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Effects of Traditional High School Versus Career Academy High School on Literacy and Mathematics Achievement

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EFFECTS OF TRADITIONAL HIGH SCHOOL VERSUS CAREER ACADEMY HIGH SCHOOL ON LITERACY AND MATHEMATICS ACHIEVEMENT

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EFFECTS OF TRADITIONAL HIGH SCHOOL VERSUS CAREER ACADEMY HIGH SCHOOL ON LITERACY AND MATHEMATICS ACHIEVEMENT

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Dissertation

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ABSTRACT

by
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Title: Effects of Traditional High School Versus Career Academy High School on Literacy and Mathematics Achievement (Under the direction of Dr. Michael Brooks)

The purpose of this dissertation was to determine the effects by gender and by socioeconomic status between students in career academy high schools versus students in traditional high schools on literacy and mathematics achievement for 8th-11th grade students in 6A and 7A high schools in the state of Arkansas. In the context of this study, relevance has to do with the connection or link established between something learned and an opportunity to apply that learning. Critics of the traditional learning structure argue that because information is learned in isolation, a difficulty arises in how that learning is readily applicable to one's life.

The review of research literature by Cheney et al. established that when implemented correctly, career academies connected students to real-world learning opportunities and assisted students in meeting high academic expectations. They contented, "[T]he Career Academy model is probably the best-established integration reform effort that deals with the academic and motivational issues confronted by at-risk students" (p. 37). Cheney et al. concluded that this integration is paramount in establishing the link between students' academic needs and motivational aspirations to

promote active engagement in the educational process at the highest level. Although the concept of relevance seems static, it provides many opportunities for activity and engagement.

Numerous reform movements exist that are available to school districts to implement. Achieving growth in the areas of student achievement, decreasing the dropout rate, and increasing graduation rates are goals any school district would strive to attain (Seltz, 2008). However, it is important to address the issue of change and how to maintain a reform once implemented. Although literature does exist on the subject, more research needs to be conducted to determine if the career academy approach is a viable option. Given literature that finds little or no positive impact on student achievement, there is cause for concern. Therefore, the purpose of this study was to determine the effects by socioeconomic status and gender of students in career academy high schools versus students in a traditional high school on literacy and mathematics achievement measured by Arkansas exams for 11th grade students in two 6A and two 7A high schools in the state of Arkansas. By reviewing the change literature and defining the critical attributes of career academy models, insight can be gained on how to sustain change. This study attempted to determine if the implementation of a career academy model contributed to literacy and mathematics achievement for high school students.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

In schools today, most students' achievement falls in an average grading range with mostly Bs and Cs (Cornelius, Haas, & Sattan, 2002). These students usually do not need special services (i.e. limited ability, gifted and talented, etc.). Among this group of students, there are students who engage in athletics or extracurricular activities and those who are disengaged. They may or may not be at risk of failing in school, but they tend to stay on the fringes of academic or social success. Even among this group of students, educational needs vary greatly. For school administrators and faculty, determining what educational needs exist for these students and how to meet these needs have long been issues.

For years, many have tried the traditional high school structure as a way of meeting students' needs. In this model, although the engaged and disengaged students' educational needs may vary widely, most students are viewed as having many educational needs in common (Ark, 2002). To address this commonality, traditional high schools were organized as a variation of grades with a curriculum-centered approach based on general subjects such as English, mathematics, science, and social studies. These subjects were taught in isolation more for mastery than for integration (Reese, 2007). In this model, students were more passive in the learning process with teachers carrying the main responsibility for instruction.

However, concerns about increasing dropout rates, decreasing graduation rates, and increasing attendance/discipline issues have been the focus of research regarding how to get the disengaged students whose achievement falls in an average grading range and engaged, at-risk students involved in the learning process (Reeves, 2008). Research, as summarized by Mittelsteadt and Reeves (2003), emphasized restructuring reforms such as small learning communities and career academies as the models that engage all students and assist them with post-secondary or career decisions. In contrast to the traditional high schools with a curriculum centered on isolated subjects, Sullivan and Shaw (2010) noted the academic focus of small learning communities and career academies reflected the integrated curriculum and interdisciplinary units using career clusters. In this restructuring of the learning process, students are provided an opportunity to be an active participant in their educational development. Students would be called on to interrelate actively with teachers as well as interact with various subject areas across the curriculum. Springston (2002) referred to the focus of the restructured models as a curricular change or "The 3 R's for the 21st Century," which include Relationships, Relevance, and Rigor (p. 19).

Kemple and Snipes (2000) asserted that the outcome of increasing student engagement is a goal that schools should strive to obtain. According to their study,

> [T]he career academy approach is one of the oldest and most widely established high school reforms in the U.S., stretching back for more than 30 years. Some findings of this study include the following: (1) the career academies in the study increased both the level of interpersonal support students experienced and their participation in career awareness and work-based learning activities; (2) the career

> academies substantially improved high school outcomes among students at high risk of dropping out; (3) among students least likely to drop out, the career academies increased the likelihood of graduating on time; (4) in academies with greatly enhanced interpersonal support from teachers and peers, the dropout rates dropped dramatically; (5) the academies did not improve standardized mathematics and reading test scores; and (6) the impact of the academies and the types of students who participated in them varied greatly from site to site. (p. 3)

The study stated that the use of career academies could be an effective means of reducing the high school dropout rate and enhancing students' engagement with school, especially if they increase personal support of students through involvement with teachers and peers.

However, traditionalists would argue that reform movements should reflect a back-to-basics approach (Seltz, 2008). According to Noguera (2004), because high schools become embedded in traditions, they tend to rely on practices that have outlived their usefulness. Noguera noted focusing on reading, writing, and arithmetic is the way students will succeed in the future. He compared this practice to the way most high schools throughout the nation operate under the status quo philosophy of not fixing what is not broken. By contrast, Stern, Raby, and Dayton (1992) noted that the focus of the small learning community and career academy reform is that of encompassing not only the basics but also the integration of career clusters to the curriculum to allow students to see the relevance of subject matter.

Statement of the Problem

The purpose of this study was four-fold. First, the purpose of the study was to determine the effects by gender of students in career academy high schools versus students in traditional high schools on literacy achievement measured by the Grade 11 Literacy Exam for students in 6A and 7A high schools in the state of Arkansas. Second, the purpose of the study was to determine the effects by gender of students in career academy high schools versus students in a traditional high school on mathematics achievement on the End of Course (EOC) Geometry Exam for 8-10th grade students in 6A and 7A high schools in the state of Arkansas. Third, the purpose of the study was to determine the effects by socioeconomic status of students in career academy high schools versus students in a traditional high school on literacy achievement on the Grade 11 Literacy Exam for students in 6A and 7A high schools in the state of Arkansas. Fourth, the purpose of the study was to determine the effects by socioeconomic status of students in career academy high schools versus students in a traditional high school on mathematics achievement on the EOC Geometry Exam for 8-10th grade students in 6A and 7A high schools in the state of Arkansas.

Background

The research of Noguera (2004) reflected the benefits of changing a traditional high school into a career academy. However, the research did not address the strategies used by schools to maintain the reform. Also, the research did not reflect the impact on achievement in students attending a career academy school compared to a traditional high school in the state of Arkansas. Noguera argued extensive literature exists concerning the

issue of change, but critical attributes of career academies that have successfully maintained change have not been defined.

The following background includes three components of study reflecting characteristics of effective career academies. The first component reviews major studies conducted on the development and benefits of career academies through rigorous instructional practices. The second component reflects on the concept of relevance the career academy model provides. Finally, the third component describes how the career academy model lends itself to establishing relationships with stakeholders.

Development and Benefits of Career Academies

A study by Kemple (2004), which began in 1993, consisted of conducting evaluations of the career academy approach compared to the traditional high school approach by using diverse high schools across the U.S. Kemple noted, "[E]stablished more than 30 years ago, Career Academies have become a widely used high school reform initiative that aims to keep students engaged in school and prepare them for successful transitions to post-secondary education and employment" (p. 1). In commenting on their organizational methodology in contrast to traditional high schools, he said, "Career Academies are organized as small learning communities, combine academic and technical curricula around a career theme, and establish partnerships with local employers to provide work-based learning opportunities" (p. 1). Kemple endeavored to determine if the use of Career Academies would keep students on task and prepare them to transition into the next phase of their lives more than a traditional high school approach (see also Kemple, 2001).

Kemple (2004) outlined four key findings. First, career academies substantially improved the labor market prospects of young men, a group that has experienced a severe decline in real earnings in recent years. Second, in contrast, career academies had no significant impacts (positive or negative) on the labor market outcomes for young women. Third, overall, the career academies served as viable pathways to a range of post-secondary education opportunities, but they did not appear to be more effective than options available to the non-academy group. More than 90% of the students in the academy and non-academy groups graduated from high school or received a General Educational Development certificate. Fourth, the positive labor market impacts were concentrated among academy group members who were at high or medium risk of dropping out of high school when they entered the programs.

Although the career academies reduced enrollments in post-secondary education among those who entered the programs at highest risk of dropping out, this did not appear to have diminished the substantial earnings advantage produced by the academies for this subgroup (Dayton, Raby, & Stern, 2000). As stressed by Kemple (2004),

> [T]he findings demonstrate the feasibility of improving labor market preparation and successful school-to-work transitions without compromising academic goals and preparation for college. They provide compelling evidence that investments in career-related experiences during high school can produce substantial and sustained improvements in the labor market prospects of youth during their post-secondary years. In fact, Career Academies are one of the few youth-focused interventions that have been found to improve the labor market prospects of young men. (p. 3)

In summary, Kemple found the academies provided positive results, particularly for those who had difficulty finding the educational process engaging.

According to Conley (2001), the call for high school reform has become a "constant drumbeat over the past two decades" (p. 26). Conley stated that research shows structuring a high school into career academies was beneficial to disengaged students whose achievement falls in an average grading range and engaged, at-risk students. In a study conducted by Schnitzer (2003), students in an urban setting exposed to the career academy approach experienced a positive growth in student achievement, a decrease in dropout rates, and a narrowing of the achievement gap between minority and majority students as compared to the traditional high school model. However, the research did not address how or if the change was sustained. Given that this research is 10 years old, it may be important to consider whether or not it has been sustained. When addressing the career academy schools, Schnitzer noted the following items should be addressed to determine if they support a true career academy model rather than a traditional high school:

- Has a structured career academy been in place long enough to determine if that is what made the difference?
- What strategies were used to maintain career academy status?
- Do their data reflect beneficial changes, such as increased graduation rates or decreased discipline referrals?
- Have critical attributes of the career academy been implemented and have they led to a successful change?

Schnitzer believed these components were important in establishing an effective career academy that would make a positive difference in the lives of students, both for disengaged students whose achievement falls in an average grading range and engaged, at-risk students. However, Stern, Dayton, and Raby (2010) argued that one of the more important components of the career academy approach that differs from the traditional high school approach is the relevance of what is taught. Do students see a link or connection in what is taught and how it will be used in a career or college education? If so, will they tend to be more engaged in the educational experience?

Providing Relevance

In the context of this study, relevance has to do with the connection or link established between something learned and an opportunity to apply that learning. Critics of the traditional learning structure argue that because information is learned in isolation, a difficulty arises in how that learning is readily applicable to one's life. On the other hand, Porter, Cheney, and Kraemer (2001) asserted, "[T]he Career Academy model can offer more than a connection between high school and the real-world, this model can offer credentials that lead to careers and college educations" (p. 36). The review of research literature by Cheney et al. established that when implemented correctly, career academies connected students to real-world learning opportunities and assisted students in meeting high academic expectations. They contented, "[T]he Career Academy model is probably the best-established integration reform effort that deals with the academic and motivational issues confronted by at-risk students" (p. 37). Cheney et al. concluded that this integration is paramount in establishing the link between students' academic needs

and motivational aspirations to promote active engagement in the educational process at the highest level.

Although the concept of relevance seems static, it provides many opportunities for activity and engagement. In a study conducted by the California Partnership Academies, Mittelsteadt and Reeves (2003) stated their particular study confirmed a growing collection of data supporting the theory that the following 12 components are common to career academies operating in the truest and most successful sense of the model concerning relevance:

- A school-within-a-school or small learning community atmosphere that provides a certain degree of autonomy and flexibility;
- An enrollment policy that includes all students, both at-risk and high achievers;
- A voluntary enrollment policy where participating students and staff are self-selected;
- Scheduling systems that allow for consistent groups of academy students to move together in sequence for two–four years of high school;
- A dedicated team of teachers with decision-making power and common teacher planning time;
- A designated academy director or lead teacher with counselor support;
- A broad-based career theme, such as health or information technology that is supported by community resources;
- A block-scheduled format that integrates academic and career/technical education;

- Rigorous, applied and contextual college prep curricula;
- Business and community support that provide work-based learning experiences;
- Articulation with post-secondary education; and
- Parental involvement and support

The 12 components as defined by Mittelsteadt and Reeves assist in establishing a framework to follow when schools are faced with the issue of sustaining the career academy model and providing relevance. The relevance of the career academy approach is not an end in and of itself. The components of an effective system will break down and not provide the results needed to help students without establishing appropriate relationships (Dayton, 2010).

Establishing Relationships Among Stakeholders

Relevance has to do with the relationship established between something learned and an opportunity to apply that learning. Other types of relationships must be developed to form a more effective learning environment. Schnitzer (2003) argued the relational benefits of career academies in his Virginia study. The focus of this study was based on a review of research on small schools or the creation of schools-within-schools. Schnitzer observed that evidence suggested smaller schools and even larger schools that were restructured into smaller units offered the same relational advantages. The advantages of this restructuring indicated that when schools redesign into small, relational learning communities, student achievement increases, graduation rates increase, and fewer discipline issues occur. One of the main reasons for these positive results was that

relationships between students and faculty developed, which in turn created positive attitudes among students toward school as well as greater teacher satisfaction.

In reviewing educational research, Ark (2002) came to similar conclusions. Ark observed that "by utilizing small learning community strategies including career academies, schools can improve attendance, climate, safety, achievement, graduation rates, college attendance rates, staff member satisfaction, parent involvement, and community engagement" (p. 11). By incorporating personalization strategies like career academies or personalized instruction, Ark suggested that schools would be creating educational environments that work for students by assisting them in achieving academic and future career success.

Hypotheses

The researcher generated the following hypotheses to guide the study.

1. No significant difference will exist by gender for students in two 6A and two 7A high schools in the state of Arkansas who attend a career academy high school versus students in a traditional high school on literacy achievement measured by the Grade 11 Literacy Exam.
2. No significant difference will exist by gender for 8-10th grade students in two 6A and two 7A high schools in the state of Arkansas of students who attend a career academy high school versus students in a traditional high school on mathematics achievement measured by the EOC Geometry Exam.
3. No significant difference will exist by socioeconomic status for students in two 6A and two 7A high schools in the state of Arkansas who attend a career

academy high school versus students in a traditional high school on literacy achievement measured by the Grade 11 Literacy Exam.

4. No significant difference will exist by socioeconomic status for 8-10th grade students in two 6A and two 7A high schools in the state of Arkansas of students who attend a career academy high school versus students in a traditional high school on mathematics achievement measured by the EOC Geometry Exam.

Description of Terms

Accountability. Accountability, as defined by the Arkansas Department of Education (2011), concerns the obligation of comprehensive school improvement planning, reporting, explaining, or justifying standards, making them responsible, explicable, and answerable.

Adequate Yearly Progress. D'Amico, McLeod, and Protheroe (2003) defined adequately yearly progress by stating all states are required to develop and implement an accountability system that defines student proficiency in the attainment of their academic standards, with adequate yearly progress expectations for every school in the state. D'Amico et al. noted, ultimately, over the course of 12 years, all students are to reach 100% proficiency, and states are to set intermediate progress goals for student achievement, with the first increase to occur no later than 2004-2005. Adequate yearly progress is defined at the state education level and may be different state by state, although each state will apply the same academic measures to all public schools in that state. They asserted adequate yearly progress is measured by students' performance on

annual state academic assessments, and all students in the school must participate in these tests.

