change the interpretation of later results.

Table 2

*Results of Independent Measures, Two-Tailed T-test for Differences of Six-Week Numerical Grade Averages Between Groups*

Group	n	M	SD	t	p=
Students with mentor	40	58.85	5.072		
Students without mentor	40	62.28	5.533	-2.886	.005

The following research questions and hypotheses guided the data collection and analyzing of this study.

**Research question 1:** *What is the impact of ninth grade students receiving assistance from the trained freshman friend mentor versus first time ninth grade students who do not receive peer mentoring assistance (control) on the post-test interim assessment in Integrated Algebra I?*

$H_{01}$ : There will be no significant difference in academic performance of ninth grade students receiving assistance from a trained freshman friend mentor versus first-time ninth grade students who do not receive peer mentoring assistance (control) on the post-test interim assessment in Integrated Algebra I.

**Research question 2:** *Is the distribution of the proportion of passing students for Algebra I independent of whether or not a first time ninth grade student received assistance from a trained freshman friend mentor.*

$H_{02}$ : The distribution of the proportion of passing students for Algebra 1 is independent of whether or not a first time ninth grade student received assistance from a trained freshman friend mentor.

**Research question 3:** *What is the impact of ninth grade students receiving assistance from the trained Freshman Friend mentor versus first-time ninth grade students who do not receive peer mentoring assistance (control) in the numerical averages in Integrated Algebra I?*

$H_{03}$ : There will be no significant difference in numerical averages in Integrated Algebra I of first-time ninth grade students participating in the freshman friend mentoring program versus those first-time ninth grade students who do not participate in the freshman friend mentoring program.

### **Research Questions and Results**

**Research question 1:** *What is the impact of ninth grade students receiving assistance from the trained freshman friend mentor versus first time ninth grade students who do not receive peer mentoring assistance (control) on the post-test interim assessment in Integrated Algebra I?* In order to answer research question 1, the researcher retrieved the 2010 results of the post-test interim assessment in Integrated Algebra I. The reliability of this independent variable was assumed as a result of the information included in the Georgia Department of Education's *An Assessment and Accountability Brief* (2011).

After retrieving these data, the researcher compiled the 2010 first semester post-test interim assessment scores in Integrated Algebra I of those students who did and did not receive treatment. A Mann-Whiney U test was used to compare the median post-test scores of both groups as well as to determine if the average scores of the students who

had peer tutoring was significantly higher than the average score of the control group. The two groups are considered to be statistically independent of one another because they are composed of different students, and were not paired with one another on any basis. The sampling distributions do not have extreme departures from normality, as shown in Figure 1 and Figure 2, and normality of the population can be assumed for testing purposes.

Figure 1. Histogram of Post-Test Scores for Control Group

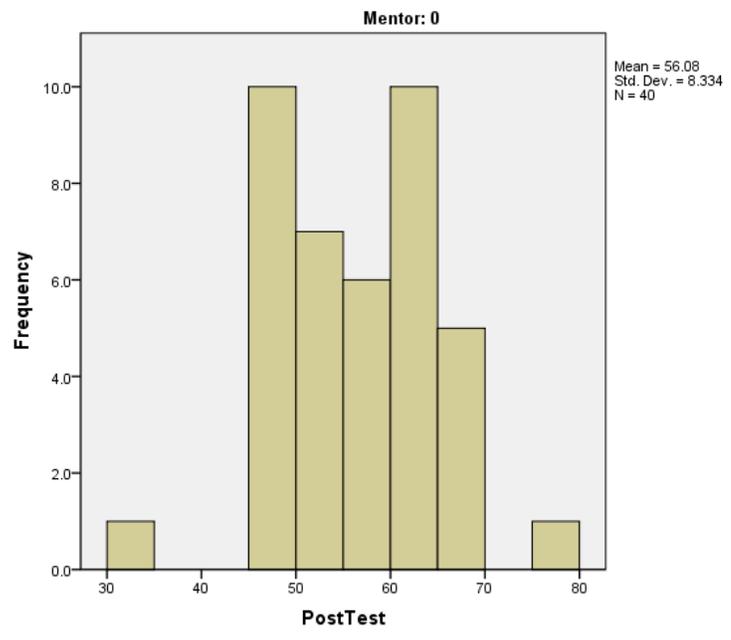
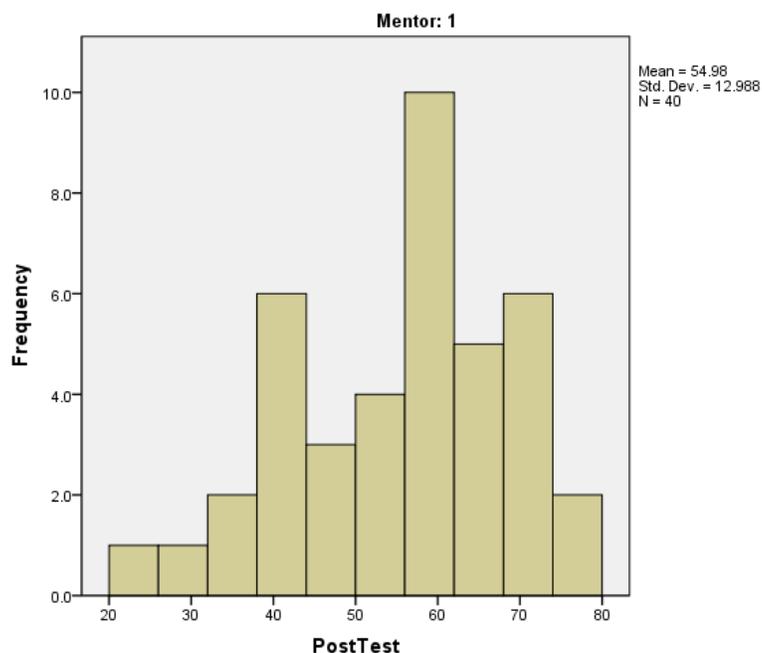


