

WORK READINESS OF CAREER AND TECHNICAL EDUCATION
HIGH SCHOOL STUDENTS

by

VALERY LANG HALL

(Under the Direction of Clifton L. Smith)

ABSTRACT

The definition and scope of work readiness skills have been guided by the 1991 landmark report *What Work Requires of Schools: A SCANS Report for America 2000*. The report identified that employers are lacking workers who can use technology effectively, think critically, and solve problems and that more than half of students leave secondary education without the knowledge or foundation required to sustain meaningful employment. Whether enrolled in a comprehensive high school career and technical education program (CTE) or in a career academy, students should learn certain basic work readiness skills before graduating. Despite this, there is no evidence to support if either of these educational structures is making a difference in Georgia.

The purpose of this study was to examine the influence of CTE enrollment in a comprehensive high school and a career academy on the work readiness of high school students in two Georgia school districts. Work readiness, as defined by the Occupational Information Network, is the foundational skills necessary to learn additional job-specific skills in an occupation that offers wages sufficient to support a small family and the potential for career advancement in a growing field. For this study, work readiness was measured using the WorkKeys® Skills Assessments in the areas of locating information, applied math, and reading

for information. The 256 comprehensive high school students and 245 career academy students were seniors who had taken the WorkKeys® assessments in school year 2009-2010.

Statistically significant differences found between the two groups on the three WorkKeys® scales were deemed to have little practical significance when effect sizes were calculated. Examination of the number of WorkKeys® certificates earned indicated a small association between type of certificate earned and type of CTE program; although, 27% of career academy students earned platinum and gold certificates, while only 7% of comprehensive high school students did. Career academy students otherwise showed no real advantage over comprehensive CTE students in terms of work readiness. The addition of community relationships and required work-based learning experiences in career academies do not seem to influence the level of basic workplace skills obtained by high school students.

INDEX WORDS: Work readiness, Career and technical education, Career and technical education frameworks, High school reform, Career academies, Employability skills, School-to-work initiatives, Noncollege bound high school students, and Career education

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DEDICATION

This dissertation is dedicated to the memory of my grandmother, Mrs. Lois Hood. Grandmother Hood instilled in all of her grandchildren the importance of hard work and showed us what it meant to support those around us. No matter what endeavor I ever set out to accomplish in life, she was always there with a kind word and endless encouragement. While she was not alive to walk with me through this journey, I know she would be very proud of the successful completion of the first doctoral degree in her family!

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TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	v
LIST OF TABLES	ix
CHAPTER	
1 INTRODUCTION	1
Background of the Problem	1
Purpose of the Study	8
Research Objectives.....	8
Conceptual Framework.....	9
Significance of the Study	12
2 REVIEW OF LITERATURE	15
Introduction.....	15
Framework for Work Readiness	17
Career and Technical Education Influences on Work Readiness	22
Work Readiness Skills Students Need to be Successful.....	40
Work Readiness Affects on Employers	45
Work Ready Credentialing for High School Students	49
Research Methodology	54
Summary and Implications	59
3 RESEARCH METHOD.....	61
Purpose of the Study	61

Research Objectives.....	61
Design.....	62
Participants.....	64
Instrumentation.....	68
Procedure.....	76
Data Analysis.....	77
Summary.....	81
4 DATA ANALYSIS.....	83
Description of the Sample.....	84
Characteristics of the Students.....	84
Analysis of Research Objectives.....	87
5 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS.....	94
Background of the Problem.....	94
Purpose of the Study.....	95
Findings of the Study.....	96
Conclusions.....	98
Limitations of the Study.....	102
Implications for Practice and Research.....	103
Recommendations for Further Research.....	104
Summary.....	105
REFERENCES.....	106
APPENDIXES.....	125
A Institutional Review Board Approval Letter.....	126

B Permission Letters from Participating School Districts.....128

LIST OF TABLES

Table	Page
1. High School Competencies	50
2. WorkKeys [®] Locating Information Scale.....	72
3. WorkKeys [®] Applied Mathematics Scale	73
4. WorkKeys [®] Reading for Information Scale.....	74
5. WorkKeys [®] Work Ready Certificate Requirements	75
6. Analysis Strategy.....	78
7. Chi-Square Analyses of Demographic Characteristics	86
8. Descriptive Statistics of High School Graduation Test English/Language Arts Scores	87
9. Results of Analysis of High School Graduate Test English/Language Arts Scores by CTE Program Enrollment	87
10. Descriptive Statistics of WorkKeys [®] Locating Information Scores by CTE Program Enrollment.....	88
11. Results of Analysis of WorkKeys [®] Locating Information Scores by CTE Program Enrollment.....	89
12. Descriptive Statistics of WorkKeys [®] Applied Mathematics Scores by CTE Program Enrollment.....	90
13. Results of Analysis of WorkKeys [®] Locating Information Scores by CTE Program Enrollment.....	90
14. Descriptive Statistics of WorkKeys [®] Reading for Information Scores by CTE Program Enrollment.....	91
15. Results of Analysis of WorkKeys [®] Reading for Information Scores by CTE Program Enrollment.....	91
16. Chi-Square Analysis of Number of WorkKeys [®] Work Ready Certificates Earned by CTE Program Enrollment	92

CHAPTER 1

INTRODUCTION

Perhaps now more than ever, students are exiting high school not equipped with the necessary skills required of postsecondary education and the workforce (Alvarez, Gillies, & Bradsher, 2003). Inability to compete in the academic arena makes students unable to compete in the economic arena. Secondary career and technical education (CTE) is finding itself at the forefront of these challenges and is emerging as an active stakeholder of high school reform efforts (Neumark, 2007). Most all aspects of high school reform center on the critical role education must play in influencing the economic development of our rapidly changing society. Parents must be convinced that career and technical educators are teaching different skills from those of a generation ago and are better preparing students with the basic work readiness skills employers are seeking (Cavanagh, 2005).

Background of the Problem

It has been a common belief that students going directly into college require a different academic preparation than those going directly into the workforce; however, employers are convinced that this is no longer the case (American College Testing, 2006a). This is in part due to the expanding global economy. Not only must graduates now be able to transition successfully into a postsecondary option, they must also be able to thrive and survive in a rapidly changing work environment once they get there. Whether entering the workforce directly upon graduation or later after the completion of college or other postsecondary training, all students should be graduating high school with basic knowledge and applied skills critical for success in

the 21st century (The Conference Board, Inc., The Partnership for 21st Century Skills, Corporate Voices for Working Families, & the Society for Human Resource Management, 2006).

American College Testing (2006a) provided empirical evidence that all high school students need a comparable education regardless of whether they are deemed college bound or work bound. This education must provide students a certain level of readiness if they are to be successful. American College Testing reached this conclusion by looking at levels of skills required for employment success, comparing these results on tests that measure work readiness and college readiness, and then determining if the performance levels needed for college and workforce readiness were the same or different. Their results showed that the landscape has rapidly changed from just a few years ago, making it critical that high school students possess the ability to adapt to and sustain meaningful employment.

High school graduates are deficient in the basic skills desired by employers: written communication, math, reading comprehension, professionalism, leadership, and basic work ethic skills (The Conference Board et al., 2006). This opinion echoes those found in the landmark report, *A Nation at Risk* (National Commission on Excellence in Education, 1983). *A Nation at Risk* revealed that high school students did not possess these very same basic skills required for success. The findings reported in *A Nation at Risk* provided the impetus for educational programs for many years. In light of the findings of *A Nation at Risk*, an increased focus of academic skill development began for schools across the country. However, other programs, particularly career and technical education programs were viewed as an unnecessary part of public education. Initiatives focused heavily on the need for increased academic standards and changes to work-related education, which carved the path for an increased emphasis on basic education to emerge (Secretary's Commission on Achieving Necessary Skills, 1991).

However, the William T. Grant Foundation (1988) released their report, *The Forgotten Half*, which supported the notion that high school students lacked both academic and work ethic skills required for life. Acknowledging that not all students would go on to college, the report urged educators to consider working harder for the population of students who may not be college bound. Subsequent pieces of reform were introduced, including the release of a report titled *What Work Requires of Schools: A SCANS Report for America 2000* (Secretary's Commission on Achieving Necessary Skills, 1991). The report acknowledged that most high school graduates do not have the foundational skills necessary to be successful in the workplace. Not only did this report address academic skills, but for the first time also addressed such things as critical thinking, using information and technology, and being able to demonstrate teamwork and problem-solving skills. This report was perhaps also the first of its kind to address the importance of education and employers working together to overcome these skill gaps.

Legislation followed that addressed the important findings from the *SCANS Report*, particularly in the form of the School-to-Work Opportunities Act of 1994. Passed to address noted skill shortages and to advocate for an increase in work-based learning opportunities, this legislation created a model for partnership between educators and employers to lead to an increased connection between education and employment (Gordon, 2008). By identifying the knowledge, skills, abilities, and other important characteristics of occupations, smoother transitions could occur from school to work. Significant factors of the Act included collaborative partnerships, integrated curriculum, technological advances, adaptable workers, comprehensive career guidance, work-based learning, and a systematic approach to implementation (Scott & Sarkees-Wircenski, 2008).

Despite the impetus provided by the School-to-Work Opportunities Act of 1994 and surrounded by academic efforts that centered on raising achievement and increasing the number of students ready for college transitions, the other mission of preparing students for future careers is still often viewed as lost (Hoachlander, 2006). Once considered only suited for those students not attending college, career and technical education is actively being brought into the educational reform conversation. Major emphasis in recent years has been placed on the ability of CTE to provide instructional programs that improve the transition of students from secondary education into a postsecondary option. Work readiness is often a part of this conversation; however, high school students today are typically unable to connect educational ambitions with future careers. In addition, students and teachers alike often do not have methods for translating academic achievement into a measurement of work readiness (Grummon, 1997).

Work readiness is often understood as the ability to obtain employment that provides wages sufficient to support a small family and that offers the ability to advance in the occupation (U.S. Department of Labor, 2000). One main component often linked with work readiness discussions centers on the ability of students to be able to carry out responsibilities as citizens, family members, and workers with the skills learned through the educational process (National Work Readiness Credential, 2006). Many states, including Georgia, have adopted work readiness credentialing processes that attempt to validate that students and other citizens possess work-ready skills required by employers (Hyslop, 2008). These skills include soft skills (people skills needed for everyday life) and hard skills (technical or administrative procedures related to an organization's core business) that are transferable across industries and are considered valuable for any occupation at any level of education (American College Testing, 2006a).

With a high-performance, high-skill economy evolving through technological advancements and the blurring of international borders, CTE today is emerging as an avenue for students to gain valuable career preparation through programs ranging from entry-level to professional-level occupations. Through this type of education, students have the ability to explore career preferences while obtaining basic work readiness skills required of any occupation. This may occur in a comprehensive high school classroom or through other school-to-work initiatives such as full-time enrollment in career academies, Tech Prep involvement, cooperative education participation, or apprenticeship enrollment. Whatever the route, CTE experts agree that high school programs in the 21st century must focus on the integration and absorption of academic skills necessary for contemporary workplaces (Lynch, 2000).

High school is a time for students to begin making decisions that shape the links between necessary education and future careers. However, with noticeable emphasis on testing and other reform strategies, many students are being lost in the transitional shuffle from high school to the next step (Rosenbaum, 2001). In Georgia, it is estimated that 39% of high school students entering the labor market are not prepared for entry-level positions and another 40% of freshman drop out of high school altogether (Commission for a New Georgia, 2004). This is of such concern that the Georgia Department of Education (2009) adopted as part of their strategic plan a goal to improve workforce readiness skills of students. Their plan details the accomplishment through four indicators: (a) work readiness and industry certification, (b) work-based learning opportunities, (c) career pathways, and (d) career academies. Additionally, the Georgia Partnership for Excellence in Education (2008) listed the crisis of unskilled graduates as one of the top 10 issues facing education. The Georgia Partnership for Excellence in Education advocated that Georgia must focus on increasing the rigor of education. This is due to the

increasing fact that the expectation gap of what is required for high school and what is required for college and careers seems to be growing. The Georgia Partnership for Excellence in Education reported, “Our economy depends on having individuals capable of filling jobs that require education and training beyond high school, yet students are leaving high school ill-equipped to succeed in college or at work” (p. 21). All of these efforts create a sense of urgency in Georgia, particularly for the direction of career pathways and career academies.

Career pathways in comprehensive high schools have seen major changes over the past several years in regards to work readiness. An initiative within the State of Georgia, the importance of work readiness as part of career pathway design is also a part of the national conversation. Janet Bray, executive director of The Association for Career and Technical Education, recently testified before the United States House Education and Labor Committee that as part of high school reform, better links to career and work readiness were needed. She believed in the importance of including career and technical education work readiness credentials as part of the No Child Left Behind measurements guiding progressive reform (Kidwai, 2007). Career pathways are often the vehicle to assess work readiness for comprehensive high schools and are a coherent way to lead students toward postsecondary education, industry certification, or other licensure (Hull, 2004).

In Georgia, career pathways are structured in ways that help students align educational goals with skills required of future employment (Myers, 2007). The overall approach to the design of career pathways involves the introduction to a high-demand employment sector of the region, basic skills needed to succeed in a postsecondary option, and a transition to entry-level skills training (Alssid et al., 2002). While all of these efforts are valid and certainly moving in

the right direction, it is difficult to understand fully the impact career pathways are having on the work readiness of Georgia high school students.

Career academies are also gaining in popularity across the country for their work readiness efforts. In Georgia, career academies are an alternative to career pathways found in comprehensive high schools. Typically designed as schools-within-a-school, career academies place emphasis on integration of academic and career content. These institutions also place a mandatory emphasis on work-based learning experiences. Currently, 10 career academies exist in Georgia, an increase from four operational in 2007 (Georgia Department of Education, 2009). As stated by the Georgia Partnership for Excellence in Education (2008), educators in Georgia are trying to combat the crisis to ensure students are “in fact ready to work or to enter college—two pathways that require a remarkably similar set of skills—policymakers are again stressing the importance of career academies” (p. 24). Career academies are seen as the answer to the work readiness crisis and one of the most promising school-to-work approaches for high school reform (Kemple & Rock, 1996). Despite these accolades, it is difficult to understand if this approach is making a difference for Georgia students.

Whether housed in a comprehensive high school or career academy, CTE must be firmly grounded in informing students of career options and instilling in them certain basic skills required of any employer (Rosenbaum, 2001). Whether planning to enter the workforce or enroll in college upon graduation, high school students must possess these skills in order to be successful with college-level courses and to enter workforce-training programs. Research has been conducted into the benefits of CTE in terms of high school completion, attendance while in school, average grades, postsecondary enrollment, and future earnings; however, little is known about the level of work readiness skills students obtain while participating in such programs.

This information is valuable for future reform strategies and especially important for the future of school-to-work initiatives in regards to creating environments conducive for transferring work readiness skills to students.

Purpose of the Study

The purpose of this causal-comparative study was to examine the influence of career and technical education enrollment in either a comprehensive high school or a career academy on the work readiness of high school students in two Georgia school districts. The independent variable, enrollment in either a comprehensive high school or career academy, was qualified by student involvement in a defined career pathway in one of the identified CTE. The dependent variable, work readiness, as defined by the Occupational Information Network, is the foundational skills necessary to learn additional job-specific skills in an occupation that offers wages sufficient to support a small family and the potential for career advancement in a growing field (U.S. Department of Labor, 2000). For this study, work readiness was measured using the WorkKeys® Skills Assessments in the areas of locating information, applied math, and reading for information, which are the three individual scoring sections Georgia uses as a benchmark for awarding work ready certificates.

Research Objectives

The research objectives that guided this study were:

1. To compare characteristics of students who enroll in a career academy to those students who enroll in a career and technical education program at a comprehensive high school in relation to gender, ethnicity, and High School Graduation Test English/Language Arts scores in order to establish equivalence and reduce self-selection bias.

2. To compare individual scores of career and technical education comprehensive high school students and career academy students in relation to the work readiness characteristics for locating information as defined by WorkKeys[®].
3. To compare individual scores of comprehensive career and technical education high school students and career academy students in relation to the work readiness characteristics for applied math as defined by WorkKeys[®].
4. To compare individual scores of career and technical education comprehensive high school students and career academy students in relation to the work readiness characteristics for reading for information as defined by WorkKeys[®].
5. To compare whether career and technical education enrollment affects the overall level of work readiness in Georgia based on level of certificate earned (platinum, gold, silver, or bronze).

Conceptual Framework

Career and technical education plays a central role in the development of work readiness skills and the ability for students to exit high school with certain transferable basic skills. Traditional education programs may often address some of these same skills; however, few programs ever provide comprehensive training across an occupational skill (Hyslop, 2008). Nobel laureate James Heckman recently stated that work readiness skills are as important to success in the workplace as other traditional academic indicators, and students may not be receiving these unless enrolled in CTE programs (Hyslop, 2008).

The skills defined by what is considered work readiness for students have been and continue to be guided by the influence of the landmark *SCANS Report* (Secretary's Commission on Achieving Necessary Skills (1991)). This report called for a more rigorous high school

curriculum so that students will be able lead lives that are more productive in the 21st century (Olson, 2006). For perhaps the first time in American history, the report identified that employers are lacking workers who can use technology effectively, think critically, and solve problems and that more than half of high school students leave secondary education without the knowledge or foundation required to sustain meaningful employment (Secretary's Commission on Achieving Necessary Skills, 1991). The primary objective of the *SCANS Report* was to help educators understand how curriculum and instruction must change in order to enable students to develop high performance skills needed to succeed in the high performance workplace (Cople, Kane, Matheson, Packer, & White, 1993). It sought to assess not only where high school students currently were at the time, but also to define the skills needed by employers, propose acceptable levels of proficiency, design effective ways to assess proficiency, and to develop a dissemination strategy for the country (O'Neil, Allred, & Baker, 1997).

Based on the work over several years of the Secretary's Commission on Achieving Necessary Skills (1991), five competencies were identified as necessary for use among students. These competencies became the foundational objectives for benchmarking and developing educational programs. They included (a) resources, (b) interpersonal skills, (c) information, (d) systems, and (e) technology. These competencies closely relate to what students would be expected to do in the workplace and specific domains such as identifying, organizing, and planning for time, materials, money, and workers. Competencies also focused on such things as negotiating, exercising leadership, working with diversity, serving clients and customers, and using technology to access information, acquire information, and evaluate information. Technology was a large part of this emerging report and continues to be a vital piece of career and technical education.