Arkansas Comprehensive Testing, Assessment and Accountability Program. The Arkansas Comprehensive Testing, Assessment and Accountability Program is a comprehensive system that includes high academic standards, professional development, student assessment, and accountability for schools (Arkansas Department of Education, 2011).

Career Academy. Sammon (2000) defined a career academy as a small learning community enrolling students and teachers who self-select to be part of the academy. Each academy has a broad-based career theme, an integrated sequence of courses, work-based experiences, and strong partnerships with business and community partners.

Criterion-Referenced Test. The criterion-referenced tests used in this study are assessment instruments customized around the Arkansas Curriculum Frameworks. In Arkansas, the test items are based on the academic standards in the Arkansas Curriculum Frameworks and are developed by committees of Arkansas teachers with support from the Department of Education and a testing contractor (Arkansas Department of Education, 2011). The educational department noted general criterion-referenced tests are administered in Grades 3–8, and subject-based criterion-referenced tests are administered in the form of the EOC Exams in Algebra I and Geometry for Grades 8-10 and the Grade 11 Literacy Exam. The EOC exams are criterion-referenced tests taken at the completion of a course of study to determine whether a student demonstrates attainment of the knowledge and skills necessary for mastery of that subject.

Performance Levels. Performance levels are a concept that refers to the four levels of student achievement on the state's criterion-referenced exams (Arkansas Department of Education, 2011). The four levels are based on scaled scores from the tests and consist of advanced, proficient (grade level), basic, and below basic. For the purpose of this study, however, the scaled scores were used in data analysis.

Small Learning Community. Sammon (2000) defined a small learning community as any separately defined, individualized learning unit within a larger school setting. In this configuration, Sammon pointed out that students and teachers are scheduled together and frequently have a common area of the school in which to hold most or all of their classes. Small learning communities may or may not have a career theme or a set sequence of courses for their students.

Significance

Research Gap

Numerous reform movements exist that are available to school districts to implement. Achieving growth in the areas of student achievement, decreasing the dropout rate, and increasing graduation rates are goals any school district would strive to attain (Seltz, 2008). However, it is important to address the issue of change and how to maintain a reform once implemented. Although literature does exist on the subject, more research needs to be conducted to determine if the career academy approach is a viable option. Given literature that finds little or no positive impact on student achievement, there is cause for concern. Therefore, the purpose of this study was to determine the effects by socioeconomic status and gender of students in career academy high schools versus students in a traditional high school on literacy and mathematics achievement

measured by Arkansas exams for 11th grade students in two 6A and two 7A high schools in the state of Arkansas. By reviewing the change literature and defining the critical attributes of career academy models, insight can be gained on how to sustain change. This study attempted to determine if the implementation of a career academy model contributed to literacy and mathematics achievement for high school students.

Potential Implications for Practice

On the one hand, according to a policy paper commissioned by the National Career Academy Coalition authored by Brand (2009), comparisons of group evaluations demonstrated positive impacts on student academic outcomes in the areas of graduation rates, attendance, earned high school credits, grade point averages, and college attendance rates of students who participated in a career academy high school. On the other hand, Kemple and Snipes (2000) found no significant impact on achievement. Thus, this study provides further research that is needed to explore these findings, and in turn, improve the academic level of students in the state of Arkansas.

In addition, administrators and faculty members benefit from this type of study because it provides evidence of effective teaching models and strategies to be replicated by others in the state. A study conducted by Manpower Demonstration Research Corporation (Reen, 2011) found the following:

> Career academies doubled the rate at which high-risk students completed a core academic curriculum, raising this completion rate to 32 percent, versus 16 percent for the control group (traditional high school students). In terms of future employability eight years after expected high school graduation, participation in a career academy increased post-high school employment rates and earnings

without reducing the chances of going to college or completing a post-secondary credential. (p. 1)

The emphasis placed on college and career readiness by the state of Arkansas is evident with the implementation of the Common Core Initiative. Career academy schools model this initiative through the National Standards of Practice as provided by the National Career Academy Coalition (Brand, 2009). Because the structure of a career academy high school differs from that of a traditional high school, school officials can observe through these types of studies the school configurations that best prepare students for both college and careers.

Process to Accomplish

Design

A quantitative, causal-comparative strategy was used for the study. The researcher used four 2 x 2 factorial between-groups designs to analyze the hypotheses. For Hypothesis 1 and 2, the independent variables were the type of school structure (career academy versus tradition high school) and gender (male versus female). The dependent variable for Hypothesis 1 was literacy achievement measured by the Grade 11 Literacy Exam, and the dependent variable for Hypothesis 2 was mathematics achievement measured by the EOC Geometry Exam. For Hypotheses 3 and 4, the independent variables were the type of school structure (career academy versus tradition high school and socioeconomic status categorized by lunch status (free/reduced lunch status versus regular lunch). The dependent variable for Hypothesis 3 was literacy achievement measured by the Grade 11 Literacy Exam, and the dependent variable for Hypothesis 4 was mathematics achievement measured by the EOC Geometry Exam.

Sample

The study focused on four high schools: two high schools operated as traditional high schools and the remaining two operated as career academy high schools. The study compared two 6A high schools, one traditional high school located in central Arkansas and one career academy high school located in north central Arkansas. The two 6A high schools were selected based on similar student demographics of the student population, ethnicity, and socioeconomic status. Also, the study compared two 7A high schools: one traditional high school and one career academy high school located in northwest Arkansas. The two7A high schools were also selected based on similar student demographics of the student population, ethnicity, and socioeconomic status.

Instrumentation

In the Spring of 2011, students in School A, B, C, and D participated in the EOC Geometry Exam and the Grade 11 Literacy Exam to determine adequate yearly progress. According to the Arkansas EOC and Grade 11 Literacy Technical Report (Arkansas Department of Education, 2011), in terms of score reliability,

> [R]eaders are held to the same agreement standards once they begin live scoring as they were required to meet during the qualifying process. Readers for Algebra I, Geometry, and Biology EOC and Grade Eleven Reading are expected to maintain exact agreement of 70-80% with their peers. Readers for Grade Eleven Writing are expected to maintain 60-70% exact agreement with their peers in each domain. (p. 51)

Evidence existed of content validity as shared by the Arkansas Department of Education (2011), which verifies the curriculum alignment of the exams with the statewide

frameworks. Their report revealed that the validity of both exams is reinforced given that content area teachers are involved in establishing the frameworks. Alignment between the frameworks and components of the EOC and Grade 11 Literacy Exams provide evidence that both assessments quantify the frameworks. The career academy model supports the frameworks and the components of the EOC exams as well as the Grade 11 Literacy Exam by incorporating the identified weak student learning expectations for integrated projects across the curriculum.

Data Analysis

The results of the Grade 11 Literacy Exam and the EOC Geometry Exam were compiled, and appropriate statistical tests were conducted to accept or reject the null hypotheses formulated. To address Hypothesis 1, a 2 x 2 factorial analysis of variance (ANOVA) was conducted using type of school structure (career academy versus traditional high school) and gender (male versus female) as independent variables and literacy achievement as the dependent variable. To address Hypothesis 2, a 2 x 2 factorial ANOVA was conducted using type of school structure (career academy versus traditional high school) and gender (male versus female) as independent variables and mathematics achievement as the dependent variable. To address Hypothesis 3, a 2 x 2 factorial ANOVA was conducted using type of school structure (career academy versus traditional high school) and socioeconomic status (free/reduced lunch status versus regular lunch) as independent variables and literacy achievement as the dependent variable. To address Hypothesis 4, a 2 x 2 factorial ANOVA was conducted using type of school structure (career academy versus traditional high school) and socioeconomic status (free/reduced

lunch status versus regular lunch) as independent variables and mathematics achievement as the dependent variable. To test the null hypotheses, an alpha level of .05 was used.

CHAPTER II

REVIEW OF RELATED LITERATURE

The traditional high school structure has been organized as a variation of Grades 9-12 with the curriculum centered on basic subjects such as English, mathematics, science, and social studies. With this model in mind, the educational needs for disengaged students whose achievement falls in an average grading range and engaged, at-risk students have been an issue many in education have long tried to determine. Concerns about increasing dropout rates, decreasing graduation rates, and increasing attendance and discipline issues have been the focus of data to determine how to get all students engaged in the learning process (Reeves, 2008). Research, as summarized by Mittelsteadt and Reeves (2003), emphasized restructuring reforms such as small learning communities and career academies as the models that engage all students and assist them with post-secondary or career decisions. In contrast to the traditional high schools where the curriculum centers on isolated subjects, the academic focus of small learning communities and career academies reflects integrated curriculum and interdisciplinary units using career clusters.

The review of literature provides research that is organized by the following main concepts. First, an historical background provides an overview of the traditional high school model. Second, the conceptual framework and philosophy behind the career academy model will be reviewed. Third, an examination of research on career academies

and student performance will be presented. Finally, conclusions will be drawn based on the results of the research findings.

The Establishment of the Traditional High School Model

According to Bergeson and Heuschel (2006), the history and tradition of the American high school is grounded in the original *Latin grammar schools*, which began as early as 1635. The purpose of these institutions was to educate the sons of the elite leaders and members of clergy. Bergeson and Heuschel noted that, during the mid-1700s, Benjamin Franklin proposed *academies* in order to educate children of tradesmen. At the end of the Civil War, American high schools were offering a combination of classical and modern subjects to broaden the scope of education (Mirel, 2006).

Krug (1969, 1972) contended that, in 1892, the evolution of the nature and function of the American high school could be traced to the Committee of Ten. The Committee of Ten was a panel of influential educators primarily consisting of presidents of leading colleges and appointed by the National Education Association. Krug noted that they issued a report with the suggestion that all public high school students should receive a liberal arts education. The purpose of the report was to establish curriculum standardization for college-bound, public high school students. George, McEwin, and Jenkins (2000) held that the work of the Committee of Ten included standardization of curriculum, of high school accreditation, and of credits through the use of Carnegie units.

According to Mirel (2006), the Committee of Ten, led by Charles Eliot, then president of Harvard University, wanted to change the face of the educational landscape. Eliot argued that, regardless of students' academic backgrounds, their intention to graduate from school, or their plans to attend an institute of higher education, all public

students in high school should be enrolled in a college-preparatory curriculum. From Eliot's perspective, high schools should provide equal educational opportunities by insisting that the rigorous academic curriculum be the same for all students. However, Mirel noted that the guiding principle of the Committee of Ten suggested that all students receive a high quality liberal arts background that included a variety of programs of study for high schools (Krug, 1972). Their suggestions promoted the inclusion of languages, sciences, and mathematics, as well as electives in the high school curriculum (Mirel, 2006).

In 1918, the Commission on the Reorganization of Secondary Education, a separate National Education Association group, issued a manifesto called the *Cardinal Principles of Secondary Education.* In contrast to the Committee of Ten, the Commission concluded that a more effective high school program is one that provides differentiated programs and better serves diverse student populations (Pulliam & Van Patten, 2003). Because of their report, two interrelated assumptions became the central point of discussion concerning the American high school. According to Mirel (2006), the first assumption was that new high school students, as compared to previous generations of students, were overall less intelligent. The second assumption was that, due to the lack of financial means, lack of intellectual ability, and aspirations to attend college, it was pointless to demand that these new students enroll in a college-preparatory program. Mirel noted that these assumptions led the proponents of the *Cardinal Principles* to believe that having students follow the same academic program of study increased educational inequality.

In the 1920s, American high schools tried to balance the philosophies of both the Committee of Ten and the Commission on the Reorganization of Secondary Education. Pulliam and Van Patten (2003) observed that schools began offering four academic tracks for students to follow that included college preparatory for those wanting to continue their education, commercial education for those interested in office work, vocational education for those interested in various areas of industry, and general education for students who were undecided about future plans. During this period, the high school curriculum was structured around the traditional academic areas of English, social studies, mathematics, science, and foreign language, as well as vocational and elective courses. Bergeson and Heuschel (2006) noted that comprehensive schools emerged during the 1920s and 1930s and included content in the areas of health, citizenship, vocation, leisure, and ethical character, as well as academic fundamentals. They indicated that comprehensive schools were implemented to serve a diverse population and instituted practices that included Grade 9-12 configuration, tracking graduation plans, and vocational education.

In the years that followed, the traditional high school model went through various changes; some changes were prompted by the economic collapse of the 1930s that forced students back into schools and out of the labor market. Mirel (2006) stated that, during the period between 1928 and 1934, students taking academic courses dropped from 67% to approximately 62%. A result from this shift was the increased gap between the social classes. Mirel noted that, by the late 1940s, research showed a high correlation between the social class of students and the academic track placements. Then, by 1961, studies found that a significantly greater number of students from lower economic families

enrolled in the general education track compared to their peers from upper-income families (Finn, 2006).

During the 1960s and 1970s, Bergeson and Heuschel (2006) argued that educational leaders shifted the responsibility of course selection and programs of study choices into the hands of parents and students rather than guidance counselors. This shift in responsibility was to avoid the perception of inequality of education. In 1983, the Reagan administration revisited the Committee of Ten main ideas and developed a report called *A Nation at Risk.* The assumption behind this report was that academic courses had a greater educational purpose than other courses. According to Mirel (2006), because of this shift in assumptions, graduation requirements rose in 45 states and the District of Columbia, mathematics requirements increased in 42 states, and science requirements increased in 34 states by 1986.

With all of the changes in education that span two decades, the emphasis on improving mathematic and reading skills through the No Child Left Behind (2002) reform sought to prepare students for transitioning into post-secondary education. In 2005, Finn (2006) described President George W. Bush's call for high-school reform, which included the adoption of a 5-part state action agenda. Finn listed the five parts as follows: placing value on the high school diploma, redesigning the structure of the high school, strengthening the commitment to education of high school principals and teachers, maintaining high accountability standards for high schools, and reorganizing educational governance. Along with the idea of high school redesign, other problems existed, as identified by the National Governors Association (Mirel, 2006). The Governors stated that achievement was too low in their states as a whole and that students

lacked a strong work ethic. They continued that students were not taking the right courses to prepare them for the next level of their education and that the content in the courses was inadequate for this preparation. They added that the dropout rate was increasing, and more students were not engaged in the educational process, tuning out and turning off instruction. The governors noted that the philosophy from the 1950s of a one-size-fits-all education resulted in courses not rigorous enough to match the demands needed to function in the real world. They concluded that students' academic work lacked the relevance of blending curriculum within community service or work programs (Bergeson & Heuschel, 2006).

Basic Components and Purposes of the Traditional High School

The American high school reflects the culture in which it exists. According to Boyer (1983), education supports two opposing purposes: to assist individuals to grow as they obtain skills and knowledge and to uphold the social culture. The contemporary public high schools have a number of similar characteristics as acknowledged by Bergeson and Heuschel (2006). They include district-based, tuition free educational opportunities, typical configuration of Grades 9-12, and school days divided into six or seven periods. In addition, they contain students enrolled in college preparatory courses or vocational courses as a requirement or elective and a curriculum organized by subject area departments with courses ranging from regular education to advanced placement. Bergeson and Heuschel also noted that most high schools have student graduation determined by credit accumulation as defined by Carnegie credits based on hours of instruction and athletic programs and co-curricular groups that are a fundamental part of

the traditional high school experience (see also Baldwin, 2001; Carnegie Council on Advancing Adolescent Literacy, 2010).

During the late 20th Century, Cusick (1973) described the organization of the contemporary high school as two primary subsystems. First, schools were organized into maintenance tasks and procedures. Maintenance allowed schools to administratively deal with facilities, rules and regulations, and attendance in general. Second, schools were organized for production, which included the curriculum, instruction, and student testing. Thus, the structure of the school and classroom experience served the main purpose of keeping order to prevent loss of control by limiting student to teacher interaction. Schools were also tasked with producing a product that aligned with societal norms. Cusick found that at least 75% of students' classroom experiences included the teacher lecturing to the class and argued that the contemporary high school model is summed up as teaching is talking, and listening is learning.