Figure 2. Histogram of Post-Test Scores for Experimental Group



The results of the Mann-Whitney U test are provided in Table 3. Levene's Test for Equality of Variances failed to indicate homogeneity of the two groups ( $F = 6.992$ ,  $p = 0.010$ ) and so equal variances were not assumed for the Mann-Whitney U test. Students in the experimental group had a median post-test score that was 0.1 points higher (Median = 5.65) than the control group (Median = 5.55). The difference in the grade changes is not significant at the 0.05 level of significance ( $p = .919$ ). This indicates that that students in the experimental group and students in the control group have similar median post-test scores over the course of the semester.

Table 3

*Results of Mann-Whitney U Test for Differences of post-test scores Between Groups*

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of PostTest is the same across categories of Mentor.	Independent-Samples Mann-Whitney U Test	.919	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

**Research question 2:** *Is the distribution of the proportion of passing students for Algebra 1 dependent on whether or not a first time ninth grade student received assistance from a trained freshman friend mentor?*

Observed counts were compared with the expected counts of each cell by using the chi-square formula. Once computed, a  $\chi^2$  table was used to find a corresponding p-value. Observed counts were compared with expected counts to compute the chi-square statistic. There was no evidence that the distribution of passing students was dependent on whether or not a student received assistance from a freshman friend mentor,  $\chi^2(1, n=80) = 1.270, p = 0.260$ . The significance level was set at  $\alpha < .05$ . The frequency distribution for this chi-squared test is displayed below in Table 4. After collecting and analyzing the data, the researcher failed to reject the null hypothesis, stating that the distribution of the proportion of passing students in Integrated Algebra 1 is independent of whether or not a first time ninth grade student received assistance from a trained freshman friend mentor.

Table 4

*First time ninth grade students receiving mentor assistance and non-assistance by the passing and failure rates in Integrated Algebra I.*

Observed counts are listed in the table below, along with percent passing and failing within each group.

<b>PassFail * Mentor Crosstabulation</b>					
			Mentor		Total
			No	Yes	
Pass Fail	Fail	Count	20	25	45
		% within Mentor	50.0%	62.5%	56.3%
Pass	Pass	Count	20	15	35
		% within Mentor	50.0%	37.5%	43.8%
Total		Count	40	40	80
		% within Mentor	100.0%	100.0%	100.0%

**Research question 3:** *What is the impact of ninth grade students receiving assistance from the trained Freshman Friend mentor versus first-time ninth grade students who do not receive peer mentoring assistance (control) in the numerical averages in Integrated Algebra I?*

In order to answer research question 3, the researcher examined the difference of each student's (control and experimental) final grade compared to their grade at the beginning of the first semester of the 2010 school year in Integrated Algebra I. The data was for all first-time ninth grade students whose numerical average at the end of the first six-week grading period was 50-69%. The information was retrieved from the system's SASI database. The researcher removed all students who had taken Integrated Algebra I more than once (failed previously) and those students who were not in the ninth grade for the first-time.

A Mann-Whitney U test was used to compare the distribution of numerical grade averages of the two groups. Students in the experimental group had a grade difference that was 4.5 points higher (Median = 6.5) than the control group (Median = 2.0). Note that Levene's Test for Equality of Variances indicated homogeneity of the two groups ( $F = 3.283, p = 0.074$ ); this difference is not significant evidence of different variances at the 0.05 level of significance. As before, the two groups are considered to be statistically independent of one another. As shown in Figure 3, one extreme outlying observation is apparent in the control group, with a grade change of -35 points from the six-week evaluation to the end of the semester. With the exception of this one data point, the data do appear to be normally distributed. However, as shown in Figure 4, the data for the experimental group do not appear to be normally distributed and have no apparent outliers (skewness = -1.038), and given these considerations a non-parametric test was chosen to compare the medians of the two groups rather than the parametric independent t-test for differences of means.