The SCANS Report further indicated the belief that these competencies were foundationally based on the importance of acquiring basic skills, thinking skills, and personal qualities first (Secretary's Commission on Achieving Necessary Skills, 1991). Basic skills include things such as reading, writing, speaking, listening, and understanding mathematical concepts. Thinking skills include reasoning, making decisions, thinking creatively, solving problems, and knowing how to learn. Personal qualities mentioned in the report include characteristics such as responsibility, self-esteem, self-management, integrity, and honesty. The Commission believed that these skills were necessary if workplace skills or competencies could be mastered by high school students.

Much in part due to the work of the Secretary's Commission on Achieving Necessary Skills over the past 20 years, deficiencies in transferable workplace skills have been a focus of workforce development and have guided the work of CTE (McNamara, 2009). Educational efforts across career and technical education have incorporated the report into both secondary and postsecondary work and many states, including Georgia, have used this as a framework for curriculum development (Lankard, 1995). The New Commission on the Skills of the American Workforce recently declared, basing their findings on the recommendations of the earlier report, that higher-order thinking skills remain a priority when looking at success and failure among 21st century workers. Other reports, particularly work from the National Work Readiness Council, *Equipped for the Future*, and other independent studies, continue to use the *SCANS Report* as a benchmark for work readiness innovation. While acknowledging that the Commission completed its work in 1992, the U.S. Department of Labor (2009) recognized that its findings and recommendations continue to be a valuable source of information for educators and workforce development efforts alike. Using the *SCANS Report* as a conceptual framework

allows outcomes for both comprehensive CTE students and career academy students to be compared. The report placed emphasis on the need for schools and employers to work together to close the skills gap and felt that without the alignment and interaction among these two sectors through work-based learning opportunities, high school graduates would fail to acquire the knowledge, skills, and foundation necessary to maintain meaningful employment (Hogg, 1999). This is the premise for the establishment of career academies in Georgia.

Significance of Study

The magnitude of Georgia high school graduates leaving high school unequipped for postsecondary options is an issue across the state. Educational leaders and policymakers need support to help create interventions to increase work readiness skills. Now is a critical moment for high school reform in Georgia in order to plan for building capacity and boosting national and state global competitiveness (Georgia Partnership for Excellence in Education, 2009). In regards to boosting national competitiveness, Secretary of Education Arne Duncan recently stated that themed schools, such as career academies, are springing up throughout school districts; however, the nation has yet to distinguish between approaches that are boosting achievement and those that are not. A proposal he has recently embarked upon which he feels is critical to reform is the establishment of career-ready standards to guide work readiness (Dyrli, 2009). A national scan of the work readiness of individual states notes that Georgia is often viewed as unable to move high school graduates seamlessly into postsecondary options and is often identified as a state that has a disconnect between policy and workforce development programs. This is despite the fact that policymakers stress the growing importance of a skilled workforce (Jenkins & Boswell, 2002).

In order to lead students toward economic stability and fulfilling careers, it is critical to instill in them the 21st century skills required of the new economy. Labor market research has demonstrated the dire need for increased skill development for high-wage, high-demand occupations; therefore, it is especially important today that high school graduates receive basic work readiness skills required of any employer (Alssid et al., 2002). Similar findings were reported by the National Center on Education and the Economy (2007), which stated that America was headed toward a decline in wages and long working hours with graduates unable to compete in the job market. The country must be willing to adopt international standards for educating students because only countries with highly skilled workforces can successfully compete (National Center on Education and the Economy, 2007).

This study sought to understand better the level of work readiness of CTE students. Whether enrolled in a comprehensive high school CTE program or in a career academy, it is expected that students will learn certain basic work readiness skills before graduating from high school. Despite this, there is no evidence to support if either of these educational structures is making a difference in Georgia. While Georgia is joining other states in an attempt to measure work readiness of potential hires through programs such as the Georgia Work Ready initiative, only 4,000 high school seniors were given this assessment in 2008 (Georgia Work Ready, 2009). Data show that CTE is increasing indicators such as industry certification, graduation rates of students, postsecondary transition, and employer participation in Georgia; however, there is no research available on the level of work readiness of graduates from CTE programs (Georgia Department of Education, 2008). Georgia's Governor Perdue recently stated, "We need a system that links workforce development and education together and aligns the economic needs of the state, its regions, and local community" (Georgia Department of Education, 2008, p. 14). With

growing budget constraints and trying to do more with less, Georgia must understand the level of work readiness students possess upon graduation in order to shape effectively the future of career and technical education programming.

CHAPTER 2

REVIEW OF LITERATURE

A review of literature was conducted to establish a need for this study and to assist in determining the appropriate research methodology. With the purpose of this study focusing on differences in work readiness of CTE students based on program enrollment, the review of literature examined both theoretical and historical underpinnings of high school work readiness. The literature review is organized into sections developed around the primary constructs of work readiness, CTE in comprehensive high schools, and CTE in career academies.

Introduction

Today, high school students are commonly classified as too ambitious and typically unable to reach often lofty goals set for their future careers (Schneider & Stevenson, 1999). Schneider and Stevenson found that if high school experts compare the occupational goals of current high school students with projected needs of the American economy, the occupational outlook is very bleak. Certainly realistic expectations on wage and ambition are misaligned, as are strategies that effectively align students with the basic work readiness skills they need in order to survive beyond high school.

Everyday in the United States, over 6,000 high school students drop out of school (American College Testing, 2008). While this is quite staggering, a crisis of greater substantial magnitude awaits. Of the more than one million students who remain in school, many will graduate without the necessary skills for survival in college or the workplace. Students graduate with the shocking

realization that they are not prepared for high-wage, high-opportunity jobs of the future and are left wondering just what was earned from their high school experience.

Questions arise daily as to whether high school students graduate with the basic skills they need to survive in today's economy. This is especially important for those students who are going directly into the workforce. With a major focus on testing and policy, it is often doubted by educators whether this approach will lead to thriving citizens without somehow connecting this to career aspirations (Hull, 2004). Neumark (2007) found that many students will not attain any postsecondary education and believed that the implicit or explicit focus on college preparation that is encouraged through testing is serving students particularly poorly. A solid academic foundation is essential for all students to succeed beyond high school, and this academic foundation is one that aligns closely with CTE in order to make the connection between school and work (Parnell, 1985).

With the purpose of this study focusing on what influences CTE enrollment has on the work readiness of high school students, it is important to understand what current literature says about the implications of and what defines work readiness for high school graduates. Researchers suggest that defining work and career readiness is a confusing process at best. Currently, only 26 of the 50 states have a plan in place that defines work readiness through content standards, broad and specific skills, academic and technical coursework, or performance on assessment instruments (National Governors Association Center for Best Practices, National Conference of State Legislatures, National Association of State Boards of Education, & Council of Chief State School Officers, 2008).

The review of literature is organized into six major sections and begins with a discussion of the framework and philosophical considerations for work readiness. Other sections are career

and technical education influences on work readiness, work readiness skills high school students need to be successful, employer perspectives in regards to work readiness, work readiness credentialing, research methodology that supports the research design, and a summary of how all of this relates directly to the purpose of this study.

Literature and findings reviewed in this chapter emerged from an extensive diversification of sources. GALILEO and the library of the University of Georgia served as a basis for beginning the search that expanded into databases such as ERIC, PsycINFO, Sociological Abstracts, and Lexis/Nexis. The parameters used for the search included work readiness, career and technical education, career and technical education frameworks, high school reform, career academies, employability skills, school-to-work initiatives, noncollege bound high school students, and career education.

Framework for Work Readiness

Defining the focus of work readiness for high school students is still evolving for educators; however, certain philosophical arguments relating to the purpose of career and technical education have rarely changed (Rojewski, 2002). In outlining the framework for work readiness, it is necessary to connect how certain performance indicators relate to legislative mandates and underlying philosophy that guide the basic beliefs of work readiness in today's society. From a historical perspective, much of what is written about choosing occupations dates back to the works of Plato, who helped evaluate and make recommendations about vocational decisions (Noddings, 2007). This historical beginning helped shape and influence modern perspective.

Career and technical education has often relied on unstated principles to guide policy rather than looking deeper into aspects such as truth, reality, and values (Miller, 1994). Miller

recommended a balance between principles and philosophy in order to describe why things should be the way they are. Scott and Sarkees-Wircenski (2008) agreed and stated, “There is a need for career and technical educators to develop a coherent framework for thinking about issues and challenges that confront the field of CTE” (p. 390). The discussions surrounding a framework will assist with determining what is important to this field of education and individual studies. The following will seek to validate the need for more research on the work readiness of high school students and to ascertain how this study could lead to implications regarding the value of using underlying theoretical assumptions as a solid framework (Camp, 2001).

Dewey and Pragmatism

Much of what defines the basic philosophical perspectives of work readiness dates back to Charles Darwin who had substantial impact on another young philosopher, John Dewey. Dewey wrote about many great issues in education and is often noted for insisting that students take an active role in their own personal educational planning and activity. Dewey believed in planning for the future and that education was a democratic method for survival in society (Noddings, 2007). Dewey believed that education ensured growth and had a purpose beyond the present. In essence, he believed that education was developed and acquired through blending academic and occupational skills. He believed that “the principle goal of public education was to meet individual needs to personal fulfillment and preparation for life” (Rojewski, 2002, p. 11). Dewey (1938) stated,

With the advent of democracy and modern industrial conditions, it is impossible to foretell definitely just what civilization will be twenty years from now. Hence it is impossible to prepare the child for any precise set of conditions. To prepare him for the future life means to give him command of himself; it means so to train him that he will

have the full and ready use of all his capacities; that his eye and ear and hand may be tools ready to command, that his judgment may be capable of grasping the conditions under which it has to work, and the executive forces be trained to act economically and efficiently. (p. 5-6)

Dewey's ideas also served as a framework for pragmatism and the basic belief that "the meaning and value of ideas could be found only in the practical results of these ideas" (Johnson, Musial, Hall, Gollnick, & Dupuis, 2008, p. 327). His prior works suggest that the ability for a student to be fully prepared upon exiting education lies in these practical results and assisted in allowing education to focus on the social aspect of creating change. Dewey believed that if students did not exit high school with the ability to provide for themselves then students have been failed. He also believed that education is constantly changing. Because of this, a quality education should reflect, generate, and guide social change. He believed that education has the power to lead society in certain directions and fully believed that moving in the right direction involved strong workforce education programs (Dewey, 2001). Overall, his contribution to defining work readiness today is based on his strong progressive views. He believed if educators attempt to understand and process the ideas of democracy, then an understanding of how school contributes to social change would be defined. His works also helped shape many landmark recommendations made decades later in defining what skills employees need to be successful in the workplace.

The SCANS Report

In 1990, the United States Secretary of Labor appointed a committee to study the skills high school students needed to survive in the workplace. The report, *What Work Requires of Schools: A SCANS Report for America 2000*, identified several key areas of focus for anyone

involved in high school reform to develop high school graduates to be productive and thriving citizens (Secretary's Commission on Achieving Necessary Skills, 1991). Considered landmark findings in regards to work readiness, the report provided evidence that more than half of young people did not have the foundational knowledge necessary for meaningful employment. The report identified five competencies and three foundational skills that all young people must possess to be successful in the workplace. Competencies noted include resources, interpersonal skills, information, systems, and technology. Each of these was regarded as skills employees must possess to be able to exhibit solid work performance. Foundational skills identified were basic skills such as reading, writing, arithmetic and mathematics, speaking and listening, thinking skills, and personal qualities such as responsibility and integrity (Secretary's Commission on Achieving Necessary Skills, 1991).

Education Through Occupations and the Influence of Contextual Learning

Similar to works citing common employability skills, literature suggests that work readiness comes through occupational discovery. This type of readiness is often rooted in Grubb's (1995) belief that career and technical education should be based on a combination of employability skills and general academics. The notion of curriculum integration is the basis of allowing high school students the ability to explore careers while gaining the necessary basic skills required of any career. While normally seen as separate entities, Grubb (1995) advocated that traditional academic content be integrated into CTE courses and vice versa, allowing students the ability to make connections between school and work. Grubb (1997) viewed CTE as an applied context for teaching academics and felt that contextual learning was the new future of the American high school.

The underlying theory that links to work readiness lies in contextual learning. The integration of academic and vocational curriculum helps address the skills required of the 21st century student (Miller, 2002). This theory assumes that rigorous academic credentialing aligns well with basic workplace readiness skills. However, some researchers are not sure the outcomes are evident. A review of studies by Stasz, Kanganoff, and Eden (1994) found that there was little evidence that participation in such a program affects learning outcomes. Contextual learning theorists Resnick and Jury (2000) also refuted the clear connection by stating that there is no systematic evidence about academic achievement. Other widely known cognitive psychologists such as Anderson, Reder, and Simon felt that learning claims are unproven and could prove difficult for students to transfer knowledge to an occupational setting upon graduation (Miller, 2002).

Contrary to these researchers' opinions, other findings do suggest that blending academics and work readiness yields achievement on both sides of the curriculum. Rock and Pollack (1995) and Bottoms, Fox, and New (n. d.) each provided evidence that higher achievement in test scores was obtained among those students with a blended curriculum. With these varied views of contextual philosophy linked to school-to-work initiatives, the education community often questions why more discussion is not held to facilitate further research. Miller (2002) stated, "It is time to open the forum for discussion so that all evidence and empirical research can contribute to formulating sound education policy and practice" (p. 13).

Each of the identified frameworks for work readiness helps to understand past, present, and future efforts. With foundational beliefs in progressive education, practice has been influenced heavily by allowing basic skills to emerge through contextual learning. Combine this with reports such the *SCANS Report* and America has established a strong foundation in moving

forward to improve work readiness education. All of these work readiness frameworks help create a system of best practices that play a strong role in influencing career and technical education.

Career and Technical Education Influences on Work Readiness

Over the past 200 years, CTE has evolved into an innovative way of preparing a skilled workforce. Concerned citizens realized during the 1800s that traditional schooling was not preparing students effectively for the real world. Consequently, many students left school in their early teens to enter the workforce to learn a trade either through training or personal observation, most commonly through participation in apprenticeship programs or being taught by family members. It was during this period that the deep roots of vocational education emerged. Dewey (1915) argued, “It is, as we have seen, the future of the worker in industry which has been neglected” (p. 308). He believed in the power of blending basic skills with industry specific training that he felt was necessary for success in life. These beliefs, coupled with high dropout rates and the inability of workers to provide for their families, began the drive to vocationalize education and create a strong pathway to instill the work readiness skills required of employers today (Kantor, 1986).

Historical Perspective

Career and technical education has been greatly influenced by the landmark study, *A Nation at Risk* (National Commission on Excellence in Education, 1983). Perhaps considered the strongest appeal for educational reform ever released, this report shed a negative light on public education and recommended several areas for improvement. Vocational education was not specifically targeted in the report or in the recommendations, which made many educators feel that its presence was not felt quite strong enough when discussing national policy issues

(Gilli, 1990). However, the William T. Grant Foundation Commission on Work, Family, and Citizenship (1988) released a report that focused primarily on those students who would not be attending college. At the time the report was released in 1988, only 30% of high school graduates would go on to college. The Foundation's concern was that if the other 70% of graduates did not receive appropriate school-to-work transitions upon graduation from high school, the future of society would be very bleak.

The report by the William T. Grant Foundation Commission on Work, Family, and Citizenship (1988) identified key educational weaknesses such as the lack of linkage between school and work, inadequate work experience, ineffective vocational education incentives, and the overall unresponsiveness of students toward counseling efforts at school. The need for change was evident in regards to work readiness for high school graduates, and during the 1990s, the importance of and need for vocational education gave rise to a new focus on what is now known as career and technical education. It was also during this time that *America's Choice: High Schools or Low Wages Report* and the *SCANS Report* were released (Secretary's Commission on Achieving Necessary Skills, 1991). Both of these reports helped to establish workplace demands and to determine if the future workforce could meet those demands (Packer, 1992). These reports continue to be the guiding light for career and technical educators across the country.

Today, the focus of career and technical education is more heavily grounded in survival in the competitive job market experienced by students graduating now. Lynch (2000) identified the key functions of CTE as "providing career exploration and planning, enhancing academic achievement and motivation to learn more, acquiring generic work competencies and skills useful for employment, and establishing pathways for continuing education and lifelong

learning” (p. 4). Embodied in the principles that Lynch mentioned are four overarching themes for CTE: (a) career planning and development, (b) high school reform, (c) upgrading *voc ed* to a new career and technical education, and (d) the K-14 model. The emphasis on high school reform demands improvement in regards to team instructional planning and delivery and full integration among curriculum disciplines.

As stated from the historical perspective, the shift in philosophy and instruction from vocational to CTE is relatively new and seeks to encourage more innovative program offerings that meet the needs of today’s society. Brewer, Campbell, and Petty (2000) identified several principles about the foundations of CTE that they felt should seek to introduce students to historical perspectives, examine the role based on the economy, interrogate workforce needs in the changing economy, provide worker training and retraining, promote upward mobility, and explore workforce education as a social movement. Each characteristic is shaping career preparedness of students by allowing them to choose and move towards work readiness. Each characteristic is offered in a variety of program settings, including comprehensive high schools and career academies.

Career and Technical Education Enrollment in Comprehensive High Schools

A review of literature reveals that CTE programs are offered in 93% of comprehensive high schools across the nation. These schools offer introductory career education in areas such as business, technology, and family and consumer sciences (Lynch, 2000). Of those comprehensive high schools, 75% offer more specialized courses such as agriculture, business and office, marketing, health occupations, or trade and industrial (Lynch, 2000). Traditional CTE programs in comprehensive high schools are often characterized as containing students who are lower performing academically and as having a higher enrollment of male students

(Levesque & Hudson, 2003). These students are also known to live less often with both parents and are often more economically disadvantaged (Palmer & Gaunt, 2007).

From a historical perspective, CTE has come full circle from the days of preparing students to support their families and ensuring workers knew a specific trade or vocation, back to providing students with the basic work readiness skills required of any postsecondary option (Scott & Sarkees-Wircenski, 2008). The landscape of work is characterized by a new economic world. With technology rapidly changing and the competitive market evolving internationally, CTE is finding itself back at a crossroads of opportunity to prepare students for work.

Of the students enrolled in CTE program at comprehensive high schools, the number of CTE credits earned has remained stable at around 3.03 for year 2000 graduates (Levesque, 2003). This indicates that CTE students served in comprehensive high schools are individuals from various socioeconomic and racial backgrounds, as well as all levels of ability. Most students enroll in these programs in order to prepare themselves for the workforce and postsecondary education (Scott & Sarkees-Wircenski, 2008). Students are enrolled in what is known as a career pathway that is typically developed by the local district or state as a partnership between secondary and postsecondary education and paces students through a series of structured courses and work-based learning opportunities. A traditional career and technical education student's curriculum consists of a number of courses within the career pathway and separate academic courses throughout Grades 9-12 (Levesque et al., 2000).