Goodlad (1984) based his research on observations of 1,000 classrooms in 38 schools including elementary, middle, and high schools. His team of researchers collected data through surveys of parents, teachers, students, and researcher observations. Goodlad found that, despite the location of the schools, the size of the schools, the student population characteristics, and the income status of the parents, there emerged a common theme of the nature of schooling (see also Johnson, Howley, & Howley, 2002). His findings indicated that students had a neutral opinion of their educational experience. Students overall enjoyed the subjects that were taught; however, they were exposed to a narrow scope of instructional strategies as well as limited student support as they moved forward through the grade levels. The research further found that the breakdown of

student activity within the classroom, in general, included 25% spent listening to lectures and/or explanations, 17.5% spent in practice, 15% spent on written assignments, and 13% spent on preparation of assignments. Goodlad, like Cusick (1973), noted that the classroom atmosphere of most high schools involved students working independently in a large group setting. They found that teachers used instructional techniques as policing devices to minimize disruptions to the learning process rather than for helping students work in cooperative groups. In fact, Goodlad (1984) argued that little was done in traditional school settings to promote student-to-student communication and role-playing. He found that teachers spent only 5.1% on discussions of topics, 1.6% on watching demonstrations, and 0.1% on role-play or simulations.

Powell, Farrar, and Cohen (1985) referred to the traditional high school as a shopping mall that offers choices in the form of a voluntary selection of course offerings, without the pressure to commit to a specific choice. They noted that the goal of offering such a variety of courses is to maximize graduation rates and learner satisfaction. Powell et al. argued that the shopping mall high school offers students a horizontally based curriculum because of its breadth of courses and a vertically based curriculum because of its range of difficulty from basic to advanced placement. They added that this type of school also includes extra-curricular curriculum activities for meeting the social needs of students and service curriculum to meet student's psychological needs. According to the findings of Powell et al., this type of school institution has produced students and teachers who are flexible, tolerant, and ambitious but wish for a different educational experience, one that focuses on purpose, push, and personalization.

Different Models of High School Reform

In 2007, Wise (2008) cited research that U.S. high schools were in crisis. Nationally, only approximately 30% of incoming freshmen could read at grade level, and more than 1.2 million high school students dropped out each year, which was approximately 7,000 each school day (Lee, Grigg, & Donahue, 2007). In addition, Lee et al. (2007) noted that approximately 42% of community college freshmen and 20% of freshmen in 4-year institutions were required to take remedial courses in the subjects of mathematics, reading, and writing in order to handle college curriculum. Moreover, Bill Gates, owner of Microsoft, was critical of the traditional high school model because it did not challenge students (Scherer, 2008). Gates stated that the traditional high school curriculum neglected to engage students in a digital culture, in turn making learning irrelevant to students who must transition into a global society.

Darling-Hammond and Friedlaender (2008) acknowledged that the design of high schools dictates whether they are successful in educating students. They stated that the 20th Century factory-model high schools were designed to produce efficient learners, select and support a few for thinking jobs, and prepare the rest for the world of work focusing on the basic skills curriculum rather than pushing them to engage in more advanced studies (Jobs for the Future, 2013). Darling-Hammond and Friedlaender (2008) noted that instructors within these types of schools preferred teaching in large, whole group styles. They added that these schools focused on subject matter content in isolation rather than focusing on interconnected subjects and building relationships between instructors and learners in smaller community-style environments. They contended that students were assigned to a single building and shuffled every 50 minutes to several

different teachers, which were assigned up to 150 students each day. In addition to subjects taught in isolation, teachers taught in isolation with minimal time to plan in a collaborative, common planning period in order to engage students with project-based learning (Blomenkamp, 2009).

In contrast to the traditional American high school, researchers with Alberta Education (2009) presented different models in an effort to redesign the American high school. The redesign movement stemmed from foundational principles created by various organization of what a high school redesign should look like. The redesign was promoted by organizations such as the Association for Supervision and Curriculum Development, the Canadian Coalition of Self-Directed Learning, the Coalition of Essential Schools, the Learning Environments Consortium International, the Manpower Demonstration Research Corporation, the National Association for Secondary School Principals, the National Conference of State Legislatures, the School Redesign Network, and the Office of Vocational and Adult Education, U.S. Department of Education.

Alberta Education (2009) explained that, when the foundational principles of each organization were analyzed, several common threads were revealed that focused on supporting high school redesign. First, they believed that mastery learning was important because it requires students to demonstrate a depth of knowledge of the curriculum through performance-based evaluations (Thurman, 2007). Rather than learning many concepts in a surface way, mastery learning requires covering fewer topics with greater depth. Second, they held that personalization of education was a key educational concept for student success (Ark, 2002). In contrast to teaching in large, whole groups for the majority of the school day, students' individual learning styles are recognized, and

individual needs are met through instructional strategies such as differentiated instruction. Smaller, more intimate situations promote more interaction with the teachers and form the basis for meeting students' learning goals. Third, they agreed that flexible learning environments would provide varied opportunities to learn content (U.S. Department of Education, 2007c). Flexible learning environments are created to enhance learning situations by allowing flexible scheduling, differing structures in which to learn, and internships for real-world experiences. Students are given various avenues to learn content that are more often evaluated by project-based learning.

Alberta Education (2009) noted that the fourth common thread throughout the principles of the organizations promoting school redesign dealt with the curriculum itself. The organizations believed that the curriculum should be rigorous and relevant. Rigorous and relevant curriculum exposes all students to challenging and engaging content that meets the needs of their career focus or post-secondary choices. One assumption of this component is that, by making curriculum more relevant, students will develop an increased motivation to dig deeper into the content because they see the connection between what they are learning and what they will be doing in the near future (Ford Motor Company Fund, 2008). A second assumption is that relevant curriculum will motivate the business community to engage actively in the learning process of the students. This engagement is aided by providing feedback to help inform the curriculum and by affording students opportunities to experience real-world working situations through internships and other school/work partnerships (Smith, 2002, 2008). Fifth, they saw value in home and community involvement (U.S. Department of Education, 2007d). They felt that student learning should be supported through the engagement of home,

community, business, and post-secondary education partnerships. The educational process is not just what happens within the walls of the high school for a specific number of years; the educational process is the interaction within and outside the school walls and is a life-long process. Also, education is not just a leave-it-to-the-professions proposition. It is assumed that having a broad spectrum of stakeholders, which includes parents and the community, will enhance the learning experience for all students (Noguera, 2004). If all participants feel that they have a stake in the educational outcomes of students, they will feel more inclined to provide their support through meaningful feedback, services, and other resources.

The sixth common thread was the idea of meaningful relationships (Alberta Education, 2009). Schools need to be places where students and adults engage in a relationship that supports students' concerns, intellectual growth, and educational aspirations through frequent, positive interactions. The organizations believed that students need positive relationships with their teachers to not only motivate but also sustain students' learning through the turbulent teen years. Students do not need teachers who stand aloof from the students and dispense information without regard for the learning environment. They need teachers who care and show concern for their future, and they need teachers in whom they can develop a relationship of trust. In the same vein, the seventh thread is the paradigm shift in educator roles and professional development (U.S. Department of Education, 2000). They felt the role of the educator should now shift from the dispenser of knowledge to a facilitator of learning as well as a mentor. In this environment, administrators promote this shift by becoming instructional leaders who provide collaborative professional development opportunities for teachers and establish

supportive professional learning communities within the schools (Darling-Hammond & Friedlaender, 2008).

Over the past few decades, researchers have examined several different models of the high school redesign and attempted to implement these components or threads across the U.S. in one form or another (Quint, 2006, 2008). Some examples of these models have included the America's Choice Model, the Breaking Ranks Model (Lachat, 2001; Sizer, 2004), the Early College High School Model (Jobs for the Future, 2013), the First Things First Model (McTighe & Wiggins, 2008), and the Talent Development High School Model (U.S. Department of Education, 2007d). Alberta Education (2009) claimed that, collectively, these models of high school redesign initiatives illustrate common best practices of the foundational principles in which the high school redesign movement was based. They include the following:

- Defining high expectations for students with respect to college and career preparedness
- Connecting academic content with career and technical content through integrations within the curriculum
- Providing non-traditional forms of student support through community mentors, business internships, and differentiated instruction
- Structuring learning around small learning communities
- Promoting professional growth opportunities for teachers within the professional learning communities to include common planning time to collaborate on project-based learning

- Engaging students and adults actively in sustaining and meaningful relationships
- Fostering alliances that include community, school and home

These best practices align with the foundational principles created by the various organizations of what a high school redesign should entail (National Governors Association Center for Best Practices, 2009a). However, there is another model that entails the same components of high school redesign, the career academies model.

Beginnings of the Career Academy Approach

Dayton (2010) revealed that the first career academy school was implemented in 1969, an Electrical Academy at Edison High School in Philadelphia. Originally, the development of the first academies focused on vocational preparation and dropout prevention; however, academies evolved to include the preparation of students for 4-year college studies. Since 1982, the evolution of career academies in Philadelphia has been supported by the nonprofit Philadelphia Academies, Inc., which provides employer support through corporate contributions and foundation grants (Association for Career and Technical Education, 2009b).

With the establishment of two nonprofit-sponsored academies, the Computer Academy at Menlo-Atherton High School and an Electronics Academy at Sequoia High School near Silicon Valley, the academy concept was introduced to the state of California in 1981 (Maxwell & Rubin, 2001). The state of California passed legislation in 1984 to support 10 replications of the career academy model based on improved student achievement from a series of evaluations. In 1987, a second state bill was passed to support approximately 40 additional career academies based on a continuing pattern of

student improvement. State legislation was again renewed in 1993 and 1999, which continued the expansion of career academies to 290 by 2000 and encompassed over 25 career fields. As part of the model, California Academies formalized the integration of one career-related course for every three academic courses for Grades 10–12. The focus of the model was to prepare students for not only college but also careers (Dayton, 2010).

Since 1982, the nonprofit National Academy Foundation has sponsored the career academy reform and has supported academies in more than 30 different states (Dayton et al., 2000). In 1990, Illinois, Florida, and Hawaii followed California's lead by funding their career academy initiatives (Dixon, Cotner, Wilson, & Borman, 2011; Mullen, 2002). In 1992, the term *career academy* was coined to encompass the Philadelphia academies, California partnership academies, and the National Academy Foundation academies (Stern et al., 1992).

The American Express Company sponsored the first Academies of Finance in New York City during the 1980s. In addition to more than 100 companies, the American Express Company joined to create the National Academy Foundation. According to Stern et al. (2010), the National Academy Foundation expanded programs of study in the areas of Travel and Tourism, Public Service, and Information Technology. In addition to providing technical assistance and curriculum, the National Academy Foundation provided professional development for educators. The National Academy Foundation academies follow a college-oriented philosophy that includes Grades 11–12; however, some National Academy Foundation academies are looking to expand grades by redesigning the academies after the California and Philadelphia models (Dayton, 2010). During the 1990s, other states began to sponsor the career academy concept. For

example, the Illinois State Board of Education began 20 California-style academies in 1994-1995 and then expanded to about 50 in 2000. Atlanta, Chicago, Denver, Sacramento, Seattle, Oakland, and Washington, D.C. are some of the cities that support growing numbers of high schools aligned to the career academy model (Mirel, 2006).

The initial focus of career academies has evolved from preparing students for vocational education to one that supports preparation for both work and college (Stern et al., 1992). Vocational education traditionally encompassed occupations that did not require a bachelor's or advanced degree and led to the stigma of a less desirable option than that of college preparation for students and parents. In contrast, according to Dayton et al. (2000), the career academy concept provides industry information and exposes students to real-world learning opportunities through a range of career choices with varying amounts of formal education. They also noted that the concept also reinforces the groundwork that supports an advanced and specialized post-secondary transition. Stern et al. (1992) contended that career academies focus on rigorous academic curriculum through career-based themes with real-world experiences. They also provide relevance to students by motivating them to graduate, which qualifies them for admission to a post-secondary institution.

Key Features of the Career Academies Evaluation

Stern et al. (2010) studied over more than four decades of the program's development and reviewed evaluations spanning over three decades. In their random-assignment study, they found that career academies had consistently been an effective high school reform strategy. They argued that career academies not only improve

outcomes for students during and after high school but also prepare students for both college and career.

According to the researchers at the Manpower Demonstration Research Corporation, career academies share three basic features. First, Kemple and Rock (1996) noted that career academies structure themselves around small learning communities with a cohort of students enrolled in classes together for at least two years. The students are taught by a team of teachers, one from each core curriculum course. Second, they said that career academies combine a college preparatory curriculum with a career theme. This combination provides real world connections through career-themed, college preparatory curriculum to allow students to determine the relevance between academic courses and career pathways. Third, Kemple and Rock stated that career academies embody partnerships with employers. Academies develop relationships with community partners, employers, and post-secondary institutions to provide real-world learning opportunities. These opportunities engage students in internships, as well as work-based learning projects, which in turn create a mentoring situation to motivate students and increase achievement. Brand (2009) added that the career academy model is a high school reform that focuses on academic rigor, provides relevant learning opportunities for students, and assists in building relationships between adults and students.

Economic development issues guide the education reform movement. Policy debates around the nation focused on improving education and providing training opportunities for a skilled workforce (Stern et al., 1992). The Association for Career and Technical Education (2009a) marked April 2008 as the 25th anniversary of *A Nation at Risk*, which is often referred to as the document that began the education reform

movement in the U.S. The document noted concerns about low student achievement and lack of preparation for students to compete in the global economy. It also acknowledged the student dropout rate as a significant problem. The Association for Career and Technical Education observed that some school reform initiatives lacked educational substance to provide a broader role for career and technical education. However, Stern et al. (2010) argued that the career academy model addresses these problems, if effectively implemented. Stern et al. noted that the career academy model increases academic achievement and improves high schools with the integrations of relevant career themes and projects by engaging business partners and industry leaders in the educational process. They also asserted that the career academy model could decrease the dropout rate, increase academic outcomes, and improve technical skills that lead to increased community prosperity.

According to the Association for Career and Technical Education (2009c), the traditional academic model has not been successful in raising student academic achievement to allow for transition into college or the workplace (see also Hyslop, 2009). However, attendance rates, grades, test scores, high school graduation rates, and post-secondary transitions have increased when students participate in a career academy high school. They noted that students are less likely to drop out physically and mentally by adding relevance to learning opportunities. When redesigning a high school into career academies, research from Alberta Education (2009) cited the following five benefits: (a) increased student achievement levels as a primary goal; (b) increased retention, promotion, and graduation rates; (c) improved student participation and engagement; (d) increased success for disadvantaged youth; and (e) smoother transitions to post-secondary

education and careers. The authors of this research report stated that their results provided evidence that career-related experiences during high school helped students secure valuable jobs after school.

Research on Career Academies and Student Performance

Research provided by the Manpower Demonstration Research Corporation's evaluation of career academies provided a common thread throughout the review of literature concerning student performance (Smith, 2008). On the one hand, Smith (2008) noted that promoters of career academy high schools argue that student success is based on the basic components of rigor, relevance, and relationships. Yet, on the other hand, literature is limited concerning the influence of a career academy model on student achievement, specifically in a rural setting.

Kemple and Snipes (2000) pointed out that, in 1993, Manpower Demonstration Research Corporation began an evaluation of the career academy model. Researchers collected information over a 6-year period and focused on nine high schools. Each of the schools within the study met the criteria for the components of an effective career academy including organizing as a school within a school, integrating academic and vocational curriculum, and incorporating community employer partnerships. The locations of these high schools included both large urban centers and smaller cities that had implemented the career academy model (see also Fennessy, 2008; Ho, 2013). Kemple and Snipes (2000) noted that the Manpower Demonstration Research Corporation was concerned with providing educational opportunities for a variety of student demographics. The researchers observed, "Most of the school districts in the evaluation were large and enroll substantially higher percentages of African-American

and Hispanic students than school districts nationally" (p. ES-6). They added, "On average, these school districts have higher dropout rates, higher unemployment rates, and higher percentages of low-income families" (p. ES-6). Thus, the focus of the study was on students who exhibited the potential of not succeeding in a high school within a traditional setting.