Figure 3. Histogram of Grade Changes for Control Group

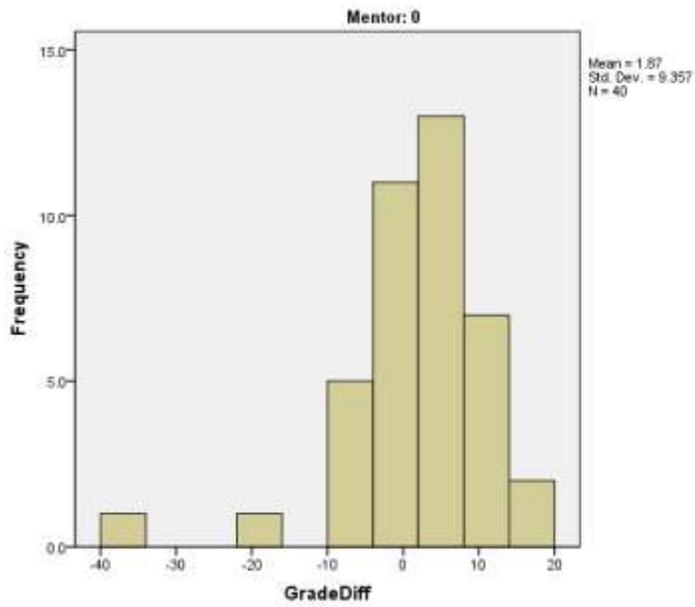
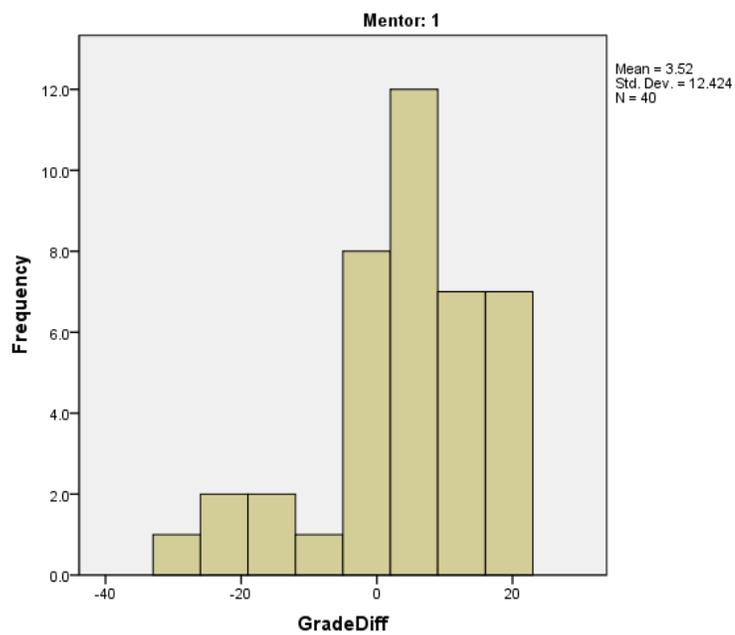


Figure 4. Histogram of Grade Changes for Experimental Group



The results of the Mann-Whitney U test are provided in Table 5. The test indicates that students in the experimental group and students in the control group have similar median grade changes over the course of the semester.

Table 5

*Results of Mann-Whitney U Test for Differences of Grade Changes Between Groups*

<b>Hypothesis Test Summary</b>				
	<b>Null Hypothesis</b>	<b>Test</b>	<b>Sig.</b>	<b>Decision</b>
<b>1</b>	The distribution of GradeDiff is the same across categories of Mentor.	Independent-Samples Mann-Whitney U Test	.173	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

The difference in the grade changes is not significant at the 0.05 level of significance ( $p = 0.173$ ). After analyzing the results of the Mann-Whitney U test, the researcher failed to reject the null hypothesis 3 and concluded that there is not a significant impact on ninth grade students receiving assistance from the trained freshman friend mentor on the final grade in Integrated Algebra I. The median numerical averages of the two groups have been shown to be statistically similar.

### **Conclusion**

The researcher failed to reject the null hypotheses of RQ's 1, 2 and 3, which indicates no significant difference in the scores on the post-test interim assessment, or the passing and failure rates, or the change in numerical averages of ninth grade students receiving assistance from the trained freshman friend mentor in Integrated Algebra I.

## CHAPTER FIVE: DISCUSSION OF RESULTS AND IMPLICATIONS FOR FUTURE RESEARCH

### Introduction

Research and current student data indicates that the transition from the middle school setting to the ninth grade causes a high number of students to fail one or more course during this time (Bottoms & Timberlake, 2007; Isakson & Jarvis, 1999; Kerr, 2002). In this study, *Peer Mentoring: The Effects on Ninth Grade Student Achievement* the researcher examined the effects that a trained peer mentor has on the academic achievement of first-time ninth grade students in Integrated Algebra I mathematics. By implementing a randomized comparative design, an administration of a treatment to an experimental group and an alternative or no treatment to a control group, and a comparison of the groups' performance on a post treatment were measured. The independent variables examined included the academic impact on post-test interim assessment scores in Integrated Algebra I, passing and failure rates in Integrated Algebra I and numerical averages in Integrated Algebra I.