A review of literature reveals that CTE is academically successful. Students enrolled in CTE programs in comprehensive high schools in the past 10 years are participating in more rigorous academic coursework and are taking higher level math and science as compared to general students (Stone, 2003). Additionally, the U.S. Department of Education (2004) and

Bottoms, Presson, and Han (2004) found that comprehensive CTE students had significantly higher student achievement on math, reading, and science test scores. The Association for Career and Technical Education (2009) also found that students were taking more rigorous academic courses than 10 years earlier, rising from 19% to 51% within a 10-year period.

Comprehensive high school CTE students are also experiencing work readiness accolades, as shown by increases in earnings and improved employment outcomes. Traditional career and technical education high school graduates are 10% to 15% more likely to be in the labor force and earn typically 8% to 9% more than nonparticipants (Rosenbaum, 2001). Secondary students enrolled in CTE who graduated from a traditional high school were also twice as likely to be employed while pursuing postsecondary education (Boesel, Hudson, Deich, & Matsen, 1994). Additionally, career and technical education students enter postsecondary education at approximately the same rate as all other high school graduates (Kober & Rentner, 2000).

Based on these statistics from literature, it is evident that work readiness skills in the new economy of career and technical education are different from the days of preparing students to farm or work in a factory. The research shows us that no longer must traditional high school students understand and be able to perform certain tasks required of an occupation. They must now be able to contextualize the big picture and apply basic skills such as reading, writing, and math into solving problems in the workplace (Clagett, 1997; Lynch, 2000). Hyslop (2008) confirmed that these same tasks must lead students towards achieving work readiness credentials. Hyslop believed this must come by helping students apply skills through preparation and assessment and by connecting students with business and industry. CTE in comprehensive high schools has the power and ability to add value to the high school diploma by ensuring

workplace success. However, some feel that comprehensive high schools are unable to provide effective school-to-work transitioning. While these programs are regularly monitored and updated to address a changing workplace, it is important to understand their history and intent for CTE programming.

School-to-Work Transitions

The National Center on Education and the Economy (1990) warned over 20 years ago that high school graduates could not compete in the economic arena because they were unable to compete in the educational arena. The lack of resources devoted to students who were not college bound conspired to produce minimal educational results. Twenty years later, and these same issues remain an unpleasant fact in America. Many school-to-work initiatives have seen recent growth because of the lack of advancement in the last 20 years, a heightened awareness from the *SCANS* Report, and numerous findings from other research (Kemple & Rock, 1996).

The intent of school-to-work programs is to create a linkage between secondary education and the workplace while remaining deeply grounded in contextual learning. Each type of initiative seeks to integrate academic and vocational education, workplace competencies, and explicit connection of learning with careers (Miller, 2002). With shifting demographics and a more defined global focus, organizations across the country need a more productive and competitive workforce. Until recently, school-to-work initiatives were developed as a direct path for students to enter the workforce immediately after high school in hopes to connect with disadvantaged students or those not bound for college; however, this focus is quickly changing (Neumark, 2007).

The focus is now shifting to all students regardless of their postsecondary aspirations. Students involved in school-to-work initiatives could be those leaving or completing high school

looking for full-time employment, those who enter the workforce and go through employer-sponsored training, those who work and continue their postsecondary education simultaneously, or those who enter the workforce and later return for additional postsecondary education (Kemple & Rock, 1996). Proponents of school-to-work initiatives contend that not everyone will nor should go to college and state that only 20% of jobs in the future will require a 4-year degree (Miller, 2002). Judy and D'Amico (1997) stated,

If Americans could increase the number of traditional high school graduates with the appropriate reading, writing, math, reasoning, and computer skills, it could go a long way toward finding available jobs and laying a suitable foundation on which workers could upgrade their skills once in the workforce. (p. 134)

Due in part to globalization, both educators and employers recognize the need for improvements in how students are prepared for the workforce. Because of this, school-to-work transitions must focus on two segments of young lives. Students must first make decisions that will make connections between school and a future career. They then must focus on the types of educational content that will help predict their future careers (Neumark, 2007). Marx (2006) stated that schools will soon become centers for continuing education, training, and retraining in response to changing times. Because education is being pressured to prepare students for jobs that may not currently exist, Marx recommended a fresh approach to school-to-work initiatives to encourage students to take responsibility for their futures and to have the ability to respond quickly to changing workforce needs. Entire communities must understand that preparing a future workforce, as well as maintaining economic stability of the current workforce, cannot happen without focusing on every segment of the student population. As suggested by Osterman

and Iannozzi (1993), successful school-to-work transitions are more severe for the students not bound for college. Therefore, legislation has been influenced by this reality.

Early career and technical education legislation focused on the development of Tech Prep programs throughout the county. These programs sought to develop an approach to vocational education that would allow students to complete 2 years of related study at a postsecondary institution (Ryan, 2001). Later, through the passage of the School-to-Work Opportunities Act in 1994, several key developments were made in hopes a true integrated system could exist and essentially make stronger connections between mandated legislation. The School-to-Work Opportunities Act of 1994 was passed to address skill shortages and advocate work-based learning opportunities. This legislation created a model for partnership between educators and employers and created a connection between education and employment. By identifying the knowledge, skills, abilities, and other important characteristics of occupations, smoother transitions could occur from school to work. Significant factors in this Act included collaborative partnerships, integrated curriculum, technological advances, adaptable workers, comprehensive career guidance, work-based learning, and a systematic approach to implementation (Scott & Sarkees-Wircenski, 2008).

The School-to-Work Opportunities Act also sought to address such things as a lack of connection between school and work that led to unmotivated students; students exiting high school without the basic skills necessary to survive in the workforce; and the need to increase demands of the workforce in regards to complex thinking, close teamwork, and the ability to learn on the job (Neumark, 2007). Specific school-to-work initiatives were quickly developed and included such approaches as job shadowing, mentoring, cooperative education, working in a

school-sponsored enterprise, Tech Prep, internships, apprenticeships, or full-time enrollment in a career academy that involves various combinations of these initiatives.

Career and Technical Education Enrollment in Career Academies

Career academies originally emerged in response to a community in Philadelphia that was charged with the challenge of creating meaningful opportunities for their children. It was 1968, and inner city riots, fueled by poverty and racism, were a common occurrence. Charles Browser, Executive Director of the Philadelphia Urban Coalition, joined forces with the Philadelphia Electric Company and Bell of Pennsylvania to create ways to combat challenges the educational community faced in motivating and training youth. At this time, the focus was primarily on student dropout prevention and vocational preparation; however, various shifts in how career academies are defined have occurred over the years. Specifically authorized under the School-to-Work Opportunities Act of 1994, career academies are considered a major milestone for this movement (Kemple & Rock, 1996). The common essential element today tends to organize basic core curriculum typically experienced in high school with a career-related theme (Stern, Raby, & Dayton, 1992).

Career academies have been defined very specifically by several national affiliations. The Career Academy Support Network (2009), perhaps the expert in structure and research to support the existence of career academies, noted that a career academy is not defined according to any national law. This lack of a specific definition has created some discrepancies in how academies are established. In order to better articulate and communicate how career academies are defined, three leading networks of career academies (Philadelphia Academies, California Partnership Academies, and the National Academy Foundation) recently banded together in order to reach agreement on a common standard. These groups define a career academy as a

small learning community within a larger high school. Students take classes together in a cohort approach for at least 2 years with instruction being led by teachers from different disciplines. The curriculum is based on applied academics that simply replicate college preparatory content with an increased career focus, and this approach allows for relationships and connections to be made by students within a broad field of study. The network also defines career academies by including a strong emphasis on partnerships with the community, employers, and local colleges in order to provide an increased level of service-learning projects, as well as postsecondary options, for students (Stern et al., 1992).

Stern, Dayton, and Raby (2000) concurred that career academies are small learning communities that incorporate college-preparatory curriculum with a career theme. They also added that the mission of career academies should be to seek to reduce dropout rates and provide a nontraditional high school environment that many students desperately need. Because such students do not always fit into the traditional mold of secondary education or find themselves seeking a closer focus on career options, an increasing number of these high school students are choosing career academies rather than dropping out (Stern, Dayton, Paik, & Weisbuerg, 1989).

Another organization, the Manpower Demonstration Research Corporation, identified career academies based on three distinct features. First, career academies are schools housed in other schools where students in the same grade take classes together. Secondly, curriculum must be integrated, contextual, meet college entrance requirements, and be related to the academy theme. The final part of their definition involves partnerships. It is believed that partnerships are essential to the success of a career academy and that employer partnerships must provide internships and other experiences outside of the classroom (Stern, Wu, Dayton, & Maul, 2007). Middlesteadt and Lindsay (2006) offered a different definition of career academies, specifically

the length of time a student is focused in this type of small learning community. They believed students should be enrolled in the career academy for 3 to 4 years. Their definition also emphasized more integration of content in bridging the gap between school and work. Perhaps more focused on career development, their focus explicitly defined creating work-based learning opportunities for secondary students.

Hoye and Stern (2008) noted that career academies are typically comprised of 30 to 60 students at each grade level taking similar courses taught by the same teachers. This definition is negotiable in that while career academies typically contain only Grades 10-12, some may also include Grade 9 or choose to include only Grades 11 and 12. In this model, the same teachers teach all academy grade levels so that students build a lasting bond with teachers over a greater length of time than just the traditional one semester or one year. Hoye and Stern noted that the blended format of curriculum often replicates the economy of the community, as well as outside learning experiences related to the academy theme. Career academies also attract students interested in specialized programs that comprehensive high schools are often unable to offer due to facility requirements or specialized equipment needs (Boesel et al., 1994).

Literature supports the common belief that students in school-to-work initiatives, such as career academies, are as academically successful as are other students. Studies by Foothill Associates (1997) and Maxwell and Rubin (2000) found that students' grades actually rose as they spent more time in career academies after comparing students in the same school districts. Students in career academies were also found more likely to earn their diploma and have better attendance than comparable students (Kemple & Snipes, 2000; Orr, 1996). Career interests and goals for the future are also clearer among students enrolled in career academies than comparable groups (Hershey, Silverberg, & Haimson, 1999; Orr, 1996).

Career academies are generally characterized by such terminology as small learning communities, contextual learning, partnerships, and high school reform (Kemple & Snipes, 2000). Small learning communities are used to describe the group of students within a larger high school or in an independent school who take classes together for at least 2 years through modified team teaching. Contextual learning occurs when academic and vocational lines are blurred and through team teaching. Partnerships are a large part of career academies and assist in providing the backdrop necessary to establish and teach relevant workplace skills. While this may be the recommended practice, Kemple (1999) found that there was a great deal of variation in terms of engagement and management structure of community partnerships. While increased participation from partners should create a support system for career academy students, advantages for career academy students had all but disappeared by the fourteenth month following their high school graduation (Kemple, 2001).

Stern et al. (1992) noted that while there is variation among career academy models, most career academies are based on the following model characteristics:

1. Uses the school-within-a-school approach for Grades 11 through 12 led by a team.
2. Recruits students who volunteer for the program through an application process.
3. Focuses on a career theme in a field that is growing with employment opportunities.
4. Focuses on the combination of technical and academic content and employability skills.
5. Provides student employment in related fields.
6. Uses employer representatives to guide program and curriculum content.
7. Provides small class size (in comparison to a comprehensive high school).

Career academies are characterized by a specific curriculum design, typically beginning in the junior and senior year of secondary education. The curriculum focuses on a central career theme or professional focus in which core academics are aligned with the technical and occupational knowledge pertaining to the area of focus. The programs seek to prepare students for a world beyond high school by equipping them with both the academic and occupational competencies necessary to advance in the workplace. Following graduation, some students may pursue postsecondary education options while others may take the employability skills developed during the experience directly into the workplace. Many also emphasize the importance of established career pathways as a part of career academies in order to guide students from the ninth grade through the fourteenth year of a postsecondary option (Brand, 2003).

The focus of career academies is to bridge the transitional process for students who in the past might have terminated their education after high school and become employed in a job that could not provide for their needs. Little research has been conducted to determine if these students are any more prepared for work than a traditional high school graduate is (Hughes, Bailey, & Mechur, 2001; Kemple, 2001). Gone are the days where graduating from high school ensured a lifelong career of decent wages and personal fulfillment. Far too many students are now exiting high school and cannot make a seamless move from school to work. It is because of this that educators across the nation are grasping for intense high school reform efforts. This study focused on what influences career academy enrollment had on readiness for work. While much has been developed in terms of the skills required for successful postsecondary transitions, little attention has been placed on outcomes. Only a small number of studies have ever

examined the impact school-to-work initiatives such as career academies have on postsecondary outcomes (Linneham, 1995).

Neumark and Rothstein (2007) studied the impact of school-to-work initiatives on those students who are less likely to attend college. They reported, “The evidence suggests that for men in the forgotten half, mentoring and co-op programs increase postsecondary education, and co-op, school enterprise, and internship-apprenticeship programs boost employment and decrease idleness after leaving high school” (p. 89). The Manpower Demonstration Research Corporation took an ongoing look into the effectiveness of career academies as a school-to-work initiative. Their research provides evidence of positive outcomes for students in regards to employment and earnings up to 4 years after graduation from high school (Kemple, 2004).

Career academies have proven to be a positive high school experience for students across the country; however, limited research exists on the quality of postsecondary transitions (Kemple, 1997; Orr & Fanscali, 1995; Orr, Fruchter, Thomas, & White, 1987). Whether this means students who go directly into the workforce or to college, the overarching fact is that most will enter some type of employment beyond high school. Taking that even a step further, Orr, Hughes, and Karp (2003) acknowledged that 26% of students graduating from career academies were continuing their employment with an affiliated employer in the summer or fall after high school. Within 10 years after graduating, 85% were working in a professional field. Other studies have shown similar results that help distinguish career academies as one of the most popular school-to-work approaches, and it seems to be widely accepted that career academies should seek to prepare a wide range of students for both work and college (Miller, 2002).

Research on the effect of career academies on student engagement and performance has been very positive. Such research has often compared the academic performance of academy

students with those students engaged in the traditional high school environment. Most of the research points to evidence showing that academy students perform slightly better while in high school. Stern (2003) studied 10 state-funded career academies in California and found that students performed better than comparison groups in areas such as attendance, credits earned, average grades, and the likelihood of staying in school.

Kemple and Snipes (2000) found that both the level of interpersonal support students experienced during high school and their participation in career awareness assisted in the creation of positive work-based learning opportunities. Kemple and Snipes also found that career academies substantially improved high school completion rates, improved attendance rates, increased academic course taking, and increased the likelihood of earning enough credits to graduate on time. These are obvious implications for those students who are most at risk of dropping out of high school. Career academies are an effective way to deter dropout, increase engagement, and prepare them for a postsecondary option (Kemple & Snipes, 2000).

The Manpower Demonstration Research Corporation began a study in 1993 that was the first of its kind in regards to multi-year research. This organization examined high school engagement and performance impacts of career academies (Kemple & Rock, 1996). The Manpower Demonstration Research Corporation found that career academies enhanced the degree of support students received from students and peers (Kemple, 1997). In earlier high school years, academy students received slightly more support than their non-academy peers received and were often collaborating more with their peers on school and work-related issues. Kemple, Poglinco, and Snipes (1999) also found that academies were more likely to increase a student's awareness of careers during high school. Because most career academy students voluntarily enroll, academies are noted for increasing high school graduation rates. Student

engagement and graduation rates are highly interrelated; therefore, one could expect graduation rates to continue to grow as more emphasis is placed on engagement. In a high-risk subgroup studied over a 10-year period, career academy dropout rates were reduced from 32% to 21% among those in the treatment group (Kemple & Snipes, 2000).

In terms of affects on access to college and the completion of postsecondary education, Reller (1987) found that 62% of academy graduates were enrolled in postsecondary education, compared with 47% of the students in the comparison group. Further studies show that career academy graduates were less likely to need remedial coursework and were more likely to complete college than other students were (Maxwell, 1999). Maxwell and Rubin (1997) also found that students who attended career academies were at least as likely to be enrolled in 4-year colleges as students who identified themselves as having been in the academic track in high school and were more likely to receive their bachelor degree than were other graduates from a similar district. Current findings indicate that labor market prospects for young men have also improved because of career academy enrollment; however, there is little evidence that suggests enrollment has significantly affected young females. Other evidence exists that indicates that participation in career education in high school, such as career academy enrollment, has substantial impact and sustained improvements in labor market options for youth (Kemple & Scott-Clayton, 2004).

Differences in Career and Technical Education Programming

In addition to the student characteristics noted previously, other differences exist between the delivery of career and technical education through comprehensive high schools and career academies. Small learning communities and a blended format are key indicators of how career academies differ from the traditional high school environment. Career academies are also unique

in that they are grounded with strong community partnerships, both from the business community as well as postsecondary institutions. Traditional high school students and teachers are often noted as being isolated from the world of work and the outside business community. Subsequently, “Many students are inadequately informed about or are unprepared for postsecondary education and employment opportunities” (Kemple & Snipes, 2000, p. ES-21).

Given this lack of preparedness with several key indicators for high school reform, it seems the seed has been planted for change. The National Career Academy Network (2009) noted that career academies are often seen as a nontraditional means to high school reform because they uniquely prepare students for both college and careers. Career academies not only provide broad information about specific fields, but they also weave major themes from careers into academic content. Many feel that magic is made by linking academics to job prospects and combining this with intense involvement from adults (National Career Academy Network, 2009). This increased linkage of education to the business community creates much uniqueness from comprehensive high schools.

Career academies offer a teacher-team approach, a shared leadership structure, common planning time for teachers, a bridge program for eighth-grade students, ninth-grade small learning communities, defined themes, unique student scheduling, student grouping, curriculum integration among academic and CTE themes, advisory programs, and personalized support. All of these approaches allow innovative education to flow and often differ from the approach of the traditional CTE classroom (Stern et al., 1992). Team teaching and a shared leadership structure are unique in that they allow teachers to work as part of a team with other departments. Rather than the typical *silo* approach to education, teachers compare and integrate curriculum in order to develop strategies that meet unique student needs. This approach works well in times of struggle

or difficulty, as well as during shared planning periods where teachers can collaborate on strategies for the classroom (Kemple & Snipes, 2000).

Access to career academies for all interested students is a key issue for consideration and often differs from the comprehensive high school enrollment procedure (Kemple & Snipes, 2000). While each career academy may have different access points and requirements, most academies are able to structure student involvement to ensure that all student demographics are represented. Career academies, from their inception, have sought to prepare students for college and careers based on voluntary participation; however, perhaps more than ever before, both postsecondary options are emphasized equally. Admission to career academies is also unique. Students typically apply for admission and are chosen through an interview process or through a lottery, depending on the individual school or district (Kemple & Snipes, 2000).