The key findings from one of the Manpower Demonstration Research Corporation studies included the following:

> Among students at high risk of school failure, career academies significantly cut dropout rates and increased attendance rates, credits earned toward graduation, and preparation for post-secondary education; career academies increased the likelihood that students in the low-risk subgroup were prepared to graduate on time. For these students, the academies also increased career-related and vocational course-taking without reducing the likelihood of completing a basic academic core curriculum. On average, the career academies produced little or no change in outcomes for students in the medium-risk subgroup. (Kemple & Snipes, 2000, p. ES-11)

For high-risk students, Kemple and Snipes (2000) found that the career academy model provided gains in student achievement. However, when all the student participants were viewed as a whole, they were quick to add, "When averaged across the diverse groups of students and sites participating in the evaluation, it appears that the career academies produced only modest improvements in students' engagement and performance during high school" (p. ES-11). In the same vein, although Kemple and Willner (2008) found that career academies increased engagement of students, they noted that the use of career

academies had not increased students' performance on reading and mathematics achievement. When considering other factors with student performance, the Ford Motor Company Fund (2008) found that career academies have been shown to increase high school graduation rates, attendance, grades, test scores, and post-secondary transition rates. Stern et al. (1992) asserted that the academy concept was established to reduce the dropout rate and engage students in academics through real-world learning opportunities.

A study conducted by Styron and Peasant (2010) linked the transition from ninth grade to high school with student achievement in the areas of mathematics and biology. Their findings revealed that student achievement depended on whether students were attending in a career academy school or a traditional high school. In their study, the students from the ninth grade academy were exposed to block scheduling, teacher teaching teams, and professional learning communities. Styron and Peasant found that the academic culture of the career academy made a positive difference in student achievement, as well as in the interaction between students and teachers, which possibly contributed to better academics. In the same vein, Lounsbury and Johnston (1985) found that the traditional setting created students who were not adjusted, academically or socially. They noted that teacher-centered 40- to 50-minute instructional periods with a lack of transitional supports did not support the students as well as the career academy setting, which focused more on teacher-student relationships. In a 1993 study, Wheelock echoed those findings and observed that students who are not provided the tools for transition, which included links to strong relationships, could become discouraged and disengage from academics, thus achieving at a lower level (cited in Ohanian, 2003).

Legters, Balfanz, and McPartland (2002) added that many students likely fail because of a lack of relationship building with the instructor.

Research by the Association for Career and Technical Education (2009a, 2009c) theorized that students perform at a higher level when instruction is presented in a relevant, real-world method. The group criticized traditional models because they felt that information was delivered in an abstract, disconnected manner rather that in the different learning styles of the students with a clear real-world application. The Association for Career and Technical Education contended that career academies embed work-based opportunities within the curriculum to assist with student achievement, which include mentoring and internships. This experience connects students, not only with an adult role model, but also connects mathematics and literacy concepts to relevant learning opportunities.

Some have asked if gender and socioeconomic status interacts with the use of career academies on student performance. The National Governors Association Center for Best Practices (2009a) concluded that achievement gaps exist among U.S. students based on ethnicity, race, and socioeconomic status; however, when gender is added as a factor, achievement gaps are even more dramatic. As acknowledged by Corbett, Hill, and St. Rose (2008), boys significantly outperform girls in all four ethnicity and race categories on the mathematics portion of the SAT college admissions exam. Again, the research was limited when examining the interaction among the career academy model, gender, and socioeconomic status on academic achievement. Darling-Hammond and Friedlaender (2008) noted that, when schools redesign curricular programs into rigorous, coherent instruction by engaging students in learning opportunities that are relevant

through real-world applications, the redesign enables students to overcome educational barriers associated with gender, race, language, poverty, or low academic skills. However, little hard data were available to link career academies to improved conditions for different educational demographics.

Career Academies, Literacy, and Mathematics Achievement

Again, research was sparse linking career academies specifically to literacy and mathematics performance. Many, therefore, looked to the struggling results of the current, traditional system of education in the high school years and hypothesized improved results with career academies. For example, the Carnegie Council on Advancing Adolescent Literacy (2010) found that fourth-grade U.S. students were on track for high literacy achievement, and their reading and writing levels were among the best in the world. Because most schools have a traditional format, this seemed to suggest that the traditional school model was working in the early grades. However, the Carnegie Council noted that, when students progressed through subsequent grades, the trend of high literacy achievement was reversed. Further, research conducted by the Association for Career and Technical Education (2009a) found that, based on the NAEP results, only two-thirds of secondary students were able to read at grade level. Thus, these results seemed to suggest that a new model of education was needed in the upper grades. Advocates of the career academy model would suggest their model as part of the change needed. In the same vein, research conducted by the U.S. Department of Education (2007b) revealed that only 35% of 12th graders were considered proficient in exhibiting an understanding of making inferences, understanding text, drawing conclusions, and making connections to previous experiences. Similarly, the American College Testing

(2009) company noted that, of the students graduating in 2009, only 67% met the criteria in English to be considered college-ready. In the same report, only 53% of graduates could be considered college-ready in the reading component. The American College Testing company indicated that these scores reflected students who reported that they were taking classes considered college-preparatory. For the career academy proponents, these data seemed to provide confirmation to their arguments.

Regarding the factor of ethnicity, research by the U.S. Department of Education (2007a) revealed that, between 1992 and 2005, the percentage of high school seniors performing at the basic level on the NAEP in literacy declined from 80% to 73% with gaps growing between White students and those of other races or ethnicities. Although these lower scores could be contributed to a rise in the overall number of test takers, the scores pointed to critical issues as they relate to the test taker literacy proficiency. Again, supporters of career academies use these and other data to make the case that a change is needed to increase students' performance in literacy.

Proponents of career academies also use these data to warn of the long-lasting effects of the inadequacy of the traditional educational model on the workforce. According to Casner-Lotto and Barrington (2006), employers stated that writing and reading skills are important in any career; yet, 72% of employers considered high school graduates to be deficient in basic writing skills. In addition, 38% considered these graduates lacking in reading comprehension as well. Based on these findings, Casner-Lotto and Barrington stated that the literacy achievement gap translated into a mismatching of literacy proficiency and job requirements. According to the U.S. Department of Education (2007d), lower literacy achievement has a large impact on

individuals as they transition into the workforce. They noted that a lack of literacy skills results in a lower participation in the labor market, considerably lower weekly and annual incomes, and less access to critical lifelong learning opportunities. Further, they stated that individuals lacking foundational literacy skills are more apt not to vote, less likely to volunteer in their community or be involved in their child's education, more likely to be incarcerated, and more likely to rely on public assistance programs.

Several challenges exist that contribute to low achievement in literacy. A key contributor is that direct literacy instruction ends for most students after the elementary grade levels. Because of this disconnect across grade levels, Miller (2009) noted that, when students are in high school, they are frustrated at the lack of literacy skills and become disengaged, which leads to dropping out. A second challenge, presented by the National Governors Association Center for Best Practices (2009b), is that high school level teachers, other than English teachers, have not received necessary professional development for teaching concepts such as reading and comprehension skills to support literacy instruction. A final challenge is that the focus on college readiness and real-world literacy requirements is disconnected from secondary level literacy instruction. Although most traditional high school curriculum focuses on fictional literature, the majority of reading and writing encountered in a career is more informational or technical in nature (Larkin, 2007). The Association for Career and Technical Education (2009a) argued that all these challenges could be overcome with the career academy model. The Association noted that the connection between continued focus on reading through the high school years, continued professional development for all teachers to support reading skills, and applied real-world examples of literacy is embraced by the career academy philosophy.

Through these three activities, the career academy philosophy motivates students to be engaged in their learning of literacy content as it relates to student interests (U.S. Department of Education, 2007c). In response, many in education believe that models like the career academy concept would increase literacy achievement.

Research by the National Council of Teachers of English (2006) stated that assisting students in making connections between writing and reading with real-world applications could improve literacy skills and engage reluctant readers. According to Vaites (2003), another critical element in improving literacy skills is to increase the time spent developing reflective journals or portfolios while engaging in activities such as internships. In addition, Vaites indicated that integrating relevant literature into the literacy curriculum could assist students in making connections within their coursework. For example, incorporating trade publications or reading novels with a medical emphasis could direct interested students toward the medical career fields. However, when assessing the bottom line of student achievement, research by Kemple and Snipes (2000) "found that career academies did not improve standardized measures of reading…achievement either on average or for any subgroup of students" (p. ES-11). Therefore, as much as the career academy model seemed to align with increased literacy achievement, little evidence existed to demonstrate this improvement.

In the area of mathematics, Zehr (2009) noted that 17-year-old students' mathematics scores on the NAEP were unchanged from 2004-2008 even though students, on average, were taking higher-level mathematics courses during this time. Test results from this period indicated that 41% of those students tested did not have comprehension of moderately complex mathematic procedures or reasoning, such as decision making

based on reading graphs and finding averages (U.S. Department of Education, 2009). In addition to the NAEP exam, a report from American College Testing (2009) cited that most students were not prepared to meet the following demands:

> ACT research shows that far too few members of the graduating class of 2004 are ready for college-level work in English, math, or science—or for the workplace, where the same skills are now being expected of those who do not attend college. This deficiency is evident among both males and females and among all racial and ethnic groups. And, at present, it does not look as though students already in the pipeline are likely to fare much better. (p. 1).

The workforce today is requiring workers to be advanced in technology and problem solving, which is rooted in student achievement in the areas of mathematics and literacy.

According to research conducted by the National Council of Teachers of Mathematics (2000), a primary education goal should be for all students to engage in a rigorous curriculum of mathematics that will prepare them for post-secondary education and for the workplace. Although the intention of the National Council of Teachers of Mathematics is to have all students learn mathematics, it does not mean that all students learn mathematics in the same way. Lack of interest in mathematics or disengagement could be a contributing factor to low student achievement as shown by Stone, Alfeld, Pearson, Lewis, and Jensen (2006). They argued that this disengagement could be caused by boredom, lack of support, or difficulty with the subject matter. Stone et al. submitted that most students believe that the mathematics courses they take in school lack relevance in their life after high school. In their view, the findings of their research reinforced the rationale for teaching mathematics in a different way. By providing a variety of curricular

opportunities, they noted that students might be able to attain mastery of a subject like algebra. When teachers incorporate post-secondary and career instruction into the curriculum, students are more engaged as they apply their knowledge in a relevant venue (U.S. Department of Education, 2009).

Viadero (2005) argued that mathematics should be taught with real-life applications. Viadero proposed that students lacking the fundamentals of algebra or only retaining how the information was taught in isolation have a difficult time when asked to apply their knowledge in a real-world setting. This lack of ability to apply knowledge learned, he stated, has a negative effect on college entrance and graduation rates. He felt that because of the pressure of high stake exams, teachers might feel forced to teach mathematics at a superficial level that exposes students only to items that will appear on the exam rather than helping students form deeper understandings of the concepts presented. Brown, Collins, and Duguid (1989) asserted that, in order for students to be actively engaged in learning mathematical concepts that are considered abstract, educators should redefine how they deliver the material. Brown et al. noted that connections should be made between the concepts they are learning in the classroom environment and how it could be applied in a real-world setting. This concept is one of the fundamental principles behind the philosophy of the career academies (Stern et al., 2010). However, Kemple and Snipes (2000) found that students participating in career academies did not score higher, on average, on mathematics exams compared to students participating in traditional high schools (see also Braswell, Daane, & Grigg, 2003).

Conclusion

A review of the literature provided a historical perspective of the traditional high school model. It began with the origins of the nature and function of the American high school from 1893 and the Committee of Ten. The review progressed to the Reagan administration's revisiting of the Committee of Ten's main ideas, which developed into *A Nation at Risk.* With all of the changes in education that span the last two decades, the emphasis on improving mathematic and reading skills through the No Child Left Behind reform sought to prepare students for transitioning into post-secondary education. According to Finn (2006), in 2005, President George W. Bush called for high school reform with the adoption of a 5-part state action agenda. Its intent was to restore the value of a high school diploma, to redesign high school in terms of an institution, to strengthen the merit of high school teachers and principals, to provide accountability for test results, and to streamline educational governance. The traditional high school model, as reflected in the research from the review of the literature, has experienced several reform initiatives to prepare students for post-secondary transition either to college or career in a better way. However, Powell et al. (1985) contended that this type of school institution has been viewed more like a shopping mall approach than an educational experience that focuses on purpose, push, and personalization.

In an effort to reform education and make learning more relevant for students, many reform models were created, one of which was the career academy. The career academy model began in 1969 at Edison High School in Philadelphia. One component of a career academy model that set it apart from the traditional high school model consisted of organizing individual schools into small learning communities (a school within a

school) (Sullivan & Shaw, 2010). Career academies also combined college-preparatory curriculum with career themes and formed partnerships with employers and post-secondary educational institutions for smoother transitions to future educational or career opportunities (Association for Career and Technical Education, 2009c). By engaging business partners and industry leaders in the educational process, career academies increase academic achievement and improve high schools with the integrations of relevant career themes and projects (Dayton, 2010; Hoachlander, 2008).

The key components of a career academy include a focus on academic rigor, on relevant learning opportunities, and on building relationships between adults and students (Springston, 2002). If this model is implemented effectively, according to Brand (2004), it can decrease the dropout rate, increase academic outcomes, and improve technical skills, which lead to increased community prosperity. Research, as summarized by Mittelsteadt and Reeves (2003), revealed that restructuring reforms such as the career academy model engage all students and assist them with post-secondary or career decisions. In contrast to the traditional high schools where the curriculum centers on isolated subjects, Mittelsteadt and Reeves found that the academic focus of small learning communities within career academies reflects the integrated curriculum and interdisciplinary units using career clusters.

However, the review of literature reflected limited data on student performance in the areas of literacy and mathematics. Most of the data found were in studies concerning California career academy students or through the Manpower Demonstration Research Corporation (Kemple & Snipes, 2000). Key findings from Kemple and Snipes (2000) revealed that career academies decreased dropout rates, increased attendance rates, and

increased the number of credits earned toward graduation for at-risk students. Because many of these factors are linked to increased academic performance, many would assume that literacy and mathematics achievement would increase. These results were not seen in students at moderate-risk of failure. Therefore, "when averaged across the diverse groups of students and sites participating in the evaluation, it appears that the career academies produced only modest improvements in students' engagement and performance during high school…" (p. 3). In the final analysis, no improvements were seen in the standardized scores of students in the areas of reading and mathematics over the different subgroups. In conclusion, Kemple and Willner (2008) found that career academies increase engagement of students by providing rigor to academics, relevance to learning, and relationships built on community business partnerships but has not increased student performance in the areas of reading and mathematics achievement.

CHAPTER III

METHODOLOGY

The review of literature reflected the characteristics of the traditional high school versus the career academy high school and its impact on student achievement in the areas of literacy and mathematics. Limited research was available regarding the effects of career academies on literacy and mathematics performance. Some research found that career academies did have an influence on student engagement (Kemple & Willner, 2008). Therefore, the following hypotheses were developed to determine whether or not the career academy model had an effect on student achievement for students in four schools in the state of Arkansas. In addition, gender and socioeconomic status were also considered.

1. No significant difference will exist by gender for students in two 6A and two 7A high schools in the state of Arkansas who attend a career academy high school versus students in a traditional high school on literacy achievement measured by the Grade 11 Literacy Exam.
2. No significant difference will exist by gender for 8-10th grade students in two 6A and two 7A high schools in the state of Arkansas of students who attend a career academy high school versus students in a traditional high school on mathematics achievement measured by the EOC Geometry Exam.

3. No significant difference will exist by socioeconomic status for students in two 6A and two 7A high schools in the state of Arkansas who attend a career academy high school versus students in a traditional high school on literacy achievement measured by the Grade 11 Literacy Exam.
4. No significant difference will exist by socioeconomic status for 8-10th grade students in two 6A and two 7A high schools in the state of Arkansas of students who attend a career academy high school versus students in a traditional high school on mathematics achievement measured by the EOC Geometry Exam.