The study included 80 first-time ninth grade students who entered the ninth grade in August 2010 and were enrolled in the required mathematics course Integrated Algebra I. The 80 students were failing Integrated Algebra I and the end of the first six weeks, and were randomly chosen out of 176 total first-time ninth grade students who had a numerical average between 50% and 69%. The cut-off score was chosen to eliminate those students who were not attempting to pass the course and were most likely to cease providing efforts towards passing. Forty first-time ninth grade students represented the

experimental group, as they received treatment and 40 first-time ninth grade students represented the control group, as these students received no treatment. After a period of 12 weeks, all (80) students were administered the post-test interim assessment, which was a system wide assessment used as the final examination. To examine the impact of a peer mentor program, a Mann-Whitney U test was used to determine if the median score of the students who had a peer mentor was significantly greater than the average score of the control group on the post-test taken in Integrated Algebra I. The significance level was set at  $\alpha = < .05$ . A second measurement of the peer mentoring program was the impact on the pass and failure rates in Integrated Algebra I of those first-time ninth grade students who were assigned a peer mentor and those who were not assigned a peer mentor. A chi-square test of independence was used to determine if there was an association between the designations of a peer mentor to a first-time ninth grade student and receiving a passing score in Integrated Algebra I. A final analysis measured the impact of a peer mentor on a first-time ninth grade student by using Mann-Whitney U test which examined the differences of Integrated Algebra I scores prior the introduction of a peer mentor, and scores afterwards. For each of the 80 first-time ninth grade students, the difference in their grades from the end of the first six week grading period and the end of the semester was computed. This median of the differences was computed for the treatment and control groups, and then compared. A Mann-Whitney U test determined if the median difference in the treatment group was significantly higher than what was expected without the introduction of a peer mentor as determined by the median difference in the control group. By using the Mann-Whitney U test, which is rank-based,

the medians were compared rather than the means because the normality did not hold true for this particular data.

### **Restatement of the Problem**

The potential success of the students who enter high school can depend much on what occurs in their first year of high school (Fiske, 2006; Garringer & MacRae, 2008). The chance that a high school student will receive a high school diploma on time increases when a first-time ninth grade student is successful during year one (McCallumore & Sparapani, 2010). Conversely, first-time ninth grade students who are unsuccessful initially, or fail course work during the freshman year are much more likely to not graduate with their classmates on time (Akker et al. 2005). Integrated Algebra I is the mathematics course that most systems require at the ninth grade level, and is one course that many first-time ninth grade students are unsuccessful passing in their first attempt (Banejee, 2011; Styron & Peasant, 2010). In fact, in some schools, nearly one half of all students who attempt Algebra I, do not pass (Neild, 2009). This creates a clear problem for many first-time ninth grade students, as this course can create a high risk of failure during their freshman year of high school, ultimately leading to devastating academic results. Research by Bottoms (2007) indicates that an unsuccessful ninth grade student has a greater chance of not graduating. Students that are unsuccessful in their first year of high school stand a greater chance of falling behind academically and never recovering (Bottoms, 2007). These facts indicate that the potential for first-time ninth grade students to face academic problems, particularly in mathematics is very real. Furthermore, a first-time ninth grade student who is unsuccessful runs a greater risk of not fulfilling his or her graduation requirements (Banejee, 2011; Styron & Peasant,

2010). Research demonstrates that the introduction of a mentor at the ninth grade level may increase academic enrichment, content knowledge, and educational success (Little, Kearney & Britner, 2010; Roberts & Cotton, 1994). However, Randolph and Johnson's (2008) review of research regarding school-based mentoring programs points to the fact that mentoring programs do have an effect on student attitudinal and behavioral outcomes, but the effects on academic performance were inconclusive. Therefore, this study was investigate the academic effects that a trained peer mentor has on student achievement with first-time ninth grade students in Algebra I which will provide further research data on the topic of peer mentor and academic performance.

### **Research Questions**

**Research question 1:** *What is the impact of ninth grade students receiving assistance from the trained freshman friend mentor versus first time ninth grade students who do not receive peer mentoring assistance (control) on the post-test interim assessment in Integrated Algebra I?* The results from the independent measures, two-sample *t*-test indicated that there is no academic impact on first-time ninth grade students that receive assistance from trained freshman friend mentors on a standardized test such as the post-test interim assessment in Integrated Algebra I. The Mann-Whitney U test determined that the experimental group had a median post-test score that was 1.0 points higher (Median = 5.65) than the control group (Median = 5.55). The difference in the grade changes was not significant at the 0.05 level of significance ( $p = .919$ ). This indicates that that students in the experimental group and students in the control group have similar median post-test scores over the course of the semester.