Literature suggests that career academy and comprehensive CTE students possess similar characteristics; however, career academy students often feel this type of programming is more relevant to their future education and career goals (Kemple, 1997). This seeks to help explain why some students might select attending career academies over CTE programs in a comprehensive high school and seeks to validate the importance of establishing initial equivalence of participants. Other than these distinctions, literature supports no other widespread differences in the background characteristics of career and technical education students (Kemple, 1997; Kemple & Snipes, 2000).

Work-based learning experiences available to students also make career academy opportunities unique. While many comprehensive high school students choose to obtain some type of employment during the school year and summers, employment is often mandatory for students enrolled in career academies (Kemple & Snipes, 2000). Employment opportunities for

students are typically made available for students in Grades 11 and 12 by local firms. Jobs are not automatically established for students; however, career academies are typically notified of vacancies. Students schedule interviews independently and, if deemed qualified by the employer, may be offered the job opportunity. In addition to employment opportunities, businesses assist with curriculum planning, advisory functions, and in providing additional financial support.

Work Readiness Skills Students Need to be Successful

Literature suggests that in order to be competitive in a global society, students must possess certain 21st century skills to remain competitive in the workplace (Gray & Herr, 2006). Bottoms and Young (2008) reported that, “Success in completing a rigorous academic core in high school is not only predictive of success in postsecondary studies, but, coupled with high-quality career/technical studies, is essential for success in the workplace” (p. 4). High schools must do a better job of giving greater emphasis to preparing students for workplace readiness, as most students combine work and college after high school graduation. Students must be able to develop what experts refer to as universal work skills. These skills will help them build a base of knowledge they can use with any occupation they choose to enter later in life and create a bridge of opportunity between school success and work success (Carter, Izumo, Kravits, & Reeves, 2001).

Saylor (2008) argued that whether one agrees or disagrees, society typically accepts certain conventions about high school graduates. He stated that the brightest students go on to continue their education upon graduation and typically earn professional degrees. The next tier of students enters into apprenticeship programs or obtains 2-year degrees. The third tier of students complete high school or drop out and work in factories and businesses owned by the

first two groups. The final group of high school students, those with special needs, is typically mainstreamed into continuing education or work or is cared for by the first three groups. While these opinions seem strong, they substantiate opinions of many who state that the system must be changed.

In order to ensure students are exiting secondary education equipped with the basic skills necessary for success in the workforce, defining those skills is one of the most important pieces of high school reform. As noted by Smith and Katz (2005), “Employability skills are included in secondary teaching programs with the expectation that students will be better prepared to obtain and maintain employment after high school” (p. 191). Several guiding pieces of research and recommendations have defined what characteristics embody work readiness. Those most referenced include the *SCANS Report* (Secretary’s Commission of Achieving Necessary Skills, 1991), the *High Schools That Work* program (Bottoms & Young, 2008), *A Nation at Risk* (National Commission on Excellence in Education, 1983) and *The Forgotten Half Revisited* (William T. Grant Foundation Commission on Work, Family, and Citizenship, 1998). Each of these contributions to high school reform is shaping the future of work readiness for high school students still today.

Because high school counseling departments direct most of their focus on students preparing to attend 4-year colleges, a large sector of students is being overlooked. Sometimes considered the noncollege bound, these are students nearing adulthood with no preparation on how to compete for sustainable jobs. With concerns growing about public education in the 1970s and 1980s, *A Nation at Risk* report was released in hopes of identifying ways in which public education was failing American students (National Commission on Excellence in Education, 1983). A focus of this report was the need for increased academic standards and

changes to work-related education often referred to as the *new basics*. In essence, this report called for a balance of both worlds. It recommended 4 years of mathematics, English, history, and science coupled with a stronger commitment to teaching foreign language and basic workplace skills. It also called for a stronger emphasis on defining occupational goals (National Commission on Excellence in Education, 1983).

The work readiness of high school students is well known in the literature, but perhaps no more widely known than Parnell's (1985) book, *The Neglected Majority*. The major tenet of this work rested with students being guided down the wrong track academically and having little exposure to the labor market. Parnell recognized that all students were not preparing for 4-year universities and helped facilitate tech-prep programs that made the connection between academic skills required for high school with occupation skills required for life. Parnell strongly believed that this combination was vital for all students, whether they were entering the workforce immediately or starting some form of postsecondary education. This work fit in well with what the William T. Grant Foundation Commission on Work, Family, and Citizenship (1988) later found in their report, *The Forgotten Half*. Not only was education not providing students the occupational skills necessary for employment, but also they were severely lacking basic academic skills. Troublesome was the lack of focus on those students who could not exit high school and find meaningful employment and that this sector of students was being done a disservice.

A similar study conducted by American College Testing (Olson, 2006) provided related empirical evidence that no matter the postsecondary option, skills needed for work or postsecondary education are converging due to an increasingly global society. Olson compared the ACT college admissions test and WorkKeys[®]. WorkKeys[®] is an assessment that measures

employability skills compared to certain entry-level positions that were able to support a family of four but did not require a college degree. The results showed that these basic skills on both tests are converging. These findings align with the results of the American Diploma Project. The American Diploma Project found that employees need high levels of math and English to survive in jobs that can support families and still have opportunities for growth. They found that these skills are indistinguishable from the academics required for success in college (Olson, 2006). The importance of defining what research shows are best practices for employability skills of high school students is vital to the workforce development of any community. Students must be able to make clear connections between the content they are being taught and how it affects them in a future career (Bottoms & Young, 2008).

Bottoms and Young (2008) detailed work facilitated in 15 states and offered several recommendations to foster collaboration between school and some type of postsecondary option. Specifically, the following recommendations were identified for states to offer greater focus. Indicators include improved academic and technical achievement at the secondary and postsecondary levels, increased enrollment and persistence in postsecondary education, decreased need for remediation at the postsecondary level, increased attainment of postsecondary degrees, certificates or other recognized credentials, and increased entry of students into employment or further education (Bottoms & Young, 2008). Georgia was a participant in the work that ultimately influenced the Georgia Work Ready Program. The Georgia Work Ready Program unites educators, job seekers, and workforce development in communities across the state in making comparisons between an employee's skill levels and certain job requirements. A Georgia Work Ready Certificate identifies portable skills, is becoming universally understood by

employers, and is becoming a large part of workforce readiness at high schools across the state (Georgia Work Ready, 2009).

With changing economic, political, and social times among us, the United States is facing several serious issues in preparing the workplace of tomorrow. Not only are people losing their jobs due to outsourcing and downsizing, students are exiting secondary education without the skills necessary to survive in the new world. It is because of this that many are advocating for a change in education across the United States. It seems to be a common consensus that education is changing, skills required in the workplace are changing, and certainly competition internationally is changing at a rapid pace. As Friedman (2007) notes, while we were sleeping the world has become a flat society where globalization has changed how things are accomplished.

Students in high school today are experiencing a world much different than previous generations. Through changes in technology and how things are accomplished, adaptation has been the key to survival. Virtually every aspect of life has been transformed, and one can only imagine how different life will be as the millennial generation and beyond seek to find meaningful and lasting employment. It is because of this that a very serious crisis is arising. Through authorization of mandates such as No Child Left Behind which ensures that the focus of education is to increase accountability for student performance, society is becoming one too solely focused on testing (Yelland, 2007). Rather than rolling out yet another standardized assessment, school systems should be focused on educating students with what many have termed 21st century skills.

21st century skills are typically defined as core subjects integrated with content such as basic work readiness, global awareness, civic literacy, financial literacy, and technology literacy.

With advancing technologies becoming an emerging theme as a part of this discussion, it is important to note that students must not only learn how to use emerging technologies but also apply this to think critically, solve problems, use information, communicate, and collaborate. As stated by Yelland (2007), “we should not be mapping the use of new technologies onto old curricula; rather, we need to rethink our curricula and pedagogies in light of the impact that we know new technologies can have on learning and meaning making in contemporary times” (p. 2).

Yelland’s (2007) views are reflected throughout the United States. He feels that our schools are still setup to prepare production workers and other routine jobs, rather than those that will be in-demand for years to come. The educational system of the United States must be revised and redirected in order to prepare a viable future marketplace. Whether that is training or retraining the workplace of tomorrow, it is evident that changes are necessary in order to properly integrate technology and other pertinent skills of tomorrow.

Literature regarding workforce readiness for high school students is grounded in the seminal works discussed above. Each of these empirical studies plays a significant role in defining the skills necessary for students to be successful. However, there is overwhelming evidence that there is a critical gap between the skills necessary for workforce readiness of high school students and what skills are actually being obtained by the students.

Work Readiness Affects on Employers

Not only does literature about work readiness focus on an educator’s perspective, it also focuses heavily on best practices and issues identified by employers and the overall impact of an unskilled workforce. Gates (2005) found that employers estimate more than 40% of high school students entering the workforce are not prepared for entry-level employment. This can be combined with the fact that 40% of students in Georgia drop out of high school in the ninth

grade, 25% of college freshman drop out of school, and over 50% of community college students never complete 2 years of education (Commission for a New Georgia, 2004). Statistics such as these identify what employers already fight on a daily basis: students are leaving high school and postsecondary education unequipped with the necessary skills to find meaningful employment.

Bottoms and Young (2008) found that shortages of qualified employees are jeopardizing the economic vitality of almost all of the 15 states featured in their report. They felt these shortages would persist until “many more students see relevancy in their education” (p. 7). Other literature found that high school students often enter a time of waste and job hopping after completion of their degrees noting the lack of purpose or career direction (Hamilton, 1990; Osterman & Iannozzi, 1993). From the viewpoint of employers, this leads to a time of instability when students are not obtaining knowledge and skills acquired from work experience and waste employers’ training time as they move quickly from job to job (Klerman & Karoly, 1995). Urquiola et al. (1997) reported,

If employers expect young people to move around, they may be less likely to invest in additional training for them, creating vicious cycles of low investment and high mobility. High job mobility in the youth labor market weakens firms’ incentives to invest in young workers since the period of time over which they can profit from such investments becomes on average short and uncertain. (p. 6)

Other reports also agree with these sentiments. Gardecki and Neumark (1995) showed a strong correlation between obtaining and maintaining a job within the first 2 years upon graduation and obtaining and maintaining a job in the 3 or 4 years after that. This aligns well with other reports that showed correlation between early work experience and subsequent wages (D’Amico & Maxwell, 1990; Lynch, 1989).

Murnane and Levy (1996) stated that not only do employers value reliability and a strong work ethic; they also look for other basic skills. Murnane and Levy reported that employers look for such things as the ability to read at the ninth-grade level or higher, the ability to do math at the ninth grade level or higher, the ability to solve problems where hypotheses must be formed and tested, the ability to communicate effectively, and the ability to use technology. Murnane and Levy reported, “These are the New Basic Skills, the minimum skills people now need to get a middle-class job” (p. 32). Olson (2006) expressed a similar opinion, “We hear from businesses that they need high school graduates, whether they go to workforce training or college, to be well skilled and have a solid foundation” (p. 2). The American Diploma Project (Achieve, 2004) recently found that a majority of employers gave high schools a grade of C, D, or F for their success in preparing students for workplace experiences. It is evident that the workforce of today must go beyond what was required of them just a few short years ago. Employers expect, if not demand, their workforce to be able to read, write, analyze, interpret, and synthesize information (Hay & Roberts, 1989).

Employers report that many high school students possess poor work habits and poor basic skills in reading, writing, and mathematics and often spend their first few years upon graduation going from job to job (Rosenbaum, 1989). After a review of alternative models being used in Japan, West Germany, and Boston, Rosenbaum recommended eight alternative methods for improving the school-to-work transitions:

- 1 Employers should hire youths based on grades, test, scores, and school recommendations.
2. Employers must show youths how basic skills lead to desirable jobs.

3. Employers must tell school counselors about job openings and hiring criteria, trust counselors' recommendations, and make hiring selections while youth are still in school.
4. Schools must make grades meaningful to employers.
5. Schools should rate students for effort and improved skills.
6. Teachers should write references for work-bound students, as they do for college-bound students.
7. Schools must make grades and teacher recommendations available to employers and make transcripts easily understood and able to be compared to each other.
8. Schools must restructure the general track to offer preparation for youths' future goals.

This list illustrates the fact that schools cannot do it alone. In order for change to occur, schools must have help from employers, specifically in regards to controlling incentives that are appealing to high school graduates (Rosenbaum, 1989).

The literature surrounding employer perspectives suggests that employers face significant challenges in regards to maintaining a qualified workforce. Students are not prepared to perform basic tasks asked of them and lack certain employability skills necessary for survival. With basic skills being so important for entry-level positions and certainly for those requiring specific vocational skills, the ability to define and assess work readiness is a critical need for employers. To assist in this process, the U.S. Chamber of Commerce (2006) established a coalition with the National Institute for Literacy and policy makers from the states of Florida, New York, New Jersey, and Washington to define work readiness. A major goal of this endeavor was to provide guidance to educators concerning what skills employers would like to see students possess upon

graduation from high school. The Chamber of Commerce's work has led to the development of a work readiness credential for high school students.

Work Ready Credentialing for High School Students

A review of literature indicates that the United States has fallen behind other countries in preparing workers for employment. This discovery has spawned increasingly focused conversations between the U.S. Departments of Labor and Education, business and industrial councils, education administrators and public policy makers (Hendrick, 2006; McNamara, 2009; Olson, 2006). Deficiencies in transferable workplace skills have been the focus of many federal workforce initiatives for over 20 years; however, federal legislation has yet to place any specific requirements on work readiness development for secondary education (McNamara, 2009). CTE plays a large role in the growth of workforce readiness credentials by helping students apply skills, providing opportunities for assessment, and connecting students with business and industry (Hyslop, 2008).

Work readiness is typically defined as possessing the basic knowledge, skills, and abilities that are required of the 21st century workforce (Junior Achievement, 2010). Bridgeland, Dilulio, Streeter, and Mason (2008) found that 80% of Americans and 84% of high school parents believe that public high school students are graduating by completing minimal requirements that are not preparing students for college or the workforce. Additionally, 58% of Americans believe our nation's public schools are falling behind in efforts to give students the training and skills they need to secure and succeed in a job, 97% of high school graduates who went into the workforce without a college degree state that real-world learning and more relevant coursework would have better prepared them for the workplace, and 75% of high school graduates who went into the workforce without a college degree state that they would have

worked harder in school if they had known then what they do now about the expectations of the world of work (Junior Achievement, 2010). It is because of these realities that both national and state campaigns for work readiness credentialing have been developed.

National Work Readiness Credentialing

Work readiness credentialing programs emerged out of the notion that basic skills, such as those documented in the *SCANS Report*, dominate workplace needs. They include such things as cooperating with others, listening, reading with understanding, solving problems, using math to solve problems, and observing critically (Partnership for 21st Century Skills, 2008). O’Neil et al. (1997) reviewed many studies to determine that work readiness credentialing should be focused on basic academic skills, higher-order thinking skills, interpersonal and teamwork skills, the ability to work with others from diverse backgrounds, and possessing personal characteristics such as motivation, self-esteem, and responsibility. A summary of their findings is in Table 1.

Table 1

High School Competencies

Major skill category	High school
Basic skills	Basic skills foundation (e.g., reading, writing, listening, speaking)
Higher order thinking skills	Thinking skills foundation (e.g., decision making, problem solving, knowing how to learn) Interpersonal competency (e.g., participates as member of a team; exercises leadership; negotiates)
Personal characteristics, attitudes	Personal qualities foundation (e.g., responsibility, honesty)
Other competencies or knowledge	Resources, information, systems and technology

Source: Review of workforce readiness theoretical frameworks. In H. F. O’Neil (Ed.), *Workforce readiness competencies and assessment* (pp. 3–26). Mahwah, NJ: Lawrence Erlbaum.

The lack of a clear direction in regards to work readiness and employability skills launched the early efforts of the National Work Readiness Credential program in 2002. The goal

of the initiative is for adults and high school students to know they possess the skills that will add value to entry-level positions (National Work Readiness Credential, 2010). A proctored test assesses the skills needed for credentialing. The credential provides employers assurance that certain basic skills are possessed by the applicant. The transparent, portable credential then becomes a necessary document that helps workers navigate the job market in their area and gives employers a common language for assessing employability skills (O'Shea, Looney, & King, 2003).

The National Work Readiness Credential (2010) program was launched to become a valid predictor for employers to know that candidates possessed certain basic work readiness skills required of entry-level positions. The credentialing process, which includes high school students, creates a visible applicant pool for employers for which those who meet job specific criteria can be chosen, easily streamlining the hiring process. The program has four specific objectives:

1. To enable adults and older youth to demonstrate to prospective employers that they have the knowledge and skills needed for successful performance as entry-level workers.
2. To streamline the hiring process for businesses, by identifying a work-ready pool of job applicants.
3. To improve the ability of local, regional, and state workforce development systems to reliably identify and consistently refer work-ready applicants to their business customers.

4. To improve the ability of these systems to help individuals develop the knowledge and skills required to be fully competent entry-level workers in the 21st century workplace.

Through the National Work Readiness Credential initiative, over 39 states have launched or are currently developing credentialing certificate processes (Hendrick, 2006). They are typically administered using their own assessments or through WorkKeys® (Hyslop, 2008). What is often known in literature as a career readiness certificate, this training is allowing businesses, schools, and training centers nationally to tie their curriculum and training to recognized criteria (Haber, 2003). A review of literature reveals that a number of states, including Georgia, all have successful credentialing programs that include high school students and are showing that a common language of work readiness is working for educators and employers alike (Hendrick, 2006; O'Shea et al., 2003; The Worker Credentialing Task Force, 2006). Hyslop (2008) stated,

Workforce readiness credentials provide added value to the high school diploma and help adults gain the skills necessary for workplace success. CTE is at the forefront of preparing students at all levels for the testing that leads to a workforce readiness credential, and perhaps more importantly, with the skills necessary for 21st century success. (p. 43)

Georgia Work Readiness Credentialing

As a way to increase work readiness in Georgia for both high school students and adults, Governor Perdue and the Georgia Chamber of Commerce launched what is known as Georgia Work Ready in August 2006. Their purpose centered on the need to improve job training and marketability of Georgia's workforce and was the first partnership in the country between a state

agency and chamber of commerce (Georgia Work Ready, 2009). Policy makers in Georgia understood that high school students needed real work experience and they felt that establishing such an initiative would help students understand work readiness skills, make a connection between education and work, and lead to a higher number of students graduating from high school.