Research Design

A quantitative, causal-comparative strategy was used for the study. The researcher used four 2 x 2 factorial between-groups designs to analyze the hypotheses. For Hypothesis 1 and 2, the independent variables were the type of school structure (career academy versus tradition high school) and gender (male versus female). The dependent variable for Hypothesis 1 was literacy achievement measured by the Grade 11 Literacy Exam, and the dependent variable for Hypothesis 2 was mathematics achievement measured by the EOC Geometry Exam. For Hypotheses 3 and 4, the independent variables were the type of school structure (career academy versus tradition high school and socioeconomic status categorized by lunch status (free/reduced lunch status versus regular lunch). The dependent variable for Hypothesis 3 was literacy achievement measured by the Grade 11 Literacy Exam, and the dependent variable for Hypothesis 4 was mathematics achievement measured by the EOC Geometry Exam.

Sample

The study focused on four high schools: two operated as traditional high schools and the remaining two operated as career academy high schools. The researcher controlled for school size by comparing two 6A high schools: one traditional high school located in Central Arkansas and one career academy high school located in North Central Arkansas, and two 7A high schools: one traditional high school and one career academy high school located in Northwest Arkansas. All the comparison high schools were selected based on similar student demographics including student population, ethnicity, and socioeconomic status.

School A was a 6A high school that operated as a career academy high school. The school included Grades 9–12 with an average daily membership for 2010-2011 at 1,193 students. Adequate yearly progress status in the areas of mathematics and literacy showed that School A met state standards (see Table 1). In addition, School A met the graduation goal as set by the state. Thus, overall adequate yearly progress status for 2010-2011 for School A was Meets Standards.

Table 1

School A Percent Proficient/Advanced in EOC Geometry and Grade 11 Literacy

Subgroup	Geometry	Literacy
Combined Population	80.8%	82.6%
Economic Disadvantaged	68.9%	73.1%
Female	81.4%	86.9%
Male	80.4%	78.2%

School B was a 6A high school that operated as a traditional high school. The school included Grades 9–12 with an average daily membership for 2010-2011 at 1,094 students. Overall adequate yearly progress status in the area of mathematics showed that School B met state standards. School B met the graduation goal as set by the state. In the area of mathematics, their overall adequate yearly progress met standards; however, in the area of literacy, they were on alert status (see Table 2). Therefore, adequate yearly progress status for 2010-2011 for School B was Alert.

Table 2

School B Percent Proficient/Advanced in EOC Geometry and Grade 11 Literacy

Subgroup	Geometry	Literacy
Combined Population	93.9%	84.4%
Economic Disadvantaged	87.8%	76.3%
Female	96.4%	83.6%
Male	90.5%	86.6%

School C was a 7A high school that operated as a career academy high school. The school included Grades 9–12 with an average daily membership for 2010-2011 at 1,710 students. Overall, adequate yearly progress status in the areas of mathematics and literacy showed that School C did not meet state standards in either area (see Table 3), but School C did meet the graduation rate goal as set by the state. Therefore, adequate yearly progress status for 2010-2011 for School C is School Improvement Year 4.

Table 3

School C Percent Proficient/Advanced in EOC Geometry and Grade 11 Literacy

Subgroup	Geometry	Literacy
Combined Population	70.4%	63.3%
Economic Disadvantaged	65.3%	53.5%
Female	69.4%	68.3%
Male	71.3%	59.1%

School D was a 7A high school that operated as a traditional high school. The school included Grades 9–12 with an average daily membership for 2010-2011 at 1,956 students. Overall adequate yearly progress status in the area of mathematics showed that School D met standards, but in the area of literacy, School D did not meet state standards (see Table 4). School D met the graduation goal as set by the state. Therefore, adequate yearly progress status for 2010-2011 for School D was School Improvement Year 1.

Table 4

School D Percent Proficient/Advanced in EOC Geometry and Grade 11 Literacy

Subgroup	Geometry	Literacy
Combined Population	80.1%	71.1%
Economic Disadvantaged	71.1%	53.4%
Female	80.9%	75.5%
Male	79.5%	67.1%

For Hypotheses 1 and 3, the researcher used a stratified random sampling technique to determine how type of school by gender affected literacy and mathematics. First, the four high schools were divided into two populations, traditional and career academy high schools. Second, the students were divided by gender, male and female. Third, to control for lunch status, the males and females were divided by lunch status, free/reduced and regular paid. Fourth, the researcher randomly chose an equal number of students from each category to fill the 2 x 2 factorial design cells (60 career academy males, 60 career academy females, 60 traditional males, 60 traditional females, equaling 240 students). For Hypotheses 2 and 4, the researcher used a stratified random sampling technique to determine how type of school by lunch status affected literacy and mathematics. First, the four high schools were divided into two populations, traditional and career academy high schools. Second, the males and females were divided by lunch status, free/reduced and regular paid. Third, to control for gender, the students were divided into males and females. Fourth, the researcher randomly chose an equal number of students from each category to fill the 2 x 2 factorial design cells (60 career academy males, 60 career academy females, 60 traditional males, 60 traditional females, equaling 240 students).

Instrumentation

The criterion-referenced tests, such as the EOC Geometry and Grade 11 Literacy Exam, were implemented as part of the Arkansas Comprehensive Testing, Assessment, and Accountability Program. These exams were developed in response to Arkansas Legislative Act 35, which required the State Board of Education to implement a comprehensive examination program that includes assessment of the rigorous academic

content standards as defined by the English Language Arts Curriculum Frameworks. As part of this program, students that were enrolled as an 11th grader in Arkansas public schools participated in the Grade 11 Literacy Exam in March 2011. Students were given approximately 2 hours and 45 minutes each day to complete the Grade 11 Literacy Exam and were assigned into test sessions during the two days of testing in March 2011. The development of the Grade 11 Literacy Exam was based on the Arkansas English Language Arts Curriculum Frameworks. These frameworks have distinct levels: Content Standards within each Strand, Strands to be taught in performance, and Student Learning Expectations within each Content Standard according to the Arkansas Department of Education (2011).

Each spring, students in School A, B, C, and D participated in the EOC Geometry Exam and the Grade 11 Literacy Exam to determine adequate yearly progress. According to the Arkansas EOC and Grade 11 Literacy Technical Report (Arkansas Department of Education, 2011), in terms of score reliability,

> [R]eaders are held to the same agreement standards once they begin live scoring as they were required to meet during the qualifying process. Readers for Algebra I, Geometry, and Biology EOC and Grade Eleven Reading are expected to maintain exact agreement of 70-80% with their peers. Readers for Grade Eleven Writing are expected to maintain 60-70% exact agreement with their peers in each domain. (p. 51)

Evidence existed of content validity, as shared by the Arkansas Department of Education, which verifies the curriculum alignment of the exams with the statewide frameworks. Their report revealed that the validity of both exams is reinforced given that content area

teachers are involved in establishing the frameworks. Alignment between the frameworks and components of the EOC Geometry and Grade 11 Literacy exams provide evidence that both assessments quantify the frameworks. The career academy model supports the frameworks and the components of the EOC Geometry exams as well as the Grade 11 Literacy Exam by incorporating the identified weak student learning expectations for integrated projects across the curriculum.

Data Collection Procedures

After Institutional Review Board approval (see Appendix), the researcher physically obtained existing data from the school districts in this study with permission from District Offices. These data included test scores in the form of scaled scores from both the EOC Geometry and Grade 11 Literacy exams. The data also included demographic breakdowns for ethnicity, gender, and lunch status. Names were numerically coded to maintain confidentiality. Test data from the EOC Geometry exam and Grade 11 Literacy Exam was emailed by two districts, and the other two districts provided paper copies through the postal service with names already removed. Gender and lunch status were coded by each district. Excel spreadsheets were created for the exam data. Information from each school district was grouped by variable and randomly drawn for equal-sized samples.

Analytical Methods

The results of the Grade 11 Literacy Exam and the EOC Geometry Exam were compiled, and appropriate statistical tests were conducted to test the null hypotheses. To address Hypothesis 1, a 2 x 2 factorial analysis of variance (ANOVA) was conducted using type of school structure (career academy versus traditional high school) and gender

(male versus female) as independent variables and literacy achievement as the dependent variable. To address Hypothesis 2, a 2 x 2 factorial ANOVA was conducted using type of school structure (career academy versus traditional high school) and gender (male versus female) as independent variables and mathematics achievement as the dependent variable. To address Hypothesis 3, a 2 x 2 factorial ANOVA was conducted using type of school structure (career academy versus traditional high school) and socioeconomic status (free/reduced lunch status versus regular lunch) as independent variables and literacy achievement as the dependent variable. To address Hypothesis 4, a 2 x 2 factorial ANOVA was conducted using type of school structure (career academy versus traditional high school) and socioeconomic status (free/reduced lunch status versus regular lunch) as independent variables and mathematics achievement as the dependent variable.

To test the null hypotheses, an alpha level of .05 was used. A Bonferroni correction was used to adjust the probability value because of the increased risk of type I errors that are likely when performing multiple statistical tests. Thus, the alpha level for each of the four hypotheses was set at .0125 (.05 ÷ 4). If the interaction effect was significant, the researcher ran simple main effects to determine the nature of the interaction. For interactions that were not statistically significant, the main effects were examined individually.

Limitations

Limitations should be defined in research studies such as this, to assist the reader in determining if there were any conditions present that may affect the interpretation of the results. The following limitations were present in this study. First, because the researcher wanted to use career academy schools that had been in existence for several

years to control for early implementation difficulties or novelty validity problems, only two career academy schools existed from which to choose that had been functioning for approximately nine years. Therefore, the number of 9-12 grade participants limited the researcher. These restrictions could limit the generalization of the results.

Second, the structures of the two career academy schools were quite different from each other. School A was a wall-to-wall career academy model high school, which means that every student is in an academy. On the other hand, School C had pocket career academies that focused on specific programs of study. In order to be chosen to participate in the career academies, students completed an application process. Thus, the researcher pulled from the total student population from School A; however, a more limited number of participants from School C were available.

Third, the researcher found limited resources on how the career academy model affected student achievement, specifically in the areas of mathematics and literacy. Most of the research found illustrated how the career academy model affected graduation rates, student engagement both inside and outside of the classroom environment, and students' post-secondary transition plans. In addition, most of the research on the career academy model pertained to high schools in urban setting rather than the rural settings of the two schools used in this study.

Fourth, another important limitation was the misalignment of the instruments that measured mathematics and literacy achievement. Even though the state of Arkansas mandates the use of these instruments for all public schools in the state, the instruments more closely align with the curriculum used in the traditional schools. In contrast, the career academy model focuses on providing instructional delivery of curricular concepts

through real-world learning experiences. Thus, evaluation of learning used by career academy teachers involves project-based assessments; however, students are not tested in this manner on the state exams. In addition, the assessments used in the career academy model are more formative in nature; whereas, the state exam is a summative measure.

Despite the limitations within the study, however, the results of the study could assist other districts in the state of Arkansas to look at the effects of implementing career academies. Regarding other variables from research, graduation rates have become more important in terms of school accountability. The career academy model seemed to focus on helping students determine their learning styles, on engaging them in real-world learning opportunities, on connecting them with the community, and on assisting them in post-secondary planning, all of which tends to impact graduation rates.

CHAPTER IV

RESULTS

The purpose of this quantitative research study was to determine the effects of school type (Career Academy versus Traditional) by gender and socioeconomic status on mathematics for 8-10th grade participants and literacy for 11th grade participants in Arkansas. Using IBM Statistical Packages for the Social Sciences Version 22, a Factorial ANOVA was run for each of the four null hypotheses. Prior to running the statistical analysis, assumptions of normality and homogeneity of variances were checked. In addition, descriptive statistics and inferential results were reported.

Hypothesis 1

Hypothesis 1 states that no significant difference will exist by gender for students in two 6A and two 7A high schools in the state of Arkansas who attend a career academy high school versus students in a traditional high school on literacy achievement measured by the Grade 11 Literacy Exam. To test this hypothesis, a 2 x 2 factorial ANOVA was conducted. Before conducting ANOVA, the researcher screened the data for outliers and examined the data for the assumptions of independence of observations, normality, and homogeneity of variances. Table 5 displays the group means and standard deviations for literacy achievement by school type and gender.

Table 5

Descriptive Statistics for School Type by Gender for 11th-Grade Students' Literacy Achievement

Type	Gender	*M*	*SD*	*N*
Career Academy	Male	209.43	20.39	60
	Female	212.37	21.11	60
	Total	210.90	20.72	120
Traditional	Male	210.58	18.45	60
	Female	212.90	17.75	60
	Total	211.74	18.06	120
Total	Male	210.01	19.37	120
	Female	212.63	19.42	120

An examination of box and whisker plots for each set of literacy achievement scores revealed two outliers in the sample of males from the traditional setting. However, a decision was made to keep these two cases to preserve the equal sample size across all groups in the analysis.

To test the assumption of normality, histograms as well as Kolmogorov-Smirnov (KS) statistics were examined for each group. The shape of the histograms for each group appeared normal. Results for the KS tests revealed no significant deviation from a normal distribution of scores for career academy males $D(60) = 0.09$, $p > .05$, as well as for career academy females $D(60) = 0.11$, $p > .05$. Similarly, the distribution of literacy achievement scores for traditional setting females, $D(60) = 0.07$, $p > .05$, was not

significantly different from normal. However, the assumption of normality was violated in literacy achievement distribution of traditional setting male group, $D(60) = 0.17$, $p = .001$. Despite this violation, analysis of data using ANOVA was deemed appropriate as ANOVA is considered robust to mild violations of the assumption of normality (Morgan, Leech, & Barrett, 2011). Furthermore, results of Levene's test revealed no violation of homogeneity of variances among the groups for literacy achievement, $F(3, 236) = 1.45$, $p = .228$. Results of the factorial ANOVA analysis are displayed in Table 6.

Table 6

Results of Factorial ANOVA for Literacy Achievement of 11th-Grade Students by School Type and Gender

Source	*SS*	*df*	*MS*	*F*	*p*	*ES*
School Type	42.50	1	42.50	0.12	.738	0.00
Gender	413.44	1	413.44	1.09	.297	0.00
School Type *Gender	5.70	1	5.70	0.02	.905	0.00
Error	89482.65	236	379.16			

Results of the factorial ANOVA analysis indicated no significant interaction between school type and gender $F(1, 236) = 0.02$, $p = .902$. Therefore, the null hypothesis could not be rejected. Likewise, there was not a statistically significant main effect for school type, $F(1, 236) = 0.11$, $p = .738$; the literacy scores of career academy students ($M = 210.90$, $SD = 20.72$) were not significantly different from those of students in the traditional setting ($M = 211.74$, $SD = 18.06$). There was also no statistically significant

main effect for gender, $F(1, 236) = 1.09$, $p = .297$. The literacy scores for male students ($M = 210.01$, $SD = 19.37$) were not significantly different from those of female students ($M = 212.63$, $SD = 19.42$) (see Figure 1).