As a result, the researcher failed to reject null hypothesis one which stated that there would not be a significant difference in academic performance of ninth grade students who receive assistance from a trained freshman friend mentor on the post-test interim assessment in Integrated Algebra I.

**Research question 2:** *Is the distribution of the proportion of passing students for Algebra I dependent on whether or not a first time ninth grade student received assistance from a trained freshman friend mentor?* In order to answer research question 2, the researcher retrieved the 2010 passing and failure rates in Integrated Algebra I for all first-time ninth grade students whose numerical average at the end of the first six-week grading period was 50-69%.

After the data was organized, the researcher conducted a Chi-squared test to determine if there is an association between involvement in peer mentoring and the successful passing of the course. Data was aggregated into a 2 X 2 table. The rows were labeled as mentored or not mentored. The columns were labeled pass or fail. Appropriate counts were tallied within each cell. Observed counts were compared with the expected counts of each cell by using the Chi-square formula. The Chi-squared test indicated  $\chi^2(1, n=80) = 1.270$ ,  $p = 0.260$ , which is not significant at the 0.05 level. After collecting and analyzing the data, the researcher failed to reject the null hypothesis, stating that there is no impact between first-time ninth grade students receiving assistance from the trained freshman friend mentor and first-time ninth grade students who do not receive peer mentoring assistance on the passing and failure rates in Integrated Algebra I.

**Research question 3:** *What is the impact of ninth grade students receiving assistance from the trained Freshman Friend mentor versus first-time ninth*

*grade students who do not receive peer mentoring assistance (control) in the numerical averages in Integrated Algebra I?* In order to answer research question 3, the researcher examined the difference of each student's (control and experimental) final grade compared to their grade at the beginning of the first semester of the 2010 school year in Integrated Algebra I. The data utilized included all first-time ninth grade students whose numerical average at the end of the first six-week grading period was 50-69%. After retrieving these data, the researcher took the 2010 first semester final grade and the grade at the end of the first six weeks in Integrated Algebra I of those students who did and did not received treatment. A Mann-Whitney U test compared the median difference of the mentored students to the median difference of the control group to determine if those who were mentored significantly improved more than those who were not. The results of the Mann-Whitney U test gave  $p = 0.173$ . After analyzing the results of the Mann-Whitney test, the researcher failed to reject the null hypothesis 3 and concluded that there is not significant impact on ninth grade students receiving assistance from the trained freshman friend mentor on the final grade in Integrated Algebra I.

## **Discussion**

The three research questions were carefully considered at the onset of this study and represent the foundation for this project. The researcher was intrigued by the process in which student mentors receive training and the impact this training may or may not have on student academic achievement. The researcher reviewed multiple casual-comparative and quasi-experimental studies that included the use of peer mentoring and the effects on academic achievement. King et al. (2002) and Portwood et al. (2005) are

examples of studies that utilized a pretest-post-test design. The researcher found that there is a gap in the discussion regarding mentors and the specific training that they receive. The research indicates that mentor training is an essential component to a successful mentoring program (Maheady, et al., 2006; Orten & Stokes, 2005), however the researcher found that more is needed in the efforts to define what is considered training in regards to successful academic assistance. The information within this study will help fill a gap in this area of research.

In response to the multiple academic pitfalls indicated in the research (Styron & Peasant, 2010; Weiss, 2001) that first-time ninth grade students face in the transition from middle school to high school; the researcher recognized the importance of potential intervention at this juncture in the educational process. The three research questions provided a multi-faceted examination of the effects that a trained peer mentor could have on a first-time ninth grade student and their academic achievement in critical course area of mathematics. These three research questions guided the research discussion.

**Research question 1:** *What is the impact of ninth grade students receiving assistance from the trained freshman friend mentor versus first time ninth grade students who do not receive peer mentoring assistance (control) on the post-test interim assessment in Integrated Algebra I?* The stated impact on academic performance, specifically on standardized tests was discussed in the review of the literature. With the academic requirements set forth by governmental mandates such as No Child Left Behind, school systems must implement a number of assessments to justify their progress. Springer (2008) points out that our schools are increasingly required to administer a series of national standardized tests which indicate adequate yearly

progress. The results of these assessments become the measurement tool utilized to demonstrate proficiency. As a result of the need for validation of the minimum competency performance standards, a variety of standardized test must be passed for the individual student, or more so, schools and school districts to demonstrate competency or even avoid increasing sanctions. The researcher concurs with Osguthorpe and Scruggs (1986), and Stenhoff and Lignugaris/Kraft (2007) who conclude that the use of peer mentors can assist in improving standardized test scores of both regular education students and students with special needs.