In a draft outline of additional recommendations released by the state, a major emphasis was placed on defining what *ready* means statewide in terms of no remediation needed for college or work entry (Georgia's Tough Choices or Tough Times Working Group, 2008). As stated in the report,

Having high expectations for students, engaging students in a college or career pathway of personal interest, and giving students an early introduction to the college level work will produce better student achievement results, higher graduation rates, and most importantly, help prepare Georgia students to be competitive in the global economy. (p. 1)

Ensuring Georgia's graduating seniors are ready for college and employment makes the benefits of the credentialing program even greater. Benefits include building confidence that personal skills meet those required of employers, developing a better understanding of workplace requirements, determining ways to improve skill performance, realizing opportunities for advancement, and demonstrating on a resume a certain level of skill mastery required by employers (Georgia Work Ready, 2009).

As the workforce turns to readiness credentials to help fill their needs, educational partners and states like Georgia are responding by preparing students with these same credentials. Hyslop (2008) reported, "Once selected, a credential can drive the curriculum and

instructional practices in education and training settings, helping to ensure that youth and adults have the skills necessary to succeed in the 21st century economy” (p. 41). Georgia Work Ready used the WorkKeys[®] assessment program for the credentialing process, which is noted as the leading resource for business leaders to assess the employability of potential employers (Bowles, 2004; Hendrick, 2006; McLarty, 1992; Vansickle, 1992). Contrary to a system that measures knowledge, the WorkKeys[®] system analyzes one’s ability to use knowledge through workplace contextualization (Vansickle, 1992). As recommended by the Career Readiness Certificate Consortium, Georgia Work Ready incorporates the WorkKeys[®] assessment sections of reading for information, applied mathematics, and locating information and certificates are awarded at four levels: platinum[®], gold, silver, and bronze (Georgia Work Ready, 2009). The certificates confirm to employers and educators that students are ready to obtain today’s jobs and work towards tomorrow’s innovations.

Earning a Georgia Work Ready Certificate is free for graduating seniors and is administered through a partnership with the Technical College System of Georgia. This, along with a high school diploma, provides Georgia students a better opportunity for their future (Georgia Work Ready, 2009). Whether looking for immediate employment, furthering their education, or both, communities across the state are recognized as Georgia Certified Work Ready Communities and are encouraging their graduates to participate.

Research Methodology

Designing an effective research study requires careful investigation of all facets of an anticipated research problem. Therefore, consideration must be made in regards to the approach, framework, and overall thoughts towards educational research (Creswell, 2003). By clearly understanding the appropriateness of the research problem and questions, one can begin to focus

on the design of the study and determine which approach is best for conducting empirical research.

It is critical that CTE be in constant review of issues and trends affecting the work going on in high schools today. A recent review of CTE research found that by conducting research, an ideal platform is established through which directions of educational program design can be examined (Rojewski, Asunda, & Kim, 2008). The results of one study over a 3-year period reveal that quantitative research in CTE is currently the most widely used research methodology through such research designs as descriptive/correlational in 72% of published studies, causal-comparative in 10% of published studies, and quasi-experimental in 7% of published studies (Rojewski et al., 2008).

Research designs are defined by objectives that have been developed from both theory and prior research. The research objectives allow boundaries to be established for appropriate methods to be selected and often are guided after treatment groups have been clearly identified. Causal-comparative research is the most common design used in previous studies that have compared traditional and non-traditional programming of career and technical education students (Kemple & Snipes, 2000).

Causal-Comparative Research

Causal-comparative is a type of nonexperimental research that allows a presumed cause (one or more independent variables) to be compared to a presumed effect (one or more dependant variables) based on a relationship of naturally occurring variations that exist without manipulation (Gall, Gall, & Borg, 2007). Causal-comparative research places focus on the effect, looks for a cause, and suggests if the overall effect is being influenced by the hypothesized cause (Charles & Mertler, 2002). The independent variable is assumed to

influence the dependent variable; therefore, looking at the relationship between the independent variables can uncover relationships. In this study, an attempt was made to identify a cause-and-effect relationship between CTE program enrollment and work readiness; therefore, the major independent variable is type of CTE program enrollment, and the major dependent variable is work readiness. In causal-comparative research, manipulation could have already occurred; therefore, variables are inherited (Kerlinger & Lee, 2000).

The overall goal of a researcher is to provide full control through an experimental design that allows for random assignment; however, this is not always possible when conducting educational research. In studies where random assignment is not possible, causal-comparative research is most often used to determine possible cause and effect of personal characteristics as explanations of educational phenomena (Gall et al., 2007). This type of research design allows the researcher to provide better control of extraneous variables that may have an impact on both internal and external validity.

Internal and External Validity

Because of the inability to have full experimental control, it is critical to the success of the design that both internal and external validity be considered (Ary, Jacobs, & Razavieh, 1972). Internal validity is defined as the extent to which extraneous variables have been controlled by the researcher, as anything that might affect the control of the design could have an impact (Gall et al., 2007). External validity is defined as the extent of which the findings can be applied to settings beyond those that were studied (Fraenkel & Wallen, 2000).

A large concern to internal validity involves the lack of randomization between groups. Because students are not randomly placed in comprehensive high schools or career academies (anticipated student path for CTE programming is self-selected), this must be taken into

consideration when selecting the most appropriate research design. Schneider, Carnoy, Kilpatrick, Schmidt, and Shavelson (2005) suggested controlling internal validity by comparing treatments on key variables from relevant literature such as gender, race, or other baseline measures in order to make sure that randomization has been effective. This process, known as matching, is the most common method of providing control. The procedure equates two groups on one or more extraneous variables so that they can be eliminated as influences on the dependent variable later observed. While matching does allow for more precision, it is often difficult to include the most important variables on which to match subjects.

Gall et al. (2007) suggested the preferred procedure to assure initial equivalency of groups is through the analysis of covariance. This process allows the two groups to be established as equal with respect to the main control variable included in the study. If a difference is found to exist, the control variable cannot be used to explain effect. In order to use analysis of covariance, it is necessary to identify variables prevalent in literature that would possibly neutralize existing differences. Developing and testing alternative hypotheses is another recommended approach that helps to rule out influences from other variables (Ary et al., 1972). Other threats to external validity in causal-comparative research include location, instrumentation, and loss of subjects that must be addressed during research design.

Threats to external design validity must also be closely considered; therefore, the researcher must be aware of threats that may affect the ability to generalize settings beyond those that were studied. Campbell and Stanley (1963) defined four specific threats to internal validity that could affect generalizability: (a) reactive effects of testing, (b) interaction effects of selection bias, (c) reaction effects of experimental arrangements, and (d) multiple-treatment interference. If a study is designed to include an accurate representation of students enrolled in traditional

CTE programs and career academies, population generalizability could occur. However, because this study does not include a representative sample of the overall population (two Georgia school districts), the research may not be generalized. In the case of this study, convenience sampling was used due to research interests, as well as limitations on time and available information. When a convenience sample is used, “Researchers should describe the sample as thoroughly as possible so that interested others can judge for themselves the degree to which any findings apply, and to whom and where” (Fraenkel & Wallen, 2000, p. 121).

Each of the identified threats can cause severe limitations when interpreting results. By following the recommendations mentioned above, factors such as lack of randomization, manipulation, and control can be minimized. In order to engage effectively in data analysis, it is suggested the results be interpreted with caution. It is recommended to first identify threats and minimize impact as suggested above. During research design, alternative hypotheses should be formulated and investigated that will assist in making additional inferences for causation (Fraenkel & Wallen, 2000). Parker and Gallivan (2004) further recommended that the researcher is more likely to obtain responses that represent all subgroups within the group being studied if both groups are well represented.

Admittedly when using causal-comparative research, research must turn to designs that have as much control as possible under existing situations (Charles & Mertler, 2002). With this study, the research design can be developed by clearly defining a traditional career and technical education student and career academy student in terms of enrollment and conceptual design. Work readiness for a high school student must also be clearly defined. Having clear definitions ensures that the results can be meaningfully interpreted through data analysis and makes it

possible to draw strong conclusions, because threats to validity have been addressed and minimized in the research design (Cook & Campbell, 1979).

Summary and Implications

With the central focus of education on preparing a skilled workforce and engaging productive citizens in our economy, many feel the broader mission is often lost with so much emphasis on meeting mandates and increasing test scores (Brand, 2003). A greater emphasis must be placed on ensuring students are equipped with the skills necessary for workplace success in order for them not to be the next statistical group considered forgotten. Especially important are those students who are not college bound. As stated by Rosenbaum (2001),

In a society where everyone is supposed to go to college, the problems facing high school graduates who do not continue their education are often forgotten. Many cannot find jobs, and those who do are often stuck in low-wage, dead-end positions. Meanwhile, employers complain that high school graduates lack the necessary skills for today's workplace. Studies of the interactions between employers and high schools in the United States conclude that each fails to communicate its need to the other, leading to a predictable array of problems for young people in the years after graduation. High schools caught up in the college-for-all goals provide little job advice or preparation, leading students to make unrealistic plans and hampering both students who do not go to college and those who start college but do not finish. (p. 52)

As this literature review confirms, more attention must be focused on developing the basic workforce readiness skills of future generations. While much has been developed in terms of the basic skills required for students to be successful in the workforce upon completion of high school, little attention has been placed on outcomes. Only a small number of studies have

examined the impact school-to-work initiatives such as career academies have on out-of-school outcomes (Linneham, 1995). Griffith and Wade (2001) stated that much of the school-to-work literature is about program implementation and types of activities offered to high school students; however, they are concerned that there are few empirical studies evaluating the presumed effects on students' postsecondary employment and education. Stern et al. (2000) concluded that more research focus must be placed on the balance between academic performance and career options in order for effective school-to-work transitions to exist. In preparing the workforce of tomorrow, more answers are certainly needed for students participating in career and technical education programs (Rojewski, 2002). This study sought to expand the research literature available about the work readiness of high school students.

CHAPTER 3

RESEARCH METHOD

This chapter outlines the research methodology used to compare work readiness of career and technical education high school students. The purpose of the study and its research objectives are stated. The design, participants, instrumentation, procedure, and data analysis strategies for each research objective are described.

Purpose of the Study

The purpose of this causal-comparative study was to examine the influence of career and technical education enrollment in a comprehensive high school or a career academy on the work readiness of high school students in two Georgia school districts. A causal-comparative research design allows researchers the ability to describe conditions that have already occurred, often known as ex post facto research (Fraenkel & Wallen, 2000). This type of design forms treatment groups in which an independent variable is present or absent and then determines if groups differ on a dependent variable (Gall et al., 2007). In this study, differences in work readiness of career and technical education high school students were analyzed.

Research Objectives

The research objectives that guided this study were:

1. To compare characteristics of students who enroll in a career academy to those students who enroll in a career and technical education program at a comprehensive high school in relation to gender, ethnicity, and High School Graduation Test English/language arts scores in order to establish equivalence and reduce self-selection bias.

2. To compare individual scores of career and technical education comprehensive high school students and career academy students in relation to the work readiness characteristics for locating information as defined by WorkKeys[®].
3. To compare individual scores of comprehensive career and technical education high school students and career academy students in relation to the work readiness characteristics for applied math as defined by WorkKeys[®].
4. To compare individual scores of career and technical education comprehensive high school students and career academy students in relation to the work readiness characteristics for reading for information as defined by WorkKeys[®].
5. To determine whether career and technical education enrollment affects the overall level of work readiness in Georgia based on level of certificate earned (platinum, gold, silver, or bronze).

Design

Causal-comparative research design allows researchers the ability to investigate a possible relationship among certain variables that cannot be manipulated (Fraenkel & Wallen, 2000). This relationship is one that typically already exists and research simply seeks to understand the relationship or reasons for the relationship. Sometimes known as associated research, this type of research is unique because there is no attempt to influence variables. The basic approach to causal-comparative research begins with a documented difference between the two groups with the purpose of finding out the reasons for the difference based on certain variables. For this study, possible differences in levels of work readiness among CTE students enrolled in comprehensive high schools and career academies were studied.

The basic premise for conducting causal-comparative research is to understand if there is a relationship without manipulation of an independent variable. After an effect is understood through research analysis, a researcher can then attempt to make a logical connection that suggests whether the effect is being influenced by the hypothesized cause (Charles & Merler, 2002). This is done through careful design of group definition, proper use of instrumentation, and detailed data analysis. Data analysis for causal-comparative research design is conducted using descriptive statistics and other tests to understand statistical significance (Gall et al., 2007).

Also known as quasi-experimental design, causal-comparative research allows for situations that do not allow complete control of variables. The way both independent and dependent variables are defined and how aware the researcher is of external and internal validity threats are important to the design of this research. This research design acknowledges that groups already differ on some variable, as the researcher is simply attempting to identify a major fact (Streifer, 2002). It is also favorable for use as an alternative to experiments or as a means to identify relations that could potentially be studied later experimentally (Gall et al., 2007).

The advantages provided by causal-comparative research were particularly useful for this study. Because differences concerning work readiness were analyzed between the two groups of students based on program enrollment, this study sought to identify these differences. Because there was no manipulation of variables in this study, data could be obtained in a more timely manner (Streifer, 2002). This type of approach yielded more effective and reliable results to answer the research objectives and perhaps could lead future researchers to search for a reason for research outcomes.

Several disadvantages of causal-comparative research existed that could have affected this study. One major issue involved the lack of control over threats to internal validity.

Because manipulation of the independent variable had already occurred, many controls could not be applied. Because of this, considerable concern must be expressed in interpreting the outcomes of this type of research (Fraenkel & Wallen, 2000). There was also a disadvantage due to lack of randomization, as there is often a possibility when using causal-comparative research that the groups being studied are not equal on one or more variables. Since randomization was not possible, every effort was made to establish that the groups were equivalent at the beginning of the study. This was done by conducting an exploratory data analysis that computed descriptive statistics for each comparison group. Because the purpose of the research centered on the work readiness of high school graduates, it was also important that data collector bias did not affect the study. Data collector bias was addressed through the collection of data outside the researcher's school district.

Participants

The sample for this study was drawn from a population consisting of high school seniors enrolled in a CTE program at either a comprehensive high school or a career academy in two Georgia school districts. Each district operated a career academy based on the same career academy structure and had articulation agreements in place with West Georgia Technical College. These articulation agreements allowed secondary students to receive college credit at West Georgia Technical College for certain courses completed while in high school.

The high school students chosen for this study were seniors who had taken the WorkKeys[®] assessments during the 2009-2010 school year. Of the eight comprehensive high schools in the two Georgia school districts, school characteristics, class sizes, leadership structure, and available number of students able to participate was analyzed to determine participation. Based on large participation on the WorkKeys[®] assessments and the fact that there

were no business advisory groups guiding efforts of career and technical education at this location, one comprehensive high school was selected that yielded 325 seniors. The two career academies had 362 seniors. For each of the schools selected, convenience sampling allowed for participants who met certain criteria to be included in the study. However, this allows generalizability of results to be limited. Of the 687 seniors, data were used from 501 students; 153 students did not take the assessment. In addition, the listwise deletion approach was implemented before beginning data analysis. This yielded 33 students who were removed due to missing data on either the High School Graduation Test English/language arts score or one section of the WorkKeys[®] assessments. Taking WorkKeys[®] assessments was optional in both school districts during the 2009-2010 school year.

The success of causal-comparative research depends largely on how carefully comparison groups are defined (Fraenkel & Wallen, 2000). After the groups have been defined, they can then be matched on one or more of the identified variables. If the groups selected differ on the particular variable of interest and can be compared to another variable without manipulation, the research design is appropriate. The differences between the groups should be based on one group possessing a certain characteristic the other does not have or the groups differing on known characteristics.

The two groups in this study were high school seniors enrolled in either a comprehensive high school or career academy CTE program. A student enrolled in a comprehensive high school was defined as a student engaged in a career pathway that does not operate under a career academy structure. The identified comprehensive high school did not have an advisory group of business and industry representatives nor did the CTE offerings reflect the in-demand employment base of the local community as identified by the local chamber of commerce.

Programs offered also did not articulate with postsecondary institutions. A career academy student was defined as a student engaged in a career pathway that articulates with the local technical college, contributes to work-based learning experiences outside the classroom through participation with business and industry, and represents the local landscape as identified with assistance from the local chamber of commerce.

Because randomization was not possible, groups could have differed on variables that would have had an impact on the dependent variable from the start. In experimental research, it can be assumed that these other variables cancel out among the study groups through randomization; however, in causal-comparative research, if the researcher is suspicious that some external variable might be involved, control procedures must be used in an attempt to strengthen the effect of the external variable (Gall et al., 2007). Random assignment of students to groups was not possible since students were already enrolled in one group or another.

A review of literature provided evidence that a number of demographic and other variables affect the outcome measures of work readiness. These variables were identified as predictors of work readiness and were included in the study. Areas such as gender, ethnicity, educational expectations, and performance on standardized testing are often referred to as possible predictors (Kemple & Snipes, 2000; Maxwell, 2007; Neumark & Rothstein, 2007; Reed, Jepsen, & Hill, 2007). Therefore, characteristics of students who enrolled in a career academy to those students who enrolled in a career and technical education program at a comprehensive high school were compared in relation to gender, ethnicity, and High School Graduation Test English/language arts scores. The comparison was conducted to establish equivalence, reduce self-selection bias, and to establish a baseline.

Given the design of this study based on these variables, demographic data and educational criteria influential in work readiness literature were initially compared in order to establish group equivalence. Participants in this study were equivalent in that they had taken elective courses as part of their high school experience through CTE, had the same graduation requirements as all Georgia students, experienced the same scheduling procedure, experienced the same guidance counseling, took the same state graduation tests, had the same attendance expectations, and were allowed to participate in the same extra-curricular activities. Students also experienced similar admission criteria for each type of high school setting CTE program; however, career academy students completed an application for enrollment but were automatically enrolled in the academy. There was no lottery necessary for admission, nor a formal interview process in either school district.

In light of national work readiness credentialing efforts and the ability for states to have their own system of testing accountability, the climate of standardized testing has seen great change in recent years (Achieve, 2008). Work readiness literature supports the notion that this is due to the increased level of concern of students leaving high school without necessary skills to succeed in postsecondary options (Callahan, 2007). Tests of work readiness embody a new wave of standardized testing through combining criterion-referenced achievement with construct-based ability testing (Institute for Workforce Education, 2001). Evidence in work readiness literature and national credentialing literature suggest that states are often using WorkKeys[®] sections as a replacement for state achievement tests in order to gauge both academic and work readiness proficiency of high school students simultaneously (Callahan, 2007; Darling-Hammond, Rustique-Forester, & Pecheone, 2005; Kadamus, 2004).