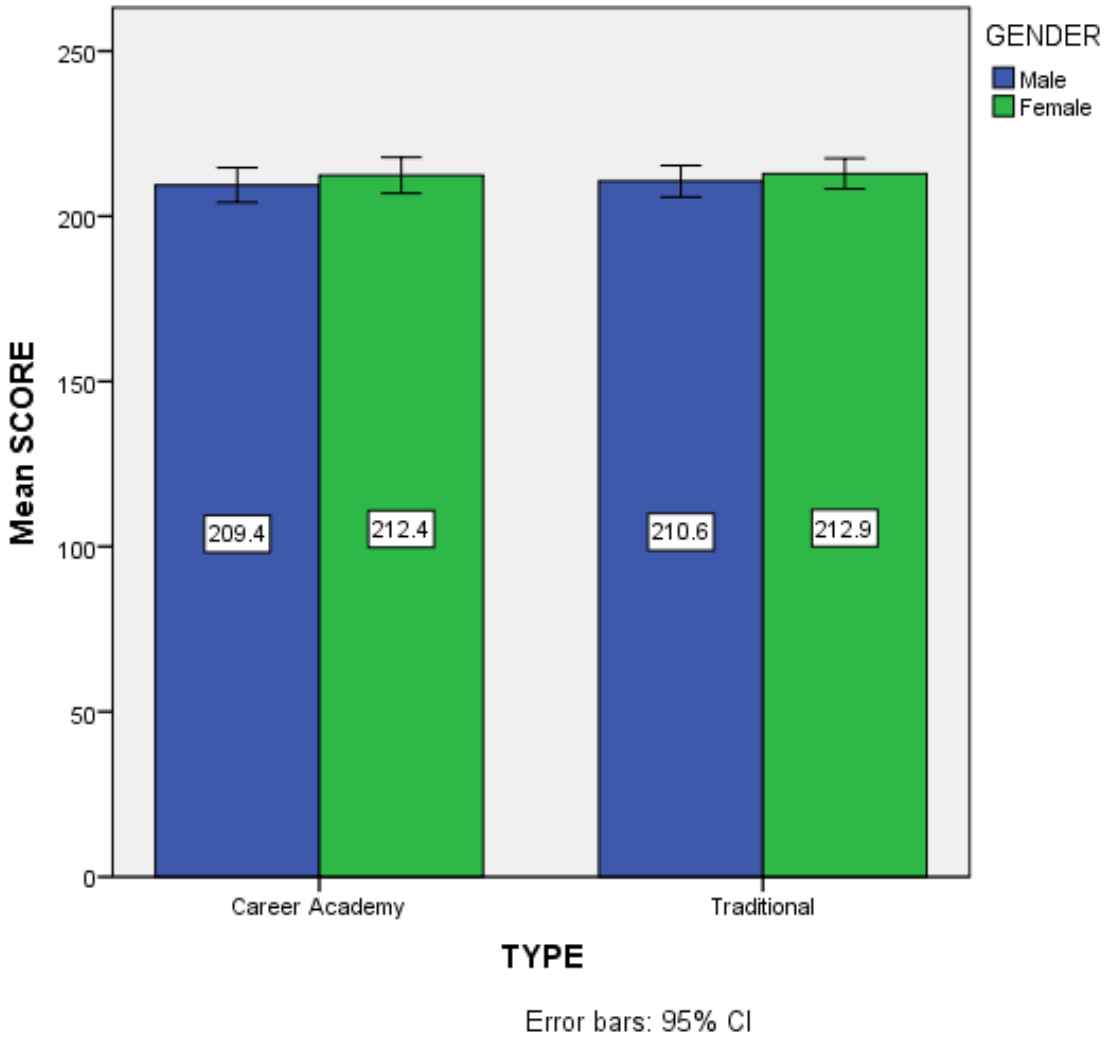

Figure 1. Mean literacy achievement by school type and gender.

Overall, the results indicate no combined or individual effect of either school type or gender on the literacy performance of 11th grade students.

Hypothesis 2

Hypothesis 2 states that no significant difference will exist by gender for 8-10th grade students in two 6A and two 7A high schools in the state of Arkansas of students who attend a career academy high school versus students in a traditional high school on mathematics achievement measured by the EOC Geometry Exam. To test this hypothesis, a 2 x 2 factorial ANOVA was conducted. Before conducting ANOVA, the researcher screened the data for outliers and examined the data for the assumptions of independence of observations, normality, and homogeneity of variances. Table 7 displays the group means and standard deviations for mathematics achievement by school type and gender.

Table 7

Descriptive Statistics for School Type by Gender for 8-10th-Grade Students' Mathematics Achievement

Type	Gender	*M*	*SD*	*N*
Career Academy	Male	228.75	35.56	60
	Female	234.87	38.56	60
	Total	231.81	36.96	120
Traditional	Male	253.45	34.17	60
	Female	248.20	34.82	60
	Total	250.83	34.45	120
Total	Male	241.10	36.77	120
	Female	241.53	37.19	120

An examination of box and whisker plots for each set of mathematics achievement scores revealed no outliers in the sample. To test the assumption of normality, histograms as well as KS statistics were examined for each group. The shape of the histograms for each group appeared normal. Results for the KS tests revealed no significant deviation from a normal distribution across all groups (career academy males $D(60) = 0.08$, $p > .05$; career academy females $D(60) = 0.08$, $p > .05$; traditional setting females $D(60) = 0.08$, $p > .05$; as well as traditional setting males $D(60) = 0.05$, $p > .05$. Similarly, Levene's test revealed no violation of homogeneity of variances among the groups for mathematics, $F(3, 236) = 0.29$, $p = .836$. Results of the factorial ANOVA analysis are displayed in Table 8.

Table 8

Results of Factorial ANOVA for Mathematics Achievement of 8-10th-Grade Students by School Type and Gender

Source	*SS*	*df*	*MS*	*F*	*p*	*ES*
School Type	21698.02	1	21698.02	16.97	.001	0.07
Gender	11.27		11.27	0.01		
School Type *Gender	1938.02		1938.02	1.52		
Error	301814.63		1278.88			

Results of the factorial ANOVA analysis indicated no significant interaction between school type and gender $F(1, 236) = 1.52$, $p = .220$. Therefore, the primary null

hypothesis could not be rejected. However, there was a statistically significant main effect for school type, $F(1, 236) = 16.97$, $p = .001$, as displayed in Figure 2.

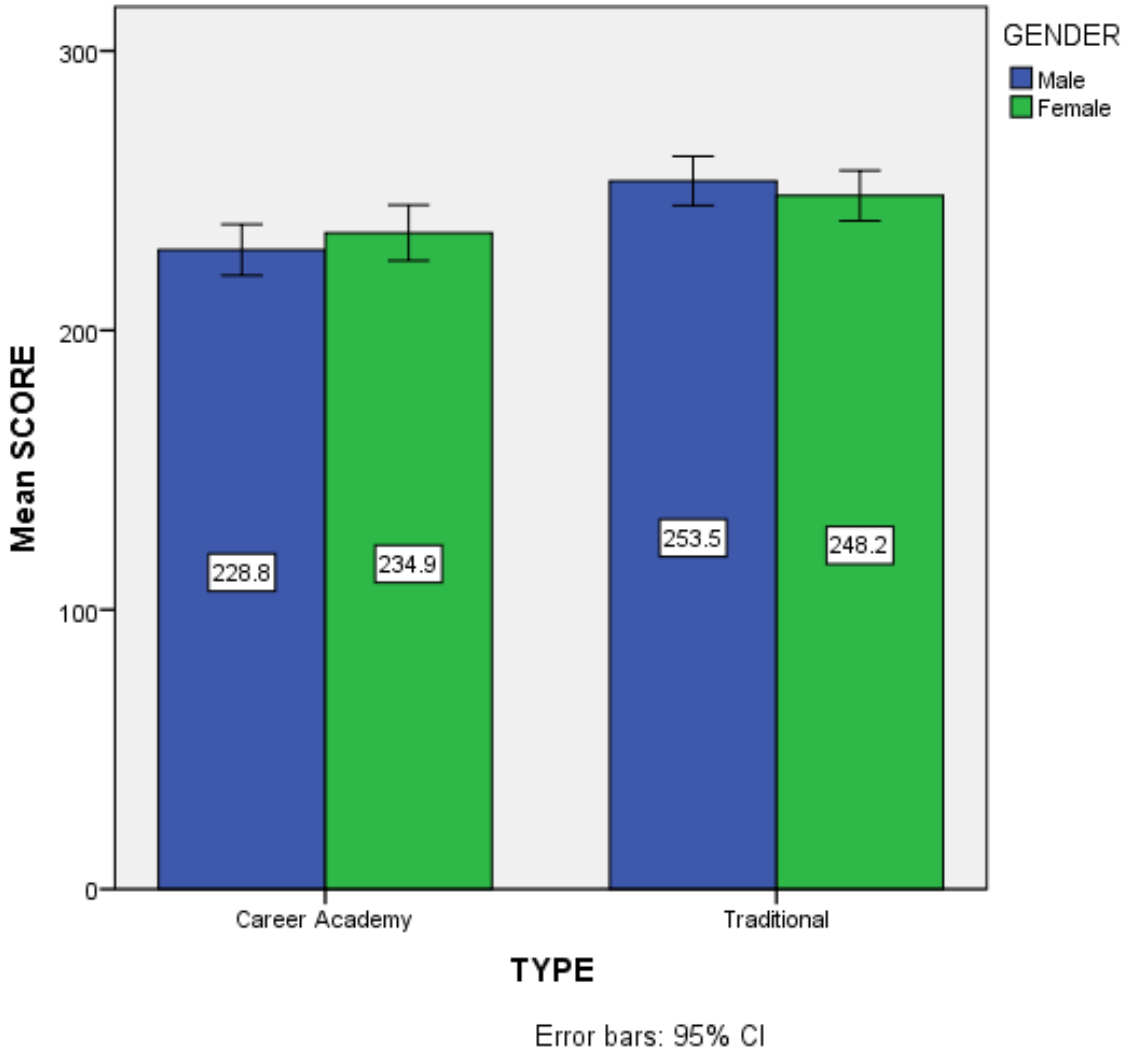

Figure 2. Mean mathematics achievement by school type and gender.

The mathematics scores of career academy students ($M = 231.81$, $SD = 36.96$) were significantly different from those of students in the traditional setting ($M = 250.83$, $SD = 34.45$). Finally, there was not a statistically significant main effect for gender, $F(1, 236) = 0.01$, $p = .925$, indicating that the mathematics scores for male students ($M = 241.10$, SD

= 36.77) were not significantly different from those of female students (*M* = 241.53, *SD* = 37.19). Overall, the results indicate no combined or individual effect of either school type or gender on the mathematics performance of 11th grade students. However, school type, when considered independently, appeared to exert a strong influence on their mathematics achievement regardless of gender.

Hypothesis 3

Hypothesis 3 states that no significant difference will exist by socioeconomic status for students in two 6A and two 7A high schools in the state of Arkansas who attend a career academy high school versus students in a traditional high school on literacy achievement measured by the Grade 11 Literacy Exam. To test this hypothesis, a 2 x 2 factorial ANOVA was conducted. Before conducting ANOVA, the researcher screened the data for outliers and examined the data for the assumptions of independence of observations, normality, and homogeneity of variances. Table 9 displays the group means and standard deviations for literacy achievement by school type and socioeconomic status.

Table 9

Descriptive Statistics for School Type by Socioeconomic Status for 11th-Grade Students' Literacy Achievement

Type	Socioeconomic Status	*M*	*SD*	*N*
Career Academy	Regular lunch	219.92	17.71	60
	Free or Reduced Lunch	201.88	19.67	60
	Total	210.90	20.72	120
Traditional	Regular lunch	217.85	14.69	60
	Free or Reduced Lunch	205.63	19.14	60
	Total	211.74	18.06	120
Total	Regular lunch	218.88	16.23	120
	Free or Reduced Lunch	203.76	19.42	120

An examination of box and whisker plots for each set of literacy achievement scores revealed no significant outliers in any of the samples. To test the assumption of normality, histograms, as well as KS statistics, were examined for each group. The shape of the histograms for each group appeared normal. Results for the KS tests revealed no significant deviation from a normal distribution of scores for career academy students in the regular lunch group $D(60) = 1.01$, $p > .05$, as well as for career academy students in the free or reduced lunch group, $D(60) = 1.02$, $p > .05$. Similarly, the distribution of literacy achievement scores for students in the traditional setting and regular lunch group, $D(60) = 0.08$, $p > .05$, was not significantly different from normal. However, the assumption of normality was violated in literacy achievement distribution of traditional

students in the free or reduced lunch group, $D(60) = 0.13$, $p = .021$. Despite this violation, analysis of data using ANOVA was deemed appropriate, as ANOVA is considered robust to mild violations of the assumption of normality (Morgan et al., 2011). Furthermore, results of Levene's test revealed no violation of homogeneity of variances among the groups for literacy achievement, $F(3, 236) = 1.33$, $p = .264$. Results of the factorial ANOVA analysis are displayed in Table 10.

Table 10

Results of Factorial ANOVA for Literacy Achievement of 11th-Grade Students by School Type and Socioeconomic Status

Source	*SS*	*df*	*MS*	*F*	*p*	*ES*
School Type	42.50	1	42.50	0.13	.716	0.00
Socioeconomic status	13725.94		13725.94	42.81		0.15
School Type *Socioeconomic status	507.50		507.50	1.58		0.01
Error	75668.35	236	320.63			

Results of the factorial ANOVA analysis indicated no significant interaction between school type and socioeconomic status, $F(1, 236) = 1.58$, $p = .210$. Therefore, this null hypothesis could not be rejected. Likewise, there was a not statistically significant main effect for school type, $F(1, 236) = 0.13$, $p = .716$; the literacy scores of career academy students ($M = 210.90$, $SD = 20.72$) were not significantly different from those of students in the traditional setting ($M = 211.74$, $SD = 18.06$). There was, however, a

statistically significant main effect for socioeconomic status, $F(1, 236) = 42.81$, $p < .001$ (see Figure 3).

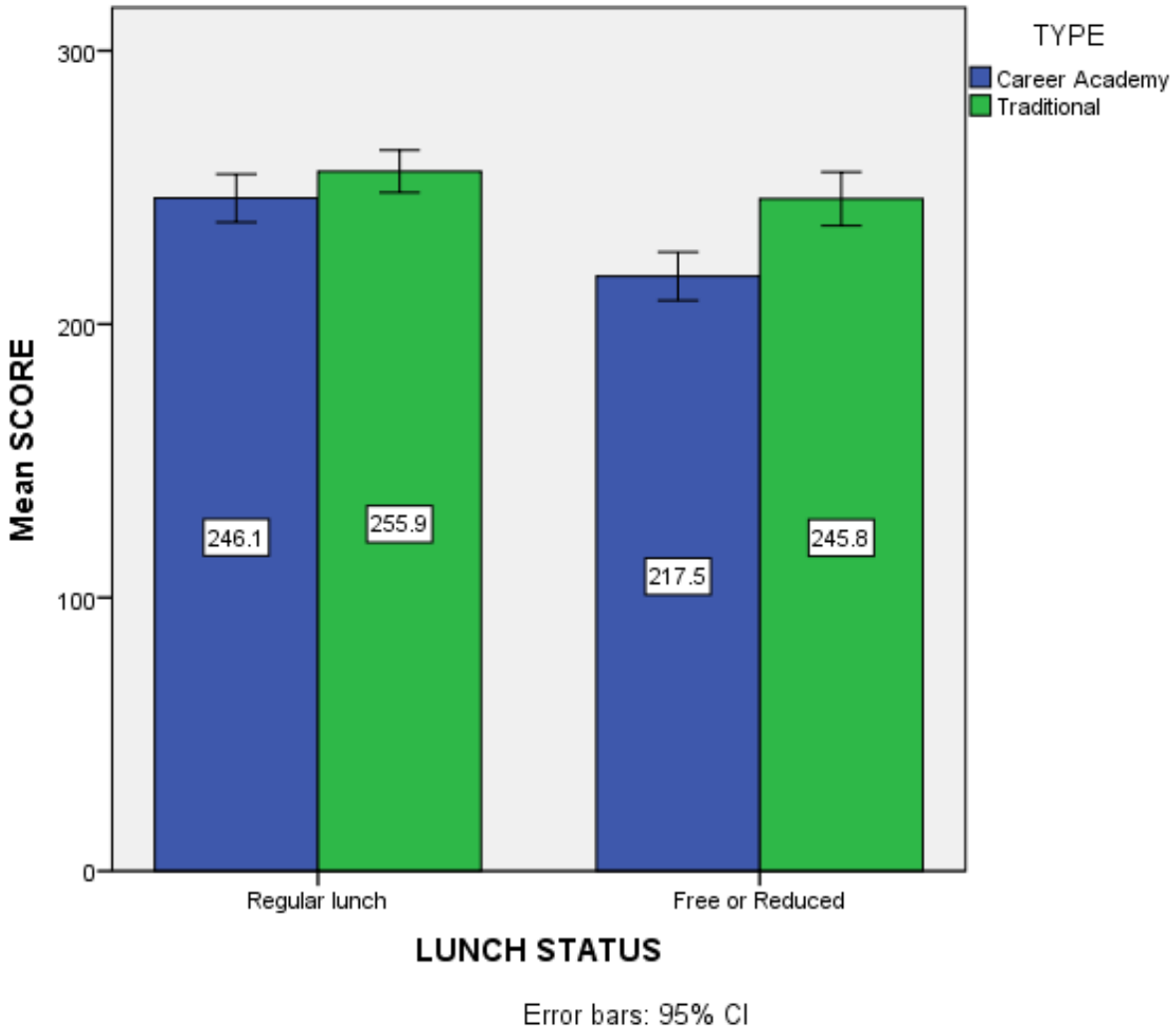

Figure 3. Mean literacy achievement by socioeconomic status and school type.