The researcher failed to reject RQ 1's null hypothesis that stated there would be no significant difference in academic performance of ninth grade students receiving assistance from a trained freshman friend mentor versus first-time ninth grade students who do not receive peer mentoring assistance (control) on the post-test interim assessment in Integrated Algebra I. The impact that was measured on ninth grade students receiving assistance from trained freshman friend mentor was not statistically significant on the culmination of this research project.

**Research question 2:** *Is the distribution of the proportion of passing students for Algebra I dependent on whether or not a first time ninth grade student received assistance from a trained freshman friend mentor?* In the review of the literature, the researcher found that the failure rates, particularly in mathematics, were considerably higher for ninth grade students compared to other age groups. The researcher agrees with Bottoms and Timberlake's (2007) assessment that adjustments of adolescents who are involved in the transition from middle school to high school, who experiencing a change in a sense of autonomy, social support, school membership, and perceived

stressor can be impacted in a manner that ultimately affects grades. In addition, the researcher concurs with Manning's (2000) view that there are many new freedoms that were not available in 8<sup>th</sup> grade, including social distractions and usually a larger campus with many more classes from which to choose that has a negative impact on first semester passing rates.

Research by Neild and Balfanz (2008), and Neild, Stoner-Eby and Furstenberg (2008) discussed and concluded that the achievements that students obtain and demonstrate in junior high school may not translate over to a student's first year in high school. According to Neild and Belfanz (2008) the reasons included higher amounts of homework, less individualized students to teacher daily contact, larger class sizes and an increased level of social pressures. The research by Stoner-Eby and Furstenburg (2008) concludes that the transition year that freshman experience can often impact their passing and failure rates, regardless of the academic success that have been achieved in past school years.

The researcher failed to reject RQ 2's null hypothesis which stated that there will be no significant difference in passing rates in Integrated Algebra I of first-time ninth grade students participating in the freshman friend mentoring program versus those first-time ninth grade students who do not participate in the freshman friend mentoring program.

**Research question 3:** *What is the impact of ninth grade students receiving assistance from the trained freshman friend mentor versus first-time ninth grade students who do not receive peer mentoring assistance (control) in the numerical averages in Integrated Algebra I?* The researcher found that the review of literature indicates a need

for intervention at the ninth grade level. Research by Blankstein (2004) and Fields (2005) demonstrates that the success achieved in the freshman year of high school can be used as an indicator for future academic success. Conversely, this research points out that students who struggle in the freshman year transition tend to struggle throughout high school. Those students who obtain a numerical average that result in retention are placing themselves at higher risk of further failure, particularly in mathematics.

The conclusion of Balfanz, et al. (2007) indicates that up to 20% of students drop out of high school after unsuccessfully gaining credit during their freshman year. Research by Dedmond (2006) identifies that more students fail mathematics during their freshman year than any other single course K-12. As a result, the researcher believes that the freshman year of high school is a critical period that not only should identify those students who are at risk, but should also provide for student intervention, particularly in the subject area of mathematics.

The researcher failed to reject RQ 3's null hypothesis which stated that there will be no significant difference in numerical averages in Integrated Algebra I of first-time ninth grade students participating in the freshman friend mentoring program versus those first-time ninth grade students who do not participate in the freshman friend mentoring program.

### **Limitations of the Study**

**Limitations.** A number of limitations affected the study's outcomes. Though measures were taken to control the potential threats to both internal and external validity, such as using students from the same school, selecting students that were only first time ninth graders, there is a likelihood that some variations in the implementation of the plan

occurred. The process of maturation could be present with the natural passage of time. First-time ninth grade students experience many changes in the year that they transition from middle school to high school. Many first-time ninth grade students make significant jumps in both academic and social maturity during their freshman year in high school. While at the same time, many students, particularly male students, do not experience this growth until later in the maturation process (McCallumore & Sparapan, 2010). Due to natural maturity growth, grades could improve with or without the introduction of a freshman friend mentor.

The relationship that does or does not develop between first-time ninth grade students and their freshman friend mentors could potentially make a statistical difference in the successfulness of such a peer mentor program. Research indicates that those who develop bonds or even friendship have more confidence in that relationship. Karcher (2009) indicates through a meta-analysis on children's friendship relationships that friends are more likely than non-friends to cooperate, communicate, and engage in positive affective exchanges.

A variance in the timing of the interaction and treatment effects will be difficult to avoid throughout the school day. Students will inevitably receive assistance (peer mentoring) at different times during the school day, particularly before and after lunch. It is the researcher's experience that students who are nearing the lunch cycle, and those who have just returned from eating lunch have different attention habits, resulting in adjusted cognitive levels. A high school with over three thousand students may need three out of the seven periods to serve all students lunch during a school day. In a school that begins at 7:30 A.M. and finishes at 2:30 P.M., this will mean that a student could be

served lunch as early as 10:15 A.M, or as late as 1:15 P.M. The simple timing of lunch during the day has anywhere from a minor to a significant effect on students' cognitive levels (Morris & Sarll, 2001; Smith, Ralph & McNeill, 1988). The described variance in effect was from student to student. According to Morris and Sarll (2001) the glucose level of a student can increase the listening span significantly, indicating that the timing of lunch could be effect student's ability to stay on-task. Schools with higher enrollments will require a large amount of time to process their student body through the lunch cycle. As a result, students that are at lower glucose levels during their prescribed meeting time with their peer mentor may not get the results of those students who meet after the lunch cycle.