High school graduation requirements have important consequences for teaching, learning, and student achievement both now and in the future. This is perhaps why so many states are using a broader range of measures to award a high school diploma. The alignment of WorkKeys[®] to state achievement tests required for graduation has proven successful in states such as Illinois, Michigan, Missouri, Oregon, Tennessee, and Wyoming, and many others are looking to revise expectations for graduation (Callahan, 2007; Kadamus, 2004). Georgia is also now among this list of states. The Georgia Department of Education (2010) adopted a rule that allows students to demonstrate alternative subject mastery on comparable WorkKeys[®] sections. Georgia and these other states have assessed a common linkage and have either replaced traditional state achievement tests altogether or have a process in place that allows students the choice of either the individual state graduation test section or comparable WorkKeys[®] section. Because of the alignment of state graduation tests and WorkKeys[®] sections, graduation testing requirements are proving equivalency (Callahan, 2007). This linkage assisted in providing additional control in this study.

In the event that this objective proved there were inequalities among students before any other data were analyzed, analysis of covariance could have been used, regression models developed, or each group could have been looked at individually. The use of analysis of covariance would have compensated for the lack of equivalency by determining whether each factor and the interactions between them have a statistically significant effect on the dependent variable through a post hoc method (Gall et al., 2007).

Instrumentation

Archival data were collected from the student records database systems of each Georgia school district. The databases were queried to obtain WorkKeys[®] assessment scores on locating

information, applied math, and reading for information sections, along with gender, ethnicity, and student High School Graduation Test English/language arts scores during the 2009-2010 school year. The administration of both career academies used the database records to query and archive the necessary information.

In the case of this research study, archival data were a primary source. The student information data systems maintained by each school district are digital repositories where the information is stored, preserved in good condition, and accessed with careful monitoring (Gall et al., 2007). When using archival data, a researcher must ensure several procedures are in place before examining of primary sources can occur. First, archival data must be accessible. Although information is available, it does not mean everyone has access (Fraenkel & Wallen, 2000). In this study, written permission was granted from cooperating schools and each school district. Another thing to consider is whether materials could be copied in reports. This may include quoting directly from the data, photocopying documents, or scanning documents. Institutions may allow documents to be examined or data analyzed; however, there could be certain stipulations on or further approval required for the information to be included as part of a study (Fraenkel & Wallen, 2000). Because the information was coded without names by each school district and permission was granted to use the data for dissertation research, this was not an issue in this study.

Other concerns with archival data, including forgery or receiving data that has been altered, did not apply since the data came directly from school district archives, which are used for state reporting purposes. This also eliminated any bias, because this data typically cannot be distorted or falsified. Overall, archival data proposes no real ethical issues in the research study. The research design also allowed individual sources of data to be analyzed though an organized

and systemic process. The accessibility and comprehensiveness of the data available from both comprehensive high schools and career academies assisted in analyzing the work readiness of each career and technical education program.

According to the U.S. Department of Labor (2000), a good test of employability skills must be reliable, able to measure the skills it is devised to measure, relevant to the characteristics of the job for which it is written, and able to enable employers to make effective employment decisions. The main assessment system gauging the level of work readiness, WorkKeys[®], is one such test developed by American College Testing as a national testing system that could be used by employers, schools, students, and workers alike to assist in building a skilled workforce. The system attempts to quantitatively measure, communicate, and improve the common skills required for success in the workplace and gauge whether or not an individual possesses certain basic skills required of employers (KeyTrain, 2009). WorkKeys[®] is designed to evaluate a person's ability to use knowledge by providing contextualized workplace situations and problems (Vansickle, 1992).

Through job profiling with subject-matter experts, the WorkKeys[®] assessment helps workers gauge their level of skill requirements in nine particular work ready sections considered foundational skills: (a) reading for information, (b) applied mathematics, (c) listening, (d) writing, (e) locating information, (f) teamwork, (g) applied technology, (h) observation, and (i) business writing. Within each section, situations are contextualized by providing workplace scenarios and problems similar to those that may be experienced in a variety of occupations for which the examiner must respond (Vansickle, 1992). WorkKeys[®] also has sections to gauge personal skills through fit, talent, and performance assessments. For the purposes of this study, reading for information, applied mathematics, and locating information sections were used

because these are the three areas used in Georgia to assess the level of work readiness of graduating seniors and to award certificates based on scale scores (Georgia Work Ready, 2009). These scales help employers identify and develop workers, help students document and advance their employability skills, and help educators tailor their educational programs to assist students in acquiring the skills required of employers (Rosen, Weil, & Zastrow, 2003).

WorkKeys[®] Locating Information Section

The WorkKeys[®] locating information section assesses skills associated with locating, using, and synthesizing information in a workplace setting (American College Testing, 2009). It also measures skills used when understanding graphical information where comparing, summarizing, and analyzing information in graphical format must be done (American College Testing). The 38-item section must be completed within a 55-minute period if taken online or 45 minutes if being administered using paper and pencil. There are four levels of difficulty, ranging from Level 3 to Level 6. At Level 6, the complexity is the highest. Table 2 outlines levels and associated skills for the WorkKeys[®] locating information section.

WorkKeys[®] Applied Mathematics Section

The WorkKeys[®] applied mathematics section assesses contextual mathematics problem solving focused on reasoning skills required of employers (American College Testing, 1998). The scale measures the skills people use when applying mathematical reasoning, critical thinking, and problem-solving techniques to workplace situations (American College Testing,

Table 2

WorkKeys® Locating Information Scale

Level (scale score)	Examples of associated skills
Level 3 (72-74)	Find one or two pieces of information in a graphic Fill in one or two pieces of information that are missing from a graphic
Level 4 (75-79)	Find several pieces of information in one or two graphics Understand how graphics are related to each other Summarize information from one or two straightforward graphics Identify trends shown in one or two straightforward graphics Compare information and trends shown in one or two straightforward graphics
Level 5 (80-86)	Sort through distracting information Summarize information from one or more detailed graphics Identify trends shown in one or more detailed or complicated graphics Compare information and trends from one or more complicated graphics
Level 6 (87-90)	Draw conclusions based on one complicated graphic or several related graphics Apply information from one or more complicated graphics to specific situations Use the information to make decisions

Source. American College Testing. (2006b). *WorkKeys® scale score interpretation guide*. Iowa City, IA: Author. (2009). The 33-item section must be completed within a 55-minute period if taken online or 45 minutes if being administered using paper and pencil. The section has five levels of difficulty ranging from Level 3 to Level 7, with 7 being the most complex. Table 3 outlines levels and associated skills for the WorkKeys® Applied Mathematics section.

WorkKeys® Reading for Information Section

With employers demanding an increase in reading requirements, the WorkKeys® reading for information section allows skills to be thoroughly assessed. It specifically measures the skills an employee uses when reading and using written text in the workplace (American College Testing, 2009). The 33-item section must be completed within a 55-minute period if taken online or 45 minutes if being administered using paper and pencil. The scale for this assessment ranges from a Level 3 to Level 7. The material becomes increasingly difficult closer to Level 7,

Table 3

WorkKeys[®] Applied Mathematics Scale

Level (scale score)	Examples of associated skills
Level 3 (71-74)	Solve problems that require a single type of mathematics operation (addition, subtraction, multiplication, and division) using whole numbers Change numbers from one form to another using whole numbers, fractions, decimals, or percentages Convert simple money and time units (e.g., hours to minutes)
Level 4 (75-77)	Solve problems that require one or two operations Put the information in the right order before performing calculations
Level 5 (78-81)	Decide what information, calculations, or unit conversions to use to solve the problem Calculate using mixed units (e.g., 3.5 hours and 4 hours 30 minutes) Find the best deal using one- and two-step calculations and then comparing results Calculate percent discounts or markups
Level 6 (82-86)	Use two formulas to change from one unit to another within the same system of measurement Find mistakes in questions that belong at Levels 3, 4, and 5 Find the best deal and use the result for another calculation Calculate multiple rates
Level 7 (87-90)	Convert between systems of measurement that involve fractions, mixed numbers, decimals, and/or percentages Find the best deal when there are several choices Apply basic statistical concepts

Source. American College Testing. (2006b). *WorkKeys[®] scale score interpretation guide*. Iowa City, IA: Author.

which involves more application and interpretation (American College Testing). Table 4 outlines levels and associated skills for the WorkKeys[®] reading for information section.

WorkKeys[®] Work Ready Certificates

In Georgia, the three sections of WorkKeys[®] are used to determine work readiness. Georgia Tech’s Enterprise Innovation Institute and The Fanning Institute at the University of Georgia (2008) reported a large disconnect between what employers think their workers should know and what skills students think they should know. Seventy-eight percent of students surveyed indicated they were interested in earning a work ready certificate, so

Table 4

WorkKeys[®] *Reading for Information Scale*

Level (scale score)	Examples of associated skills
Level 3 (73-74)	Choose the correct meaning of a word that is clearly defined in the reading Choose the correct meaning of common, everyday workplace words Apply instructions to a situation that is the same as the one in the reading materials
Level 4 (75-78)	Identify important details that may not be clearly stated Apply instructions with several steps to a situation that is the same as the situation in the reading materials
Level 5 (79-81)	Identify the paraphrased definition of a technical term or jargon that is defined in the document Apply straightforward instructions to a new situation that is similar to the one described in the material Apply complex instructions that include conditionals to situations described in the materials
Level 6 (82-84)	Apply complicated instructions to new situations Figure out the principles behind policies, rules, and procedures Explain the rationale behind a procedure, policy, or communication
Level 7 (85-90)	Figure out the definitions of difficult, uncommon words based on how they are used

Source. American College Testing. (2006b). *WorkKeys*[®] *scale score interpretation guide*. Iowa City, IA: Author.

employers know they possess the specific set of skills employers are requiring for positions. All of these findings help Georgia certify these three assessments are valid for credentialing high school students. An overall Level 5 in applied mathematics and reading for information are also good indicators of college readiness (Georgia Work Ready, 2009).

Certificates in Georgia are issued based on the lowest level earned in each area. Individuals who score at specified levels receive either a platinum, gold, silver, or bronze certificate. The skill level scores attained are based on skill levels required by many occupations listed in the job profiles established by American College Testing. This allows students to understand whether they are a good fit in terms of skills for that particular occupation. It is estimated that Georgians with a gold level certificate can be trained to fill 90% of today's jobs.

In 2008, high school seniors in Georgia scored at 17% gold in comparison to 20% of the adult population who were tested (Georgia Work Ready, 2009). A breakdown of each level appears in below in Table 5.

Table 5

WorkKeys[®] Work Ready Certificate Requirements

Certificate	WorkKeys [®] scores	Criteria for jobs in the WorkKeys [®] database
Platinum	6 and above	necessary skills for 99% of the jobs
Gold	5 and above	necessary skills for 90% of the jobs
Silver	4 and above	necessary skills for 65% of the jobs
Bronze	3 and above	necessary skills for 35% of the jobs

Source. Georgia Work Ready. (2009). *Georgia Work Ready certification overview*. Retrieved from http://www.gaworkready.org/files/resources/url/Work_Ready_Certificate_overview.pdf

Reliability of WorkKeys[®]

Reliability of the instrument being used is critical to any research design and assures readers that the instrument used will yield consistent test results that are stable over time and across many diverse settings (American College Testing, 2007). Often known as internal consistency, an instrument is considered reliable if items measuring the same concept relate with each other. In a field study conducted by American College Testing, the WorkKeys[®] assessment scales demonstrated good to excellent internal consistency reliabilities. In Georgia, WorkKeys[®] is considered reliable because it provides a common language with educators, ensures an emerging workforce to be ready for employment, reduces hiring costs and turnover rates, and increases productivity and reduces waste for employers (Governor’s Office of Workforce Development, 2009). Currently being used by leading organizations in Georgia for hiring and continued education efforts, WorkKeys[®] is also a key piece in the development and promotion of the current workforce in Georgia.

Validity of WorkKeys®

The validity of an instrument is also an important part of research design and certifies that the test is able to measure accurately what is intended to measure (Gall et al., 2007; Hill, 2001; Rojewski, 2001). There is a possibility that scores can be reliable while not being valid; however if validity is in place, reliability will also be in place. Due to the intricate design of WorkKeys® Assessment System, American College Testing used a panel of business stakeholders and educators knowledgeable in subject areas to examine content for both accuracy and fairness. The panel's opinions of these requirements were matched with skill scales for over 1,100 profiled jobs and found that the WorkKeys® skill scales are content valid for large numbers of jobs (American College Testing, 1997). Other researchers have also found that WorkKeys® provides a quality resource for business leaders to better assess employability skills of their current and future workforces (Bowles, 2004; Hendrick, 2006; Vansickle, 1992).

Additionally, WorkKeys® is often referred to as an integrity test within industrial psychology literature. WorkKeys® is often classified as such due to its ability to predict overall job performance, counterproductive work behaviors, and work safety (Coyne & Bartram, 2002; Ones, Viswesvaran, & Schmidt, 1993). Integrity tests have been proven capable across a variety of occupations and work settings in predicting workplace behaviors (Furnham, 2001). Many integrity tests focus on other workplace characteristics such as impulse control, admissions of theft, and workplace attitudes; however, it is still noted that general scales as used within WorkKeys® are as predictive of job performance as other targeted subscales (Murphy, 2000).

Procedure

Permission from the University of Georgia's institutional review board was obtained by submitting required forms to the Office of the Vice President for Research. Both school districts

were identified as cooperating participants. Evidence of this process and corresponding approval letters from these districts are in Appendixes A and B. Data were collected from both districts in April 2010. All information collected was organized and maintained anonymously throughout this study and will be archived for a period of 5 years, at which point it will be destroyed (American Psychological Association, 2005).

Data Analysis

This research study sought to examine whether CTE students enrolled in a comprehensive high school differ from career and technical education students enrolled in a career academy in regards to work readiness. Variables measured included scale scores from three sections (reading for information, applied mathematics, and locating information) of the WorkKeys[®] assessment and the type of certificate students earned. Demographic data included gender, ethnicity, CTE program enrollment, and High School Graduation Test English/language arts scores. Table 6 overviews the analysis strategy for each research objective.

Different statistical procedures were used based on the needs of the research objective. The ideal for each objective was to insure the highest level of statistical power possible in order to detect a true treatment effect (Schneider et al., 2005). Factors that affect statistical power include sample size, level of significance, and effect size. The first objective saw the use of descriptive statistics to describe the participants' CTE program enrollment, gender, ethnicity, and High School Graduation Test English/language arts score. This included the analysis of means and standard deviations of each variable. In addition, the chi-square procedure was used to compare gender and ethnicity of both groups of students using categorical data, and one-way analysis of variance (ANOVA) was used to compare High School Graduation Test English/language arts scores.

Table 6

Analysis Strategy

Research objective	Independent variable(s)	Dependent variable	Statistical procedure
1. To compare characteristics of students who enroll in a career academy to those students enrolled in career and technical education programs at a comprehensive high school in relation to gender, program enrollment, and High School Graduation Test English/language arts scores in order to establish equivalence and reduce self-selection bias.	CTE Program Enrollment Comprehensive = 0 Career Academy = 1		Descriptive statistics
	Gender Male = 0 Female = 1		Chi square
2. To compare individual scores of career and technical education comprehensive high school students and career academy students in relation to the work readiness characteristics for locating information as defined by WorkKeys®.	Ethnicity White = 0 Black = 1 Hispanic = 3 Asian/Native American = 4		
	HSGT ELA Scores		One-way ANOVA
3. To compare individual scores of comprehensive career and technical education high school students and career academy students in relation to the work readiness characteristics for applied math as defined by WorkKeys®.	CTE Program Pursued Comprehensive = 0 Career Academy = 1	WorkKeys® locating information score (Continual)	Descriptive statistics
	WorkKeys® locating information score		One-way ANOVA
4. To compare individual scores of career and technical education comprehensive high school students and career academy students in relation to the work readiness characteristics for reading for information as defined by WorkKeys®.	CTE Program Pursued Comprehensive = 0 Career Academy = 1	WorkKeys® applied math score (Continual)	Descriptive statistics
	WorkKeys® applied math score		One-way ANOVA
5. To compare whether career and technical education enrollment affects the overall level of work readiness in Georgia based on level of certificate earned (platinum, gold, silver, or bronze).	CTE Program Pursued Comprehensive = 0 Career Academy = 1	WorkKeys® reading for information score (Continual)	Descriptive statistics
	WorkKeys® reading for information score		One-way ANOVA
5. To compare whether career and technical education enrollment affects the overall level of work readiness in Georgia based on level of certificate earned (platinum, gold, silver, or bronze).	CTE Program Pursued Comprehensive = 0 Career Academy = 1	Georgia Work Ready certificate earned (categorical)	Descriptive statistics
	Georgia Work Ready certificate earned	Bronze = 0 Silver = 1 Gold = 2 Platinum = 3	Chi square

The second, third, and fourth research objectives were also best understood by using a series of one-way ANOVA procedures to compare both groups of students. A one-way analysis of variance is used when data are divided into groups according to only one factor and allows differences not only to be noted, but also to show significance. ANOVA measures multivariate normality, which means the sample is drawn from a population that is normally distributed (Kerlinger & Lee, 2000). When using this method for data analysis, the populations from which the samples were obtained must be normally distributed, the samples must be independent, and the variances of the populations must be equal (Gravetter & Wallnau, 2007). Because a one-way ANOVA looks at differences between two or more populations, it is best for repeated measures to be from the same subjects. Analysis of variance produces a F value, which indicates if there is a significant difference among the sample means. When conducting an ANOVA, the variance of the scores is divided into two components to show both the variance between the groups and the variance within the groups. These variances are determined by calculating the sum of squares between groups and the sum of squares within groups, which are then divided by their degrees of freedom to calculate the mean square between the groups and mean square within the groups. An F value can then be calculated, which is the ratio of the mean square between groups to the mean square within groups. At this time, the level of significance can be determined.

For the first and fifth research objective, a chi-square procedure was used. Chi square is defined as a nonparametric statistical technique that tests hypotheses about an entire frequency distribution (Gravetter & Wallnau, 2007). The data for these tests examine the frequency of observations that fall into certain categories and determine whether there is a relationship between two variables. This analysis occurs by comparing actual frequencies with expected frequencies. If the obtained frequencies are similar to the expected, then it is noted that the

groups do not differ. If there are considerable differences from what is expected, researchers conclude that there is a significant difference between the two groups. It is often considered the most appropriate statistical procedure for analyzing categorical variables that are exclusive, independent, and exhaustive (Rojewski, 2001).