The literacy scores for regular lunch students ($M = 218.88$, $SD = 16.23$) were significantly different from those of free and reduced lunch students ($M = 203.76$, $SD = 19.42$). These results suggest that, although there was no combined effect of school type and socioeconomic status on the literacy performance of 11th grade students, there was a statistically significant independent effect of socioeconomic status.

Hypothesis 4

Hypothesis 4 states that no significant difference will exist by socioeconomic status for 8-10th grade students in two 6A and two 7A high schools in the state of Arkansas of students who attend a career academy high school versus students in a traditional high school on mathematics achievement measured by the EOC Geometry Exam. To test this hypothesis, a 2 x 2 factorial ANOVA was conducted. Before conducting ANOVA, the researcher screened the data for outliers and examined the data for the assumptions of independence of observations, normality, and homogeneity of variances. Table 11 displays the group means and standard deviations for mathematics achievement by school type and socioeconomic status.

Table 11

Descriptive Statistics for School Type by Socioeconomic status for 8-10th-Grade Students' Mathematics Achievement

Type	Socioeconomic Status	*M*	*SD*	*N*
Career Academy	Regular lunch	246.08	34.04	60
	Free or reduced lunch	217.53	34.37	60
	Total	231.81	36.96	120
Traditional	Regular lunch	255.85	29.89	60
	Free or reduced lunch	245.80	38.07	60
	Total	250.83	34.45	120
Total	Regular lunch	250.97	32.28	120
	Free or reduced lunch	231.67	38.80	120

An examination of box and whisker plots for each set of mathematics achievement scores revealed no outliers in the sample. To test the assumption of normality, histograms, as well as KS statistics, were examined for each group. The shape of the histograms for each group appeared normal. Results for the KS tests revealed no significant deviation from a normal distribution across all groups: career academy regular lunch, $D(60) = 0.09$, $p > .05$; career academy free or reduced lunch, $D(60) = 0.09$, $p > .05$; traditional setting free or reduced lunch, $D(60) = 0.07$, $p > .05$; as well as traditional setting regular lunch, $D(60) = 0.09$, $p > .05$. Similarly, Levene's test revealed no violation of homogeneity of variances among the groups for mathematics, $F(3, 236) = 0.61$, $p = .607$. Results of the factorial ANOVA analysis are displayed in Table 12.

Table 12

Results of Factorial ANOVA for Mathematics Achievement of 8-10th-Grade Students by School Type and Socioeconomic Status

Source	*SS*	*df*	*MS*	*F*	*p*	*ES*
School Type	21698.02	1	21698.02	18.54	.001	0.07
Socioeconomic status	22349.40		22349.40	19.09		0
School Type *Socioeconomic status	5133.75		5133.75	4.39		0
Error	276280.77		1170.68			

Results of the factorial ANOVA analysis indicated no significant interaction between school type and socioeconomic status, $F(1, 236) = 4.39$, $p = .037$. However, there was a

statistically significant main effect for school type, $F(1, 236) = 18.54$, $p = .001$ (see Figure 4).

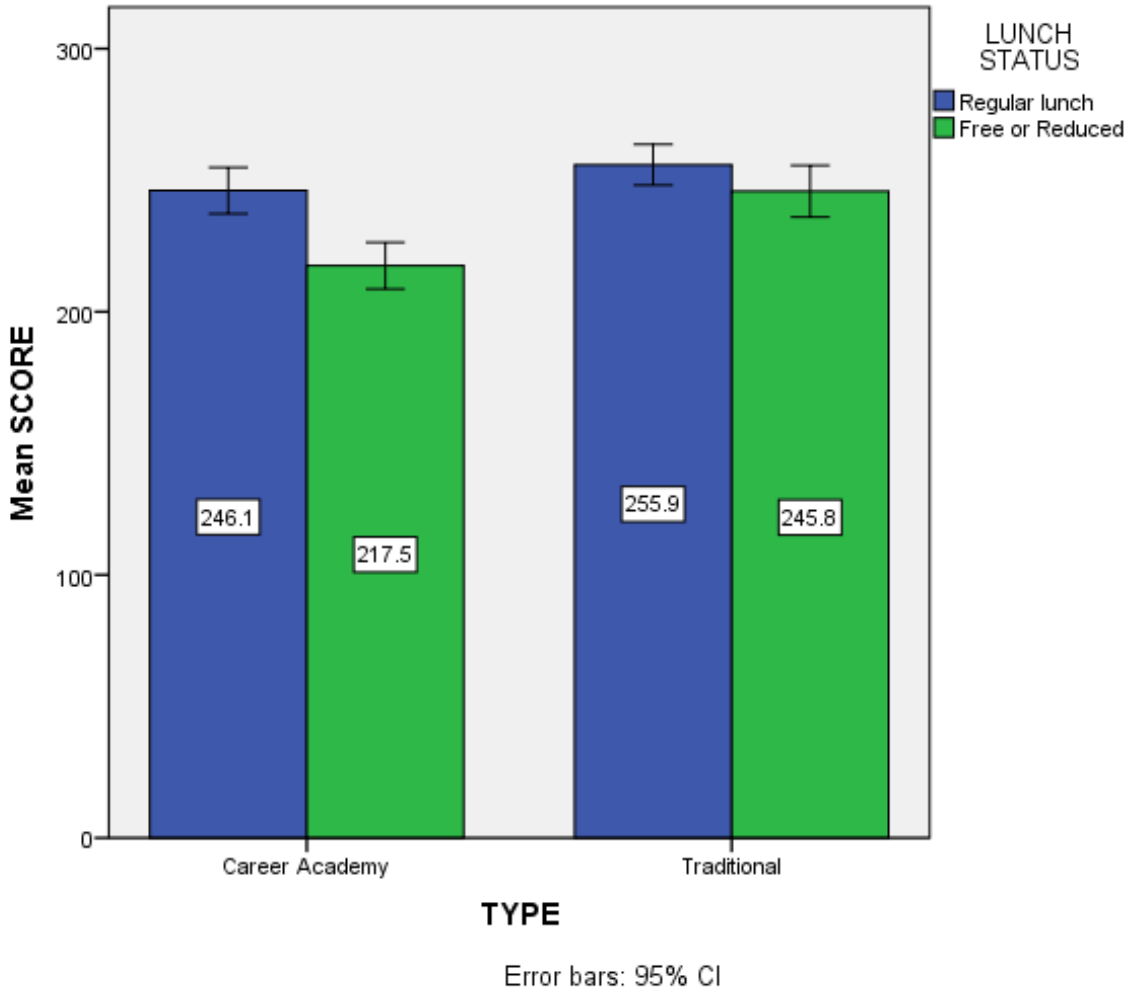

Figure 4. Mean mathematics achievement by school type and socioeconomic status.

On average, the mathematics scores for the traditional group ($M = 250.83$, $SD = 34.45$) were significantly higher compared to the scores of the career academy group ($M = 231.81$, $SD = 36.96$). In addition, there was a statistically significant main effect for socioeconomic status, $F(1, 236) = 19.09$, $p < .001$ (see Figure 5).

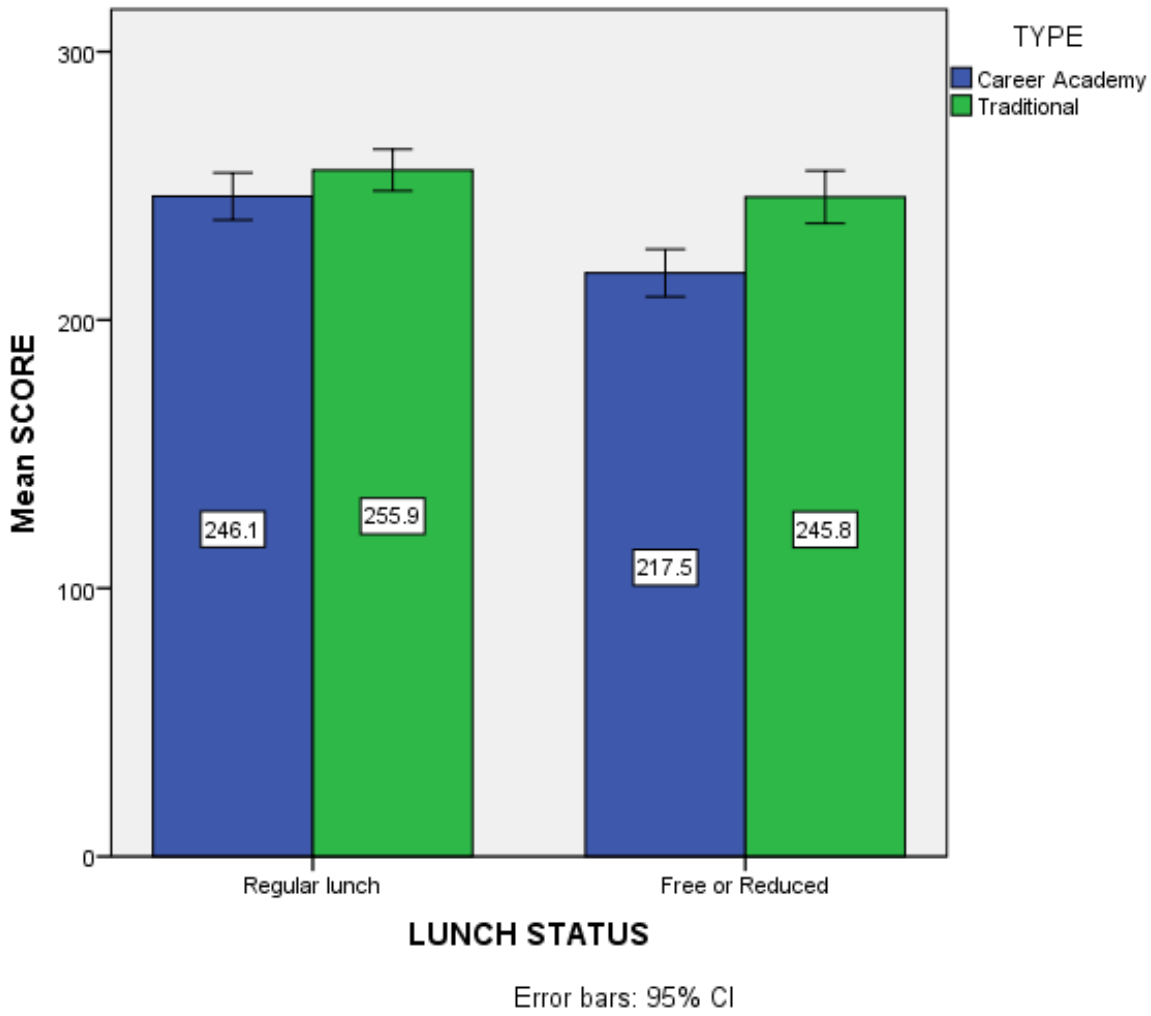

Figure 5. Mean mathematics achievement by socioeconomic status and school type.

On average, the mathematics scores for the regular lunch group (M = 250.97, SD = 32.28) were significantly higher compared to the scores of the free or reduced lunch group (M = 231.67, SD = 38.80).

CHAPTER V

DISCUSSION

For years, many have tried the traditional high school structure as a way of meeting students' needs. In this model, although the engaged and disengaged students' educational needs may vary widely, most students are viewed as having many educational needs in common (Ark, 2002). To address this commonality, traditional high schools were organized as a variation of grades with a curriculum-centered approach based on general subjects such as English, mathematics, science, and social studies. These subjects were taught in isolation more for mastery than for integration (Reese, 2007). In this model, students were more passive in the learning process with teachers carrying the main responsibility for instruction.

However, concerns about increasing dropout rates, decreasing graduation rates, and increasing attendance/discipline issues have been the focus of research regarding how to get the disengaged students whose achievement falls in an average grading range to be engaged in the learning environment, as well as, involving at-risk students in the learning process (Reeves, 2008). Research, as summarized by Mittelsteadt and Reeves (2003), emphasized restructuring reforms such as small learning communities and career academies as the models that engage all students and assist them with post-secondary or career decisions. In contrast to the traditional high schools with a curriculum addressed within isolated subjects, Sullivan and Shaw (2010) noted the academic focus of small

learning communities and career academies reflected the integrated curriculum and interdisciplinary units using career clusters. In this restructuring of the learning process, students are provided an opportunity to be active participants in their educational development. Springston (2002) referred to the focus of the restructured models as a curricular change or "The 3 R's for the 21st Century," which include Relationships, Relevance, and Rigor (p. 19). Students are called on to interrelate actively with teachers, as well as interact with various subject areas across the curriculum.

Kemple and Snipes (2000) asserted that the outcome of increasing student engagement is a goal that schools should strive to obtain. According to their study, career academies increased interpersonal support of students, heightened career awareness, decreased the dropout rate for high-risk students, and increased graduation rates for high-risk students. The study stated that the use of career academies could be an effective means of reducing the high school dropout rate and enhancing students' engagement with school, especially if they increase personal support of students through involvement with teachers and peers.

This chapter presents a summary of the research hypotheses and findings. In addition, the implications of the relationship between gender, socioeconomic status measured by lunch status, and academic achievement are discussed. Finally, recommendations for possible practice, policies, and future research considerations are addressed.

Conclusions

The researcher compiled and analyzed data from the Grade 11 Literacy Exam and the EOC Geometry Exam and conducted appropriate statistical strategies to test the null

hypotheses formulated. To address Hypothesis 1 and 2, two 2 x 2 factorial ANOVAs were conducted using type of school structure (career academy versus traditional high school) and gender (male versus female) as independent variables and literacy and mathematics achievement as the dependent variables, respectively. To address Hypothesis 3 and 4, two 2 x 2 factorial ANOVA were conducted using type of school structure (career academy versus traditional high school) and socioeconomic status (free/reduced lunch status versus regular lunch) as independent variables and literacy and mathematics achievement as the dependent variables, respectively. To test the null hypotheses, an alpha level of .05 was used. A Bonferroni correction was used to adjust the probability value because of the increased risk of type I errors that are likely when performing multiple statistical tests. Thus, the alpha level for each of the four hypotheses was set at .0125 (.05 ÷ 4). If the interaction effect was significant, the researcher ran simple main effects to determine the nature of the interaction. For interactions that were not statistically significant, the main effects were examined individually.

Hypothesis 1

Hypothesis 1 stated that no significant difference will exist by gender for students in two 6A and two 7A high schools in the state of Arkansas who attend a career academy high school versus students in a traditional high school on literacy achievement measured by the Grade 11 Literacy Exam. Results of the factorial ANOVA analysis indicated no significant interaction between school type and gender. There was no significant interaction between the variables school type and gender on 11th grade literacy achievement as measured by the Grade 11 Literacy Exam. Based on these results, there was not enough evidence to reject the null hypothesis for the interaction effect. Similarly,

there was not a statistically significant main effect for school type. The literacy scores of career academy students were within one point of the scores from students in the traditional setting. In addition, there was no statistically significant main effect for gender. Even though the literacy scores for female students averaged two points higher than the male students' scores, they were not significantly different. Overall, the results indicate no combined or individual effect of either school type or gender on the literacy performance of the students. Therefore, evidence was not sufficient to reject the null hypothesis for either of the two main effects.