First-time ninth grade students may also have experienced multiple sources of treatment interference. Many students, both in the ninth grade, and older students participating as mentors might possibly have had prior mentoring experiences that could lead to preconceived opinions about the mentoring process. A prior negative experience could possibly have affect the openness or attitude towards the assistance process that mentoring provides (Hounsell, McCune, Hounsell, & Litjens, 2008). Either mentor or mentee could experience such an effect, and the ability to have this prior knowledge will not be obtained in this study.

The 40 first-time ninth grade students who receive the treatment (assigned a freshman friend for 12 weeks) will be chosen randomly, and will have different instructors for their assigned Integrated Algebra I mathematics course. Though common assessments were utilized, and common planning and vertical teaming does occur, all instructors will have different teaching styles, and some teachers are inherently more

successful than others in instructional strategies (Burnett & Lowery, 2010; Li-fang, 2008). A student may indeed experience academic gains and or growth simply due to the fact that his or her teacher has discovered an instructional approach that proves to be beneficial. Quality instructors have the ability to understand the many different teaching styles that will be required to help multiple students and multiple learning styles become successful (Burnett & Lowery, 2010; Li-fang, 2008).

Finally, the freshman friend mentors themselves will vary. Though they are chosen using strict and unilateral criteria, receive the same peer mentoring training, and are monitored by certified staff, the forty randomly chosen students will naturally bring to the study strengths and weaknesses in both academic and leadership skills (Curren, & Marques-Quinteiro, 2009). These natural strengths and weaknesses of the individual peer mentors were not taken into consideration in this study, nor did the researcher find any evidence of such in the research. Though all peer mentors were required to meet high academic standards to become part of the freshman friend peer mentoring program, and all members received the same training, some mentors may indeed be stronger in mathematics than others. These mentors could naturally provide a higher level of mathematic assistance than a mentor with lesser skills or knowledge.

### **Implications**

The current study is significant because it provides an analysis of a widely utilized peer mentoring program in a large urban high school setting. The evidence in this study concluded that peer mentoring did not increase the academic achievement of first time ninth grade students. This finding is significant because it contradicts prior research that indicates those students who have access to a trained peer mentor will

perform at higher levels academically than those who do not have access (Neild et al., 2008, Merrill & Clark, 2008).

The recognition of the students who are academically at risk is important (Schiller, 1999; Trautwein, 2009). Such recognition should result in the establishment of a culture of assistance to assist in the ultimate goal of high school graduation for these at risk students. This research study was created to examine a current student mentoring program in a large school setting that was designed to affect the academic outcome of at risk students. Further implications include examining the duration of a provided peer mentoring program. Herrera (2004) references the time that a mentee has access to a mentor can possibly increase or decrease a desired result of a peer mentoring program. Both the amount of time (minutes) and duration (number of meetings) was dictated by a preset student schedule. A change in the time students spend with a peer mentor should be examined to determine if greater impacts on academic achievement could be achieved.

Peer mentoring programs can be costly to both begin and operate. Before a school system adopts a peer mentoring program model, sufficient evidence should exist to support the allocation of funds to do so. By simply providing the time for a student who is struggling academically to have access to a student who is academically proficient, even with training should not be considered enough.

School officials are responsible for identifying and assisting student groups that are at-risk of under- performing academically (Garringer & MacRae, 2008). Current research points to the use of peer mentoring to assist the mentee, as well as providing the classroom teacher with a differentiation tool for learning (Huebner, 2010). As these stakeholders seek to maximize the positive impact of their financial resources, peer

mentoring should not be overlooked. However, as the results of this study indicated, the use of peer mentors should not be counted on to raise numerical averages, or increase scores on standardized tests.

### **Recommendations for Future Research**

The transition from the middle school or junior high school setting to the traditional high school setting can present academic challenges for many rising ninth grade students. Larger school settings, higher academic expectations and increased academic rigor are reasons that high percentages of ninth grade students are unsuccessful during this time, particularly in mathematics (Bottoms, 2007). This reality can manifest into a greater risk for a continuance of failure, and ultimately not fulfilling graduation requirements (Banejee, 2011; Styron & Peasant, 2010). This research study was purposefully created to determine if established training methods for student mentors impacted first-time ninth grade students, specifically in the area of mathematics.

While this is a causal-comparative design, similar to the quasi-experimental design with pre- and post-test assessments utilized by Portwood et al. (2005), this study measured the effect of mentoring on academic outcomes and performance, specifically pertaining to scores on standardized assessments, passing and failure rates, and numerical averages. Based on the data retrieved by the Portwood, the effectiveness of such a program can be measured and the findings added to the existing field of research on this topic.