A chi-square analysis involves formulating a statistic (χ^2) that assists in comparing expected and obtained frequencies (Kerlinger & Lee, 2000). This comparison will determine the contingency coefficient, which is a descriptive statistic. With χ^2 identified, a researcher can then determine how likely it will be that such a result could occur if there were no relationship. The chi-square test is used to test the validity of a distribution assumed for a random occurrence and evaluates the null hypotheses (that the data are governed by the assumed distribution) against the alternative (that the data are not drawn from the assumed distribution). Once the expected frequencies are obtained, the chi-square statistic is computed to determine how well the data fits the null hypothesis. This statistic is calculated by first obtaining, for each cell in the developed table, the expected number of times it will occur if the null hypothesis is true. If the observed number of occurrences deviates substantially from the expected number, then it is unlikely that the null hypothesis is true. Necessary to calculate the chi-square statistic is O (observed count in category), E (expected count in the category under the null hypothesis), df (degrees of freedom), and c/r (represent the number of columns and rows in the contingency table). The chi-square test typically works best with a 2 x 2 table, but can vary (Gravetter & Wallnau, 2007).

In terms of significance, the .05 level was used for the duration of this study. This corresponds to two standard deviations from the mean of the normal distribution. It is the most commonly used level of significance among researchers because it is neither too high nor too low for the purposes of social science research (Kerlinger & Lee, 2000). The obtained chi-

square value is compared to the critical value from the χ^2 table and based on the comparison of the two values, statistical significance can then be determined. When the .05 level of significance is selected, it can be noted that there are 5 chances out of 100 the researcher will reject the null hypothesis when statistical evidence does not justify the rejection. This is known as a Type I error. If the level of significance were to be raised, the likelihood of a Type II error could occur. A Type II error involves not rejecting the null hypothesis when there is in fact a difference (Gall et al., 2007).

Effect size is another statistical power that analyzes the magnitude of difference, relationship, or effect of the population being studied (Gall et al., 2007). Because tests of significance are inappropriate for making inferences about practical significance, an effect size statistic is often used. A higher effect size often infers that there is a greater difference between the groups being analyzed, and the process is recommended as an aid for interpreting results between the means of two groups. The magnitude of the effect size is impacted by measures being used, the difference among the group means, the shape of the distribution, participants included in the sample, and other factors. Effect size is often measured by using what is known as eta-squared or Cohen's *d*. The eta-squared statistic focuses on reflecting the proportion of variation in the response variable that is explained by the independent variable, while Cohen's *d* looks at the difference between two means divided by the pooled standard deviation (Gall et al.). For the purposes of this study, Cohen's *d* was used since it is often found to provide the most objective measure of the importance of an effect (Field, 2009).

Summary

In order to understand the level of work readiness students are obtaining while in high school, this study sought to examine the influence of CTE enrollment in either a comprehensive

high school or a career academy on the work readiness of high school students in Georgia school districts. This chapter outlined the overall design, described participants and instrumentation, and detailed the procedure and data analysis of this study. Using the statistical procedures outlined as part of data analysis, differences were analyzed which could lead to future research regarding work readiness of high school students. The results of this study could also shape the approach of CTE programs in Georgia in regards to students graduating high school prepared for the workforce.

CHAPTER 4

DATA ANALYSIS

The purpose of this causal-comparative study was to examine the influence of career and technical education enrollment in either a comprehensive high school or a career academy on the work readiness of high school students in Georgia school districts. This chapter presents findings of data analysis related to each research objective. Specifically, this study addressed five major objectives.

1. To compare characteristics of students who enroll in a career academy to those students who enroll in a career and technical education program at a comprehensive high school in relation to gender, ethnicity, and High School Graduation Test English/language arts scores in order to establish equivalence and reduce self-selection bias.
2. To compare individual scores of career and technical education comprehensive high school students and career academy students in relation to the work readiness characteristics for locating information as defined by WorkKeys[®].
3. To compare individual scores of comprehensive career and technical education high school students and career academy students in relation to the work readiness characteristics for applied math as defined by WorkKeys[®].
4. To compare individual scores of career and technical education comprehensive high school students and career academy students in relation to the work readiness characteristics for reading for information as defined by WorkKeys[®].

5. To determine whether career and technical education enrollment affects the overall level of work readiness in Georgia based on level of certificate earned (platinum, gold, silver, or bronze).

Description of the Sample

The sample for this study was drawn from a population consisting of high school seniors enrolled in a CTE program at either a comprehensive high school or a career academy in two Georgia school districts. Each district operates a career academy based on the same career academy structure and has articulation agreements in place with West Georgia Technical College. Only those seniors who took the WorkKeys[®] assessment during the 2009-2010 school year were used in this study. Of the 687 anticipated seniors eligible to participate, data were used from 501 students; 153 students did not take the assessment. In addition, the listwise deletion approach was implemented before beginning data analysis. This yielded 33 students who were removed due to missing data on either the High School Graduation Test English/language arts score or one section of the WorkKeys[®] assessments.

Characteristics of the Students

Research Objective 1: To compare characteristics of students who enroll in a career academy to those students who enroll in a career and technical education program at a comprehensive high school in relation to gender, ethnicity, and High School Graduation Test English/language arts scores in order to establish equivalence and reduce self-selection bias.

This objective was developed to assist in best defining comparison groups, key to the success of a causal-comparative study (Fraenkel & Wallen, 2000). After the groups were defined, they could then be matched based on the identified variables above. If the groups selected differ on the particular variables of interest and can be compared to another variable

without manipulation, the research design should be considered appropriate. The differences between the groups should be based on one group possessing a certain characteristic the other does not have or the groups differing on known characteristics.

Of the single population of 501 students, descriptive statistics indicate that 256, or 51.1% of the total, were classified as comprehensive students and 245, or 48.9%, were classified as career academy students. A student enrolled in a comprehensive high school was defined as a student engaged in a career pathway that does not operate under a career academy structure. A career academy student was defined as a student engaged in career pathways that articulate with the local technical college, contribute to work-based learning experiences outside the classroom through participation with business and industry, and represent the local landscape as identified with assistance from the local Chamber of Commerce.

In further examination of student characteristics, 235 students (46.9%) were male and 266 students (53.1%) were female. The population studied included 239 students (47.7%) who were considered non-minority and 262 minority students (52.3%). Because of the low percentage of minority populations other than Black, ethnicity was grouped into minority and non-minority groups. Descriptive statistics and results of the chi-square analyses are presented in Table 7. In order to determine whether a significant association existed between CTE program enrollment and gender, a chi-square analysis was conducted. The analysis revealed that with a *df* of 1, the observed statistic (.118) is less than the critical value (0.731). This result indicates that there was no statistical difference between gender and CTE program enrollment.

In regards to CTE program enrollment and ethnicity, a chi-square analysis was conducted to determine if the two categorical variables were associated with one another. Ethnicity was

Table 7

Chi-Square Analyses of Demographic Characteristics

	Type of CTE program				total	χ^2	p
	Comprehensive		Career academy				
	n	%	n	%			
Gender							
Male	122	47.7	113	46.1	46.9		
Female	134	52.3	132	53.9	53.1	.118	>.05
Ethnicity							
Minority	143	55.9	119	48.6	52.3		
Non-minority	113	44.1	126	51.4	47.7	.103	>.05

broken down into minority and non-minority populations due to several non-minority populations having expected frequencies of less than 5. Because this violates assumptions of the chi-square test, these were grouped to avoid inappropriate interpretation and misleading probabilities of the chi-square analysis. The chi-square analysis indicated that with a *df* of 1, the observed statistic (.103) is less than the critical value (2.67). This result indicates that there was no statistical difference between ethnicity and CTE program enrollment. When examining the demographic distribution of the population being studied, it appeared that gender and ethnicity were evenly distributed in the two CTE programs.

Descriptive statistics of CTE program enrollment and High School Graduation Test English/language arts scores appear in Table 8. For these test scores, those students who were enrolled in a comprehensive high school environment had a mean score of 235.39, while career academy students had a mean score of 236.48. A one-way ANOVA was calculated to determine the effect of CTE program enrollment on the scores. ANOVA compares the amount of variance

between-groups in test scores with the amount of variance within-groups (Gall et al., 2007).

ANOVA results for High School Graduation Test English/language arts scores based on program enrollment are summarized in Table 9. Results of the ANOVA analysis indicated there was no significant difference between type of CTE program enrollment on the High School Graduation Test English/language arts scores ($F [47, 453] = 1.15, p = .24$).

Table 8

Descriptive Statistics of High School Graduate Test English/Language Arts Scores by CTE Program Enrollment

CTE Program Enrollment	<i>n</i>	<i>M</i>	<i>SD</i>	<i>SE</i>
Comprehensive	256	235.39	34.54	2.16
Career academy	245	236.41	25.81	1.65

Table 9

Results of Analysis of High School Graduate Test English/Language Arts Scores by CTE Program Enrollment

	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Between groups	13.35	47	.28	1.15	.24
Within groups	111.84	453	.25		
Total	125.19	500			

Analysis of Research Objectives

Four research objectives compared the two groups of students on work readiness measures and the number of certificates earned. Each objective is listed below with the analysis conducted. Results are presented.

WorkKeys® Locating Information by CTE Program Enrollment

Research Objective 2: To compare individual scores of career and technical education comprehensive high school students and career academy students in relation to the work readiness characteristics for locating information as defined by WorkKeys®.

Descriptive statistics for WorkKeys® locating information score by CTE program enrollment are displayed in Table 10. For this section of WorkKeys®, students enrolled in comprehensive CTE programs had a mean score of 75.72 and career academy students had a mean score of 78.71. A one-way ANOVA analysis was conducted (Table 11). The results indicated that a statistically significant difference did exist between comprehensive and career academy students for WorkKeys® locating information scores ($F [23, 477] = 5.608, p = .00$).

Table 10

Descriptive Statistics of WorkKeys® Locating Information Scores by CTE Program Enrollment

CTE program enrollment	<i>n</i>	<i>M</i>	<i>SD</i>	<i>SE</i>	Lower bound	Upper bound	Min	Max
Comprehensive	256	75.72	2.80	.18	75.38	76.07	68	87
Career Academy	245	78.71	4.17	.27	78.19	79.24	67	90
Total	501	77.19	3.84	.17	75.45	76.53	67	90

Table 11

Results of Analysis of WorkKeys® Locating Information Scores by CTE Program Enrollment

	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Between groups	26.65	23	1.16	5.61	.00
Within groups	98.55	477	.21		
Total	125.19	500			

In order to determine the practical significance of the statistically significant result, the effect size was calculated. Effect size provides an estimate of the magnitude of the difference using an objective measure, and a higher effect size indicates a larger difference between the two groups (Field, 2009). Cohen's d was used in this causal-comparative study due to its ability to be generalized across different designs and its frequent use in research. Cohen (1988) suggested .20 indicates a small effect, .50 indicates a medium effect, and .80 indicates a large effect. Based on the significant finding between CTE program enrollment and WorkKeys[®] locating information scores, Cohen's d was calculated to be .84. This represented a large effect of practical significance, as there is 47.4% of nonoverlap between the dependent variable, WorkKeys[®] locating information score, and independent variable, CTE program enrollment.

WorkKeys[®] Applied Math by CTE Program Enrollment

Research Objective 3: To compare individual scores of comprehensive career and technical education high school students and career academy students in relation to the work readiness characteristics for applied math as defined by WorkKeys[®].

Descriptive statistics for CTE program enrollment and WorkKeys[®] applied math score are displayed in Table 12. For this section of WorkKeys[®], students enrolled in comprehensive CTE programs had a mean score of 76.98 and career academy students had a mean score of 78.14. ANOVA results for WorkKeys[®] applied math scores based on program enrollment are summarized in Table 13. The results indicate that a statistically significant difference did exist between comprehensive and career academy students for WorkKeys[®] locating information scores ($F [23, 477] = 1.740, p = .019$). In order to determine the practical significance for the statistically significant result, an effect size was calculated. Based on the significant finding between CTE program enrollment and WorkKeys[®] applied math scores, Cohen's d was

calculated to be .31. This represented a small effect of practical significance, as there is only 21.3% of nonoverlap between the dependent variable, WorkKeys[®] applied math score, and independent variable, CTE program enrollment.

Table 12

Descriptive Statistics of WorkKeys[®] Applied Math Scores by CTE Program Enrollment

CTE program enrollment	<i>n</i>	<i>M</i>	<i>SD</i>	<i>SE</i>	Lower bound	Upper bound	Min	Max
Comprehensive	256	76.98	4.05	.25	76.48	77.48	65	90
Career Academy	245	78.14	3.33	.21	77.72	78.56	67	87
Total	501	77.55	3.76	.17	77.45	78.53	65	90

Table 13

Results of Analysis of WorkKeys[®] Applied Math Scores by CTE Program Enrollment

	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Between groups	9.69	23	.42	1.74	.02
Within groups	115.50	477	.24		
Total	125.19	500			

WorkKeys[®] Reading for Information by CTE Program Enrollment

Research Objective 4: To compare individual scores of career and technical education comprehensive high school students and career academy students in relation to the work readiness characteristics for reading for information as defined by WorkKeys[®].

Descriptive statistics for CTE program enrollment and WorkKeys[®] reading for information score are displayed in Table 14. For this section of WorkKeys[®], students enrolled in comprehensive CTE programs had a mean score of 79.57 and career academy students had a

mean score of 78.94. ANOVA results for WorkKeys[®] reading for information scores based on program enrollment are summarized in Table 15. The results indicate that a statistically significant difference existed between comprehensive and career academy students for WorkKeys[®] reading for information scores ($F [23, 477] = 2.028, p = .003$). In order to determine the practical significance for the statistically significant result, an effect size was calculated. Based on the significant finding between CTE program enrollment and WorkKeys[®] reading for information scores, Cohen's d was calculated to be .19. This represented a small effect of practical significance, as there is only 14.7% of nonoverlap between the dependent variable, WorkKeys[®] reading for information score, and the independent variable, CTE program enrollment.

Table 14

Descriptive Statistics of WorkKeys[®] Reading for Information Scores by CTE Program Enrollment

CTE program enrollment	n	M	SD	SE	Lower bound	Upper bound	Min	Max
Comprehensive	256	79.57	3.27	.20	79.17	79.97	65	90
Career Academy	245	78.94	3.21	.21	78.54	79.35	65	89
Total	501	79.26	3.25	.15	78.45	79.53	65	90

Table 15

Results of Analysis of WorkKeys[®] Reading for Information Scores by CTE Program Enrollment

	SS	df	MS	F	p
Between groups	11.15	23	.49	2.03	.00
Within groups	114.04	477	.24		
Total	125.19	500			

Number of WorkKeys® Certificates Earned by CTE Program Enrollment

Research Objective 5: To compare whether career and technical education enrollment affects the overall level of work readiness in Georgia based on level of certificate earned (platinum, gold, silver, or bronze).

Descriptive statistics were calculated for both comprehensive and career academy students based on the WorkKeys® certificate earned. The frequencies and percentages of students earning the WorkKeys® certification are summarized in Table 16. Because platinum and gold certificate levels are both indicative of high achievement and so that chi-square analysis would not be misinterpreted due to frequencies being less than 5, these two certificate levels were combined before conducting the statistical procedure. The chi-square analysis indicated there was a significant association between CTE program enrollment and WorkKeys® certificate earned ($\chi^2_{(3)} = 37.008, p < .05$).

Table 16

Chi-Square Analysis of Number of WorkKeys® Work Ready Certificates Earned by CTE Program Enrollment

CTE program enrollment	Type of certificate earned									
	Platinum		Gold		Silver		Bronze		None earned	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Comprehensive	1	0.4	17	6.6	144	56.2	63	24.6	31	12.1
Career Academy	3	1.2	63	25.7	118	48.1	43	17.5	18	7.3
Total	4	1.0	80	16.0	262	52.0	106	21.0	49	10.0

Effect size was then calculated to determine the significance of the analysis. Cramer's *V* is often recommended to measure effect size for a chi-square analysis when variables have more than two categories (Field, 2009). In this case, Cramer's statistic is .27 out of a possible

maximum value of 1. This represented a small association between the type of CTE program enrollment and WorkKeys[®] certificate earned. An odds ratio was not calculated since this approach is not typically recommended for contingency tables larger than 2 x 2.

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter contains a discussion of the results of this study. A brief overview of the background and the purpose of the study are included. A discussion of the findings and the conclusions drawn from the results follows. Implications for practice and research and recommendations for future research are also included.

Background of the Problem

With employers estimating that 39% of high school students entering the labor market are unprepared for entry-level positions, it is critical that high school graduates possess basic skills required of the workforce (Commission for a New Georgia, 2004). Not only must graduates be able to successfully transition into a postsecondary option, they must also be able to thrive and survive in a rapidly changing work environment upon arrival. Whether entering the workforce immediately after graduation or later after the completion of postsecondary training, all students should be graduating high school with the basic knowledge and applied skills critical for success in the 21st century (The Conference Board et al., 2006).

Citing the crisis of unskilled graduates in Georgia, the Georgia Department of Education (2009) adopted as part of their strategic plan a goal to improve the work readiness skills of students. Their plan details the accomplishment through four indicators each rooted in CTE: (a) work readiness and industry certification, (b) work-based learning opportunities, (c) career pathways, and (d) career academies. The Georgia Partnership for Excellence in Education (2008) also listed the crisis of unskilled graduates as one of their top 10 issues facing education, stating, “Our economy depends on having individuals capable of filling jobs that require

education and training beyond high school, yet students are leaving high school ill-equipped to succeed in college or at work” (p. 21).

Whether enrolled in a comprehensive high school or career academy, CTE must be firmly grounded in informing students of career options and instilling in them certain basic skills required of any employer (Rosenbaum, 2001). Prior research has looked into the benefits of CTE in terms of high school completion, attendance while in school, average grades, postsecondary enrollment, and future earnings; however, little is known about the level of work readiness skills students obtain while participating in such programs. By using the *SCANS Report* (Secretary’s Commission on Achieving Necessary Skills, 1991) as a conceptual framework, it was possible to compare outcomes for both comprehensive and career academy CTE students.

Purpose of the Study

The purpose of this causal-comparative study was to examine the influence of CTE enrollment in either a comprehensive high school or a career academy on the work readiness of high school students in Georgia school districts. For this study, work readiness was measured using the WorkKeys® Skills Assessments in the areas of locating information, applied math, and reading for information, the three individual scoring sections Georgia uses as a benchmark for awarding work ready certificates.