Hypothesis 2

Hypothesis 2 stated that no significant difference will exist by gender for 8-10th grade students in two 6A and two 7A high schools in the state of Arkansas of students who attend a career academy high school versus students in a traditional high school on mathematics achievement measured by the EOC Geometry Exam. The results of the factorial ANOVA analysis specified no significant interaction between school type and gender. There was no significant interaction between the variables school type and gender on mathematics achievement as measured by the EOC Geometry Exam. Based on these results, there was not enough evidence to reject the null hypothesis for the interaction effect. Similarly, there was not a statistically significant main effect for gender; the mean mathematics score for male students was almost identical to the mean of the female students. On the other hand, a statistically significant main effect for school type was found. The mean mathematics score of career academy students was significantly lower from the mean of those students in the traditional setting (19 points). Overall, the results indicate no combined or individual effect of gender on the

mathematics performance of the students. Therefore, evidence was not sufficient to reject the null hypothesis for the main effect of gender. However, school type did appear to exert an influence on the mathematics achievement, regardless of gender. Therefore, the null hypothesis for the main effect of school type was rejected.

Hypothesis 3

Hypothesis 3 stated that no significant difference will exist by socioeconomic status for students in two 6A and two 7A high schools in the state of Arkansas who attend a career academy high school versus students in a traditional high school on literacy achievement measured by the Grade 11 Literacy Exam. The results of the factorial ANOVA analysis indicated no significant interaction between school type and socioeconomic status. There was no significant interaction between the variables school type and socioeconomic status on 11th grade literacy achievement as measured by the Grade 11 Literacy Exam. Based on these results, there was not enough evidence to reject the null hypothesis for the interaction effect. Similarly, there was a not statistically significant main effect for school type. The literacy scores of career academy students were almost identical to those of students in the traditional setting. There was, however, a statistically significant main effect for socioeconomic status. The literacy scores for regular lunch students were significantly higher compared to those of the free and reduced lunch students (15 points). Overall, the results indicate no combined or individual effect of school type on the literacy performance of 11th grade students. Therefore, evidence was not sufficient to reject the null hypothesis for the main effect of school type. However, socioeconomic status did appear to exert an influence on the literacy achievement, regardless of school type. Therefore, the null hypothesis for the

main effect of school type was not rejected, but the hypothesis for the main effect for socioeconomic status was rejected.

Hypothesis 4

Hypothesis 4 stated that no significant difference will exist by socioeconomic status for 8-10th grade students in two 6A and two 7A high schools in the state of Arkansas of students who attend a career academy high school versus students in a traditional high school on mathematics achievement measured by the EOC Geometry Exam. Results of the factorial ANOVA analysis indicated no significant interaction between school type and socioeconomic status. There was no significant interaction between the variables school type and socioeconomic status on mathematics achievement as measured by the EOC Geometry Exam. Based on these results, there was not enough evidence to reject the null hypothesis for the interaction effect. However, both main effects were significant. First, a statistically significant main effect for school type was found. On average, the mathematics scores for traditional setting group were significantly higher compared to the career academy group (19 points). Second, a significant main effect for socioeconomic status was found. On average, the mathematics scores for the regular lunch group were significantly higher compared to those of the free and reduced lunch students (19 points).

To summarize, no significant interaction effect of school type by gender or school type by socioeconomic status was found for the four hypotheses on either literacy or mathematics achievement. For the main effect of school type, a significant result was found on mathematics achievement in Hypotheses 2 and 4, with the traditional setting group, on average, outscoring the career academy group. Concerning gender, the results

indicated no significant main effect on literacy or mathematics performance. In the area of socioeconomic status, the researcher found a significant result for literacy and mathematics achievement, with the regular lunch group, on average, outscoring the free or reduced lunch group.

Implications

When interpreting the conclusions, the researcher compared the findings of this study to the review of literature. The literature review in Chapter II reflected similar findings to this study. This section will examine the results of this study in the context of the larger literature review in three areas: school type alone, school type by gender, and school type by socioeconomic status on student literacy and mathematics achievement.

First, in the present study, results indicated that the main effect of school type did not affect the literacy achievement of the 11th grade participants. However, school type did significantly affect mathematics achievement in two of the hypotheses. In one instance, both the male and female participant means were significantly higher in the traditional school setting compared to the career academy setting. In the other instance, both the free or reduced lunch group and the regular lunch group means were significantly higher in the traditional school setting compared to the career academy setting.

For most of the literature reviewed, traditional settings and career academies did not statistically differ from one another; they did equally well, but career academy advocates played down this evidence. In the present study, the traditional model produced stronger student achievement in mathematics. For example, although Kemple and Willner (2008) found that traditional models did equally well regarding students' performance on

reading and mathematics achievement. When examining only high-risk students, Kemple and Snipes (2000) found that the career academy model provided gains in student achievement. However, when all the student participants were viewed as a whole, they found that the career academy model produced only modest improvements, if any, in the area of student achievement. They noted, "On average, the career academies produced little or no change in outcomes for students in the medium-risk subgroup" (p. ES-11). This conclusion aligns with this study's findings for literacy but not for mathematics.

Second, in the present study, results indicated that gender did not affect significantly the literacy achievement of the 11th grade participants. Males in the traditional setting scored slightly higher compared to males in the career academy setting. Similarly, females in both settings scored equally well. Overall, females averaged slightly higher scores compared to the males, though not significantly different. Regarding mathematics achievement of the 9-10th grade participants, males in the traditional setting scored higher, on average, compared to the males in the career academy setting. In the same vein, females in the traditional setting scored higher, on average, compared to the females in the career academy setting. Overall, however, males and females scored equally well, with males outscoring females in the traditional setting and females outscoring males in the career academy setting.

In examining the larger literature context, research was sparse in the area of gender and career academies. Even though Corbett et al. (2008) argued that boys significantly outperform girls in all four ethnicity and race categories on the mathematics portion of the SAT college admissions exam, this difference was not seen in this study. Darling-Hammond and Friedlaender (2008) noted that, when schools engage their

students by redesigning curricular programs by providing real-world learning applications, the redesign empowers students to overcome educational barriers associated with gender, race, language, poverty, or low academic skills. However, in the present study, data did not support their redesigning contention, particularly in mathematics. Overall, data linking career academies to improved academic performance by gender was lacking.

Third, in the present study, results indicated that socioeconomic status did affect significantly the literacy achievement of the 11th grade participants. Although free or reduced students averaged higher scores in the traditional setting compared to the career academy setting, the regular lunch students averaged slightly higher scores in the career academy setting compared to the traditional setting. Within the career academy model, students classified in the socioeconomic status subpopulation are regarded as at risk for teachers to make note of and reinforce learning through various intervention programs to those identified. Regardless of setting, however, regular lunch students significantly averaged higher scores in the study. The traditional setting also had less of a difference between regular and free or reduced lunch students compared to the career academy setting. Regarding mathematics for the 9-10th grade participants, both the free or reduced lunch group and the regular lunch group averaged higher scores in the traditional setting compared to the career academy setting. Regardless of setting, however, regular lunch students significantly averaged higher scores in the study. Again, the traditional setting had less of a difference between regular and free or reduced lunch students compared to the career academy setting.

When considering the effect of socioeconomic status on academic performance of high school students, again, the literature was sparse. The key findings from a Manpower Demonstration Research Corporation study stated that, although the career academy model might not influence student achievement for students in an at-risk sub-population such as socioeconomic status, continued schooling offers enhanced opportunities to succeed later in life by keeping students in school through graduation (Kemple & Willner, 2008). They noted that decreasing dropout rates and increasing attendance rates are steps to this end, which career academies provide.

Even though the results of the larger literature context were mixed, there were limitations that needed to be considered in all the literature. First, most states mandate instruments that align with traditional curriculum settings to measure literacy and mathematics achievement. Career academies focus on providing curricular concepts through real-world learning experiences and use project-based assessments for evaluating educational progress, which is not the practice of state exams. Therefore, for most research studies, students from traditional settings performed equally well to career academy students on state-mandated tests.

Second, in most of the research reviewed and in this study, career academies differed significantly from each other. In this study, the two career academies differed in their basic structure, as noted in the limitations of this study. In addition, because the researcher wanted to use career academy schools that had been in existence for several years to control for early implementation difficulties or novelty validity problems, only two career academy schools existed from which to choose that had been functioning for

approximately nine years. However, one disadvantage of using these experienced programs is whether the program is still implemented with fidelity.

Third, this study only examined academic performance. However, as the literature revealed, exam scores should not be the only indicator of student achievement in either a traditional high school model or a career academy model. Stern et al. (1992) asserted that the primary focus of the academy concept was not necessarily to improve all students' achievement in school. They noted that academies were established to reduce the dropout rate and engage students in academics through real-world learning opportunities. Therefore, when considering other factors with student performance, the Ford Motor Company Fund (2008) found that career academies have been shown to increase high school graduation rates, attendance, grades, and post-secondary transition rates. In addition, a study conducted by Styron and Peasant (2010) linked the successful transition from ninth grade to high school as an indicator of student success in school. In the same vein, Lounsbury and Johnston (1985) argued that students' academic and social adjustment were the foundation of student school success. They noted that developing healthy teacher-student relationships helped to enhance the adjustment process. In her 1993 study, Wheelock agreed and observed that students who are not provided the tools for transition, which included links to strong relationships, could become discouraged and disengage from academics, thus achieving at a lower level (cited in Ohanian, 2003).

Recommendations

Potential for Practice/Policy

This study was designed to determine if the type of school setting by gender or by socioeconomic status had an effect on literacy achievement for 11th grade participants

and on mathematics achievement for 9-10th grade participants in Arkansas. The study consisted of comparing two career academy model schools with two traditional model high schools on the variables mentioned above. The findings of this study could have implications on practice and policies in districts across the state looking to redesign their traditional high school into a career academy model high school at least four ways.

First, this study could challenge educators to re-think the components of student success. On the one hand, if educators look to test scores as a major indicator of student success, opponents of career academy models could use these results to show the effectiveness of traditional school models compared to career academies. They could note that participants in traditional schools outscored participants in career academy schools in mathematics achievement and performed equally well in literacy achievement. On the other hand, proponents of the career academy school model could note that test scores are not the sum total of student success in school. They could reason that districts should examine not only students' test scores but also their engagement in learning, graduation rates, attendance, and connections to community when determining student success.

Second, this study could challenge educators to re-examine the role and form of assessment. Although opponents of the career academy models might look specifically to summative assessments as student success measures, proponents of career academies promote formative assessments to help guide learning outcomes. The whole idea of a formative assessment is to prepare students for academic success. Perhaps, the academic rigor of the formative assessments within career academies is not aligned to academic expectations as a whole. Because the lower mathematics scores cannot simply be glossed over, a review of mathematics instructional practices within the academies needs to be

undertaken. In addition, it was noted earlier that one of the limitations of this study was the type of assessments used to compare the models because they did not align to the purpose of both models. The traditional model seems to align with an achievement test format, which was the choice for this study, and the career academy model emphasizes more real-world learning experiences using project-based assessments in a formative format. Regardless of the model chosen, educators need to understand in a better way the role and form assessment should take to help students become successful in their school experiences.

Third, this study could challenge educators to reflect on the changing roles of schools in students' lives. Notwithstanding the model people choose, although students today seem to have the same types of struggles as students in previous decades, they do not seem to have the same foundational supports as previous students, especially in terms of the family. Because of the instability of the family structure in American culture, most educators would agree that schools serve a strategic, stabilizing part of students' lives and that teachers are on the frontline of this effort. How a school is designed helps promote feelings of healthy, positive student-teacher relationships. Beyond the test scores, when students form a relationship with teachers and community members in the context of mentors or internship partners, they learn that their community cares about them and their education. Such partnerships assist students in post-secondary transitions for college and career readiness, education within the career academy model is not one size fits all educational plans. This could lead to some students returning to their community based on their experience with a community partner, which cannot be measured on a standardized test.

Fourth, this study could challenge educators to re-focus on the students in their schools. Today, students lose their engagement in the learning process at a rapid pace when what they are learning does not seem relevant to them (Reeves, 2008; Springston, 2002). Students have noted that being engaged in the classroom through project-based learning that provides real-world opportunities brings relevance into learning (Cheney et al., 2001). If students are engaged and more accountable for their choices, they tend to take more risks in learning new things and make better choices in school and in their career fields. When they see the relevance in learning, they attend class, focus on graduation, and make better decisions for college or transition into the workforce (Sullivan & Shaw, 2010).

Future Research Considerations

The findings of this study reflect that the career academy model did not improve student achievement in the areas of literacy and mathematics based on one set of participants that took the 9-10th grade EOC Geometry and 11th grade Literacy exams in 2011. Therefore, the researcher recommends the following research be considered:

1. A replication of this study with standardized and formative, project-based assessments would be beneficial to help determine if the traditional, summative assessments are aligned to real-world learning outcomes to measure the differences between the two schooling models.
2. An extension of this study would be helpful to determine the effects of the two schooling models on student engagement. Measuring continual student engagement would align with daily learning behaviors in the classroom.

3. A study could examine the differences between the two schooling models and students' post-secondary planning behaviors by tracking college retention.
4. A larger scale study could be conducted to measure effects on daily attendance and graduation rates.
5. An extension of this study would be helpful to determine the effects of the two schooling models by different academic levels of students. Do the schooling models differ in decreasing achievement gaps in students who are at risk of failing in school? Do the schooling models differ in decreasing achievement gaps in students who are disengaged from the learning process?
6. A study to compare students' attitudes toward the two schooling models would help measure their satisfaction level with the different learning processes.
7. A case study could be used to understand when students need to work in isolation and when they need to work in cooperation with others to accomplish tasks.
8. A study could examine the advantages and disadvantages of embedding community partnerships within learning experience. Focus groups could predict future outcomes.
9. A study could examine the alignment of formative assessments and mathematics instruction within the career academies.
10. Multi-case studies could be performed to determine whether career academy practices are being attended to with fidelity.

11. Multi-case studies could be performed to isolate meaningful practices in traditional settings.
12. A study could explore differences in the amount and type of vocational certificates completed by graduates of career academy model schools and traditional high schools (i.e. vocational certified certificates such as certified nursing assistant, A+ computer programming, associate degrees in technical skills, etc.).

Educators have continually argued about how schools should educate students and how they should measure students' progress. Regardless of the debate, however, all educators agree that the focus should always be on what is best for students in the short term, as well as the long term. When looking at each student's high school career, there are several factors to consider when determining success. First, did the school engage the students in a rigorous curriculum that will help them transition to the next level, whether in education or the workforce? Second, did the school provide curriculum that was seen as relevant and real-life oriented to better prepare them for roles in their communities? Third, did the school provide opportunities for students to connect with teachers in the way that the students felt like valued and respected members of the learning community? Educators are realizing that these factors are not easily measured by standardized tests.

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APPENDIX

HARDING UNIVERSITY
INSTITUTIONAL REVIEW BOARD

Status of Request for Exemption from IRB Review

(For Board Use Only)

Date: 11/19/13

Proposal Number: 2013-136

Title of Project: Effects of the Traditional High School Versus the Career Academy High School on Literacy and Math Achievement

Principal Investigator(s) and Co-Investigator(s): Dana Brown dbrown@mtnhome.k12.ar.us

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■ Research exempted from IRB review.

☐ Research requires IRB review.

☐ More information is needed before a determination can be made. (See attachment.)

I have reviewed the proposal referenced above and have rendered the decision noted above. This study has been found to fall under the following exemption(s):

1 ☐ 2 ☐ 3 ☐ 4 ■ 5 ☐ 6 ☐

In the event that, after this exemption is granted, this research proposal is changed, it may require a review by the full IRB. In such case, a *Request for Amendment to Approved Research* form must be completed and submitted.

This exemption is granted for one year from the date of this letter. Renewals will need to be reviewed and granted before expiration.

The IRB reserves the right to observe, review and evaluate this study and its procedures during the course of the study.

Rebecca O Weaver

Chair
Harding University Institutional Review Board