Lee and Cramond (1999) indicate that often time high risk students are recruited to participate in mentoring programs because such students are often behind academically and in need of remediation. Such students have serious needs that the peer mentor may

or may not have the training to assist with. Researchers may find it appropriate to extend research in this area by analyzing peer mentoring results on low risk students, as well those who are identified as no risk students to determine the effectiveness of peer mentoring for all types of learners.

The relationships that are built within the mentoring process can affect the academic outcomes that are intended to be measured. Rode and Kubic (2002) indicates that the improvements in the peer mentoring process will result in the ability of mentors to “enhance social skills and emotional well-being, by improving cognitive skills, and by serving as a role model (p.35). Ary (2010) points out that those seeking to benefit from the relationship derived from the peer mentoring process and demonstrate cognitive development, will find a strong link between leadership success and the ability to utilize input from other people. Further studies regarding the peer mentor / mentee relationship could lead researchers to develop a deeper understanding of what type of factors play essential roles in the development of such relationships and how it could play a role in greater academic achievement.

The success of peer mentoring, as a process, tends to greatly depend on mentor training and preparation (Fulk & King, 2001; Gensemer, 2000). One consistent theme that is found in the study of peer mentoring programs is that mentor training is very crucial to the ultimate gains that a mentee achieves while receiving help, regardless of the chosen program (Maheady, Mallette, & Harper, 2006). Mentors with current high academic achievement alone will not guarantee the successfulness of a peer mentoring program. Mentorship consists of certain skill sets that can be developed (Elmore, 2008) and future studies in this area would have an opportunity to build on the current

knowledge that points to the successful attributes of a successful mentor. Furthermore, peer mentoring programs can be considered an inexpensive alternative to academic remediation and differentiation. In times of economic cutbacks, the use of peer mentors within the field of education can be considered a cost-effective approach to a school system (Rode & Kubic, 2002). Comparing this cost effectiveness may increase the desirability of such programs and make peer mentoring possibly more appealing for any school systems that are under financial duress.

Such claims (Rode & Kubic, 2002), could be considered misleading. The researcher could not determine a dollar amount spent on the training of the freshmen friends in this study. However, monthly training sessions were held at high-end facilities (off campus). Students received books, manuals, DVD's and either lunch or breakfast or both. Most sessions were conducted by outside speakers. Instructional time was lost to afford the peer mentors the opportunity to train. To assume that such a program was not costly would be misleading at best. The school district did provide training for the peer mentors (at a cost) to assist at the local school levels, yet in the opinion of the researcher, the district did not monitor for the successfulness of the program once the peer mentors went back to their home schools.

### **Conclusion**

The transition from middle school to high school can result in academic difficulty. There are many factors that can affect the academic successfulness of the freshman student during this critical year (Durwood et al. 2010). Students are at a high risk of failure during the transition to high school (Rettig & Canady, 1998) and any academic failure during this time period increases a first-time ninth grade student's risk of not

graduating from high school (Weiss, 2001). The recognition that first-time ninth grades students are at risk is important, however minimizing the consequences that occur as a result is paramount to the ultimate goal of academic achievement and even graduation. This research study was initiated in order that those students at the highest of risk, first-time ninth grade students, could receive a form of intervention by the local school to prevent such negative and potentially lasting academic impacts.

The researcher failed to reject the null hypotheses of RQ's 1, 2 and 3, which indicates no significant difference in the scores on the post-test interim assessment, or the passing and failure rates, or the change in numerical averages of ninth grade students receiving assistance from the trained freshman friend mentor in Integrated Algebra I. However other research studies indicate that the use of peer mentoring programs has the potential to assist students who are entering their freshman year, and should be examined further, and the results of this study may not apply to all mentoring programs.

In summary, first-time ninth grade students can be at risk academically as they attempt to transition to an atmosphere that is very different from that of the middle school. There are many factors that lead to the academic instability of this particular school year. One required course that many freshman students fail at an alarming rate is Integrated Algebra I. Those students that do fail one or more courses during this time period are at a higher risk of not completing graduation requirements. Though the findings by the researcher are contrary, the research indicates that the introduction of a peer mentoring program during the ninth grade transition, particularly if the mentors have been participating in a training program, has the potential to assist first-time ninth grade students experience a higher level of academic success. The question that should

be addressed by a school system considering implementing a peer mentoring program is whether this potential worth the financial cost? If so, should such a program's success be based upon academic gains by those who participate? It is the researcher's opinion that if a school system is going to utilize public dollars to create any program, including a peer mentoring system, there should be a procedural adjustment in the accountability regarding the implementation and results. Just because peer mentors have proven to be academically successful, even with training, such a program may or may not be worth the expense. Further studies may provide insight on how to measure success, therefore making the investment more beneficial.

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