The research objectives that guided this study were:

1. To compare characteristics of students who enroll in a career academy to those students who enroll in a career and technical education program at a comprehensive high school in relation to gender, ethnicity, and High School Graduation Test

- English/language arts scores in order to establish equivalence and reduce self-selection bias.
2. To compare individual scores of career and technical education comprehensive high school students and career academy students in relation to the work readiness characteristics for locating information as defined by WorkKeys[®].
 3. To compare individual scores of comprehensive career and technical education high school students and career academy students in relation to the work readiness characteristics for applied math as defined by WorkKeys[®].
 4. To compare individual scores of career and technical education comprehensive high school students and career academy students in relation to the work readiness characteristics for reading for information as defined by WorkKeys[®].
 5. To determine whether career and technical education enrollment affects the overall level of work readiness in Georgia based on level of certificate earned (platinum, gold, silver, or bronze).

Findings of the Study

Variables identified as possible predictors of work readiness were gender, ethnicity, educational expectations, and performance on standardized testing (Kemple & Snipes, 2000; Maxwell, 2007; Neumark & Rothstein, 2007; Reed et al., 2007). Because of this, gender, ethnicity, and High School Graduation Test English/language arts scores were used to determine equivalency of the two groups of students. No statistically significant differences were found. Statistically significant differences were found between the two groups of students on the three WorkKeys[®] scales. An effect size of 0.84 was found for the WorkKeys[®] locating information scores. This indicated that the results were both practical and statistically significant and that

there is 47.4% of nonoverlap between the dependent variable, WorkKeys® locating information score, and independent variable, CTE program enrollment. Although the results are statistically significant, both groups of students still scored within the same overall level, Level 4. This level is the second of four levels of difficulty. The average scores of these two groups indicated that the students scored in the one of the two bottom levels of work readiness.

Despite the statistically significant difference found between the two groups on the WorkKeys® applied math scores, the small Cohen's *d* of 0.31 represented a small effect that has little practical implications. There is only 21.3% of nonoverlap between the dependent variable, WorkKeys® applied math score, and independent variable, CTE program enrollment. The mean scores of the two groups fell within Level 4 and Level 5. The WorkKeys® applied math assessment has five levels of difficulty, ranging from Level 3 to Level 7. Again, the average scores of these two groups indicated that the students scored in the lower levels of work readiness.

A statistically significant difference was also found between the two groups on the WorkKeys® reading for information scores. However, a small effect size of 0.19 was calculated. This means there is only 14.7% of nonoverlap between the dependent variable, WorkKeys® reading for information score, and the independent variable, CTE program enrollment. The mean scores of the two groups fell within Level 4 and Level 5. The WorkKeys® reading for information assessment has five levels of difficulty, ranging from Level 3 to Level 7. Again, the average scores of these two groups indicated that the students scored in the lower levels of work readiness.

Examination of the number of WorkKeys[®] certificates earned by students indicated a statistically significant association between CTE program enrollment and overall certificate earned. Effect size was calculated using Cramer's *V* and found to be 0.27 out of a possible maximum value of 1. This small effect size indicated the association between the two variables was not closely related. While the practical significance was small, it must be noted that 27% of career academy students earned platinum and gold certificates, while only 7% of comprehensive high school students did.

Conclusions

Differences found in work readiness were analyzed based on the recommendations of the *SCANS Report* (Secretary's Commission on Achieving Necessary Skills, 1991). Due to the work of the Commission, deficiencies in transferable workplace skills have been identified and the Commission's recommendations have guided the work of workforce education (McNamara, 2009). The report noted that education must seek input and involvement from government, industry, and the civic community to assist in shaping the experiences of the future workforce (National Career Academy Network, 2009).

Not only did the *SCANS Report* address academic skills, but for the first time also addressed critical thinking, using information and technology, and teamwork and problem-solving skills. It is also unique in that it was perhaps the first of its kind to address the importance of education and employers working together to overcome these definite skill gaps (Secretary's Commission on Achieving Necessary Skills, 1991). This same model of developing relationships among education and employers defines the vision and creation of every career academy in Georgia. Formed through partnerships with local chamber of commerce organizations and with the expertise of business and industry, career academies have a unique

advantage over comprehensive CTE programs. Through the involvement of the business community, career academy students in Georgia should have a better understanding of workplace skills and attitudes required for successful employment. This comes often through shared experiences, mentoring, and work-based learning opportunities and could help explain differences found between the two groups of students.

Based upon findings of this study, several main conclusions related to general characteristics of and work readiness ability of career and technical education students can be made. The first conclusion is that basic demographic characteristics of both programs were similar in terms of race, gender, and High School Graduation Test English/language arts scores. This aligns with similar findings of other studies that have compared both groups of students on basic demographics and standardized test scores (Kemple, 1997; Kemple & Snipes, 2000; Orr et al., 2003). This helped to establish initial equivalence before comparing other characteristics among groups of students.

The findings indicated that career academy students appear to be better able to apply basic math and reading skills when locating information because statistical and practical significance was found. However, despite this practical significance, both groups of students, on average, scored in Level 4. This indicates that students, no matter their CTE program enrollment, are able to find information in graphics, understand how graphics are related to one another, summarize information, identify trends in graphics, and compare information and trends shown in graphics (American College Testing, 2006b). This section is often noted as the most advanced of the three WorkKeys[®] assessments, because locating information requires that students apply many of the workplace skills addressed in the reading for information and applied math sections (Bidwell, 2000).

An additional finding concerned the levels of attainment on each assessment. In each case, the students in both groups, on average, scored in the second or third level of work readiness. Level 4 of WorkKeys[®] locating information is the second of 4 levels. The levels range from Level 3 to Level 6, with Level 6 being the most complex. Level 4 and 5 of WorkKeys[®] applied mathematics and reading for information are the second and third levels of five levels, ranging from Level 3 to Level 7, with Level 7 being the most complex. On average, the students in each group are not performing at the highest levels of competence on work readiness skills.

Despite finding significance in all three areas of the WorkKeys[®] assessments, the practical significance and overall level placement indicated that career academy students showed no real advantage over comprehensive career and technical education students in terms of work readiness. Although there is no way to tie this to similar studies since none exists, this finding does not satisfy many of the overarching goals of career academies. Stern et al. (1992) noted that while there is variation among career academies, one of the primary goals includes the development of basic employability skills, which occurs through strong partnerships with local business and government entities. Other studies have indicated that while increased participation from communities creates a support system for career academy students, advantages for career academy students had all but disappeared by the 14th month following their high school graduation (Kemple, 2001). This might also confirm that overall work readiness is not affected by type of CTE participation if work readiness skills are not evident.

Other studies have examined high school, postsecondary, and employment outcomes that all indicate promising results for career academy students. However, none of these studies focused on the development of basic work readiness skills (Hughes et al., 2001; Kemple, 2001;

Stern et al., 2000). The little research that exists on basic employability skills development also could relate to the level of involvement from outside partnerships. Kemple (1999) found that while many career academies do a good job at developing strong employer partnerships, there was a great deal of variation in terms of engagement and management structure of the partnerships. Kemple (1999) indicated that if the local business community is not actively engaged and being used to the fullest capacity by career academy staff, then the partnership developed to teach basic workplace skills could suffer.

Based upon findings of this study, it can also be concluded that type of CTE program enrollment does not affect whether Georgia high school students are certified as work ready. While career academy students seem to be more likely to obtain platinum and gold certificates, indicating a higher level of achievement in regards to work readiness, the practical significance was small. Approximately 10% of the students tested were unable to satisfy the credentialing requirements to be considered work ready in Georgia, which is similar to student results recently released by Georgia Work Ready (2009). On average, the students in both groups are not performing at the highest levels of work readiness as it is assessed by WorkKeys[®]. This is also in line with Hyslop (2008), who confirmed that in order to achieve work readiness credentials, students must be able to apply skills, preparation, and assessment through connections made with business and industry. Other experts in work readiness agree that students must be able to contextualize the big picture through the application of basic reading, writing, and math skills (Clagett, 1997; Lynch, 2000). In addition, the inability of both groups of students to achieve, on average, at the highest levels of work readiness assessed by WorkKeys[®] should be of concern to educators and policy makers. This study confirms the belief that there is a critical gap between

the skills necessary for workforce readiness of high school students and what skills are actually being obtained by the students.

Limitations of the Study

This study employed the use of a causal-comparative design. Since manipulation of the independent variable did not occur and since variations are considered natural between variables, it cannot be concluded with certainty what affect the independent variable had on the dependent variable (Schenker & Rumrill, 2004). Because of this, there were several delimitations to consider regarding this study. Participants in this study were high school students enrolled in CTE programs at either a comprehensive high school or career academy. Variables found in research as possible underlying factors between both groups of students were included as variables in this study as an effort to explore work readiness differences among students; however, it is possible that differences found could have been caused by some other reason.

Every attempt was made to restrict underlying variables and address self-selection bias, including the fact that both groups of students were well represented. The researcher is more likely to obtain responses that represent all subgroups within the group being studied if both groups are well represented (Parker & Gallivan, 2004). Other attempts were made to establish equivalence between both groups of students through baseline comparisons; however, other factors not addressed could still affect conclusions (Fraenkel & Wallen, 2000). Because of this, conclusions made regarding causality of the independent variable to the dependent variables cannot be generalized to other CTE programs or populations other than those participants included in this study.

The instrument used in this study to measure work readiness, WorkKeys[®], is the most recognized measurement for high school students, despite gaining momentum only within the

past few years. Hendrick (2006) confirmed that WorkKeys[®] is a relatively new instrument that has had little independent research using it, especially in secondary education. This was also confirmed through the review of the literature, which revealed no research related to high school programming. Prior studies have focused on differences based on race, gender, and educational levels, as well as analyzing standardized test scores based on race and gender; however, all research focused on the performance of adults (Hall, Davis, Bolen, & Chia, 1999; Sackett, Schmitt, Ellingson, & Kabin, 2001). No other instruments to measure work readiness for high school students are known at this time; however, different results could be obtained in the future if a different instrument is used.

Implications for Practice and Research

Linneham (1995) noted that only a small number of studies have examined the effect school-to-work initiatives, such as career academies, have on postsecondary outcomes; however, other research conducted on career academies indicates that academy students perform slightly better in areas such as attendance, credits earned, average grades, and the likelihood of staying in school (Kemple & Snipes, 2000; Stern, 2003). Career academies have also been shown to provide an increased awareness of positive work-based learning opportunities and application of workplace scenarios. However, the findings of this study did not show that students in career academies performed higher on components of a work readiness assessment than did students in CTE programs at a comprehensive high school.

Career academies have been a focus of both the Georgia Department of Workforce Development and the Georgia Department of Education in their efforts to improve the postsecondary transition of Georgia high school students. The results of this study show that the efforts made by educators in both the career academies and the comprehensive high schools are

the same. With the Georgia Work Ready initiative growing in communities throughout the state, efforts should be made by local systems to use the results of such comparisons to improve career and technical education instruction for both career academies and career and technical education programs at comprehensive high schools. Being the first of its kind, this research also has extensive implications for state educational efforts in Georgia, particularly surrounding the strategic goal of improving workforce readiness skills of students. It is vital that as career academies are developed to assist in meeting strategic planning goals of the Georgia Department of Education, perhaps additional focus should be placed on the effective use of community relationships.

Recommendations for Further Research

Based upon the research results, limitations, and implications, the following recommendations for additional study are presented:

1. A replication of this study should be conducted and include data obtained from career academy community partners to understand better their level of engagement and involvement impacting work readiness preparation of students.
2. A replication of this study should be conducted and include all career academies and comprehensive high schools in Georgia who administer the WorkKeys[®] assessment; thus, allowing the results to be more generalizable.
3. A longitudinal study should be conducted to analyze student outcomes based on CTE enrollment to better qualify successful postsecondary transitions.
4. A study should be conducted which explores self-selection into a career academy and how this may impact work readiness outcomes.

5. A work readiness study using the WorkKeys[®] assessment should be conducted and include those districts in Georgia that have an application process for career academies. Those who are accepted into the career academy and those who are not accepted into the career academy would establish comparison groups and assist in reducing self-selection bias.

Summary

The results of this study indicate that the type of CTE program enrollment does not necessarily affect the work readiness of students. Based on the findings from this study, the added increase of community relationships and required work-based learning experiences found in career academies do not seem to be influencing the level of basic workplace skills obtained by high school students. Being the first of its kind in Georgia, this study was important in that identification of work readiness comparisons among CTE students can be beneficial to educators targeting different approaches to implementation. With growing budget constraints and trying to do more with less, Georgia must understand the level of work readiness students possess upon graduation in order to shape effectively the future of CTE programming.

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APPENDIXES

APPENDIX A

Institutional Review Board Approval Letter



Office of The Vice President for Research
DHHS Assurance ID No. : FWA00003901

Institutional Review Board
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(706) 542-3199
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www.ovpr.uga.edu/hso

APPROVAL FORM

Date Proposal Received: 2010-03-04

Project Number: 2010-10696-0

Name	Title	Dept/Phone	Address	Email
Dr. Clifton L. Smith	PI	WELSF 205 Rivers Crossing +4809 542-4208		csmith@uga.edu
Ms. Valery L. Hall	CO	WELSF 770-886-5546	7230 Lang Drive Cumming, GA 30040	vlhall@uga.edu

Title of Study: Work Readiness of Career and Technical Education High School Students

45 CFR 46 Category: Administrative 4

Change(s) Required for Approval:

Parameters:

Revised Application;

Approved for Institutions with Authorization Letters on File;

Approved : 2010-03-31 **Begin date :** 2010-03-31 **Expiration date :** 2015-03-30

NOTE: Any research conducted before the approval date or after the end data collection date shown above is not covered by IRB approval, and cannot be retroactively approved.

Number Assigned by Sponsored Programs:

Funding Agency:

Your human subjects study has been approved.

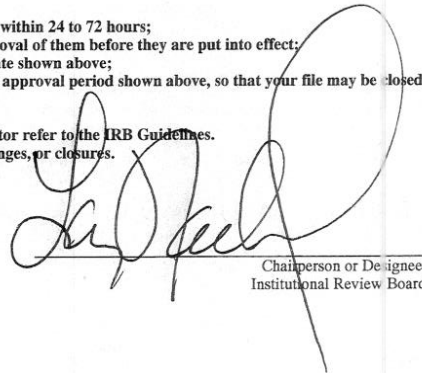
Please be aware that it is your responsibility to inform the IRB:

- ... of any adverse events or unanticipated risks to the subjects or others within 24 to 72 hours;
- ... of any significant changes or additions to your study and obtain approval of them before they are put into effect;
- ... that you need to extend the approval period beyond the expiration date shown above;
- ... that you have completed your data collection as approved, within the approval period shown above, so that your file may be closed.

For additional information regarding your responsibilities as an investigator refer to the IRB Guidelines.

Use the attached Researcher Request Form for requesting renewals, changes, or closures.

Keep this original approval form for your records.



Chairperson or Designee,
Institutional Review Board

APPENDIX B

Permission Letters from Participating School Districts

January 27, 2010

To Whom It May Concern:

agrees to act as a cooperating school district for the study conducted by Valery Lang Hall through the University of Georgia. This study is being guided by Dr. Clifton L. Smith, Major Professor and Graduate Coordinator for the Department of Workforce Education. The study will examine the outcomes of work readiness of career and technical education students.

The sample of this study will be developed through the use of archival data and will be chosen based on availability, interests, and budget constraints. Anticipated data collection date is March 2010. Data to be collected will include information already compiled while participants were enrolled at ; and High School. Specific data to be collected to reflect outcomes include WorkKeys© scores in the areas of Reading for Information, Locating Information, and Applied Math and Georgia Work Ready certificate levels earned. Additionally, descriptive data will be collected that includes gender, ethnicity, and HSGT English scores. Data will be collected from databases managed by the

Data for the study will be collected only after IRB approval from the University of Georgia is granted. Confidentiality for the study will be maintained, and no identifying factors of participation are needed for completion of this study. Additionally, only access to data listed above will be collected and analyzed.

Building Learning Communities

January 27, 2010

To Whom It May Concern:

_____ agrees to act as a cooperating school for the study conducted by Valery Lang Hall through the University of Georgia. This study is being guided by Dr. Clifton L. Smith, Major Professor and Graduate Coordinator for the Department of Workforce Education. The study will examine the outcomes of work readiness of career and technical education students.

The sample of this study will be developed through the use of archival data and will be chosen based on availability, interests, and budget constraints. Anticipated data collection date is March 2010. Data to be collected will include information already compiled while participants were enrolled at _____. Specific data to be collected to reflect outcomes include WorkKeys® scores in the areas of Reading for Information, Locating Information, and Applied Math and Georgia Work Ready certificate levels earned. Additionally, descriptive data will be collected that includes gender, ethnicity, and HSGT English scores. Data will be collected from databases managed by the _____.

Data for the study will be collected only after IRB approval from the University of Georgia is granted. Confidentiality for the study will be maintained, and no identifying factors of participation are needed for completion of this study. Additionally, only access to data listed above will be collected and analyzed.

Sincerely,

January 27, 2010

To Whom It May Concern:

agrees to act as a cooperating school for the study conducted by Valery Lang Hall through the University of Georgia. This study is being guided by Dr. Clifton L. Smith, Major Professor and Graduate Coordinator for the Department of Workforce Education. The study will examine the outcomes of work readiness of career and technical education students.

The sample of this study will be developed through the use of archival data and will be chosen based on availability, interests, and budget constraints. Anticipated data collection date is March 2010. Data to be collected will include information already compiled while participants were enrolled at I 01. Specific data to be collected to reflect outcomes include WorkKeys© scores in the areas of Reading for Information, Locating Information, and Applied Math and Georgia Work Ready certificate levels earned. Additionally, descriptive data will be collected that includes gender, ethnicity, and HSGT English scores. Data will be collected from databases managed by the

Data for the study will be collected only after IRB approval from the University of Georgia is granted. Confidentiality for the study will be maintained, and no identifying factors of participation are needed for completion of this study. Additionally, only access to data listed above will be collected and analyzed.

Sincerely,

February 4, 2010

To Whom It May Concern:

The [redacted] agrees to act as a cooperating school district for the study conducted by Valery Lang Hall through the University of Georgia. It is understood that the study will be guided by Dr. Smith in the Department of Workforce Education, and is regarding outcomes of work readiness of career/technical education students.

The [redacted] will allow the use of archival data as available in their database; after IRB approval from the University. It is understood that confidentiality will be maintained and no identifying factors of participation are needed.

Sincerely,

February 11, 2010

To Whom It May Concern:

The _____ agrees to participate with the _____ while _____ acts as a cooperating school district for the study conducted by Valery Lang Hall through the University of Georgia. It is understood that the study will be guided by Dr. Smith in the Department of Workforce Education, and is regarding outcomes of work readiness of career/technical education students.

We understand that the _____ will allow the use of archival data as available in their database; after IRB approval from the University. It is understood that confidentiality will be maintained and no identifying factors of participation are needed.

Sincerely,

