

**An Examination of Gender and Occupational Training on Grade Point Averages of  
Postsecondary Career Technical Education Graduates in Alabama**

by

Teresa Watson McCall

A dissertation submitted to the Graduate Faculty of  
Auburn University  
in partial fulfillment of the  
requirements for the Degree of  
Doctor of Philosophy

Auburn, Alabama  
December 13, 2014

Keywords: career technical education, workforce development  
gender equity, training, grade point average

Copyright 2014 by Teresa Watson McCall

Approved by

Maria Witte, Chair, Professor of Educational Foundations, Leadership, and Technology  
James Witte, Professor of Educational Foundations, Leadership, and Technology  
David DiRamio, Associate Professor of Educational Foundations, Leadership, and Technology  
Leslie Cordie, Assistant Professor of Educational Foundations, Leadership, and Technology

## Abstract

Career technical education programs are viewed as an essential resource to addressing the economic and workforce development needs in the State of Alabama. The primary impetus for this study is to determine whether students attending postsecondary career technical education programs in Alabama were adequately trained to secure employment in specialized occupational areas. A review of the literature revealed that a significant number of community and technical colleges are comprised of predominantly female students (Hirshy & Castellano, 2011; Surette, 2001); however, there are shortages of female workers in non-traditional, male-dominated occupations, as well as shortages of males in female-dominated professions (Joshi, Beck, & Nsiah, 2009; Padavic & Reskin, 2002). Societal norms and values have placed unwarranted stereotypes on career selection based on gender characteristics. Therefore, this study will attempt to understand the influence of gender of career technical education graduates and their ability to successfully matriculate through career technical education programs in Alabama.

This study reviewed preexisting data from the Alabama Department of Postsecondary Education, Career Technical Education Division, to determine if there was a relationship between gender, occupational training program (high-demand programs and traditional programs), and grade point averages of selected program graduates. The results of this study indicate that female graduates earned higher grade point averages when compared to male graduates, regardless of their enrollment in traditional or nontraditional training programs. According to the data, there were no differences in grade point averages based on completion of

high-demand or traditional occupational training programs. Finally, it was revealed that the gender of the student influences the grade point average; however, the occupational training program does not have an influence on the grade point average earned in school.

## Acknowledgments

I would first like to thank God for allowing me to embark upon this journey toward earning a doctorate degree. If it had not been for his grace and mercy, I would not have been afforded the opportunity to complete this experience. To my beloved parents, Mr. Sullivan Watson, Jr. and the late Mrs. Beulah Mae Watson, thank you for instilling Christian values and discipline into my life. I could not have asked for better parents, because you showered me with your unconditional love and provided a firm foundation so that I could flourish. Daddy, I am so grateful to be your daughter, and I want you to know that I appreciate all that you have done for me. Mama, I miss you dearly and I wish that you were here with us, but I am trusting on God's promise that I will see you again someday.

To my wonderful husband Martin McCall, Jr., thank you for being my rock, my shoulder to cry on, and my biggest supporter. You have been there for every significant milestone in my life and I am eternally grateful for your undying love and encouragement. "I'm everything I am, because you loved me." To my loving children, Herve` and Tamia, I want you to know that every sacrifice that I have made, has been especially for you. I thank God for blessing us with such amazing children. I pray that you will understand why I have worked so hard for so many years. I love you. To my dearest siblings, Vinnie, Freddie, Olivia, and Eric, thank you for being there for me whenever and however I needed you. I am equally proud of all of you for pursuing your personal and professional goals. I am truly blessed to be your little sister and although I will be called "Dr. McCall", I will always be your "Baby Bird". A special thanks to all of my friends

and family for understanding how much this means to me and supporting me unconditionally.

To Regina Adams, Marilyn Watkins, and Dr. Susan Denham thank you so much for all that you have done for me, I could not have done it without your love and support.

To my mentors, Dr. Steven Chesbro and Dr. John Garland, thank you for empowering me to challenge and exceed my expectations. I have learned so much from you personally and professionally, and I sincerely hope that I can exemplify your commitment to excellence. Thank you for not only believing in me, but for investing in my professional growth and development. To my committee chair, Dr. Maria Witte, I am forever indebted to you for your motivation and support throughout this process. To my committee members, Dr. James Witte, Dr. David DiRamio, and Dr. Leslie Cordie, I am truly grateful for the time and dedication that you have extended on my behalf. I appreciate you for making my experience at Auburn University memorable. I would also like to express my gratitude to Dr. Leane Skinner for your tremendous efforts as the University Reader. Finally, I would like to thank the staff at the Alabama Department of Postsecondary Education, Career Technical Education Division, and individual institutions for granting full access to essential data files to complete this dissertation.

## Table of Contents

Abstract .....	ii
Acknowledgments .....	iv
List of Tables .....	ix
List of Figures .....	xi
List of Abbreviations .....	xii
Chapter 1: Introduction .....	1
Statement of the Problem .....	3
Purpose of the Study .....	4
Research Questions .....	5
Hypotheses .....	6
Limitations .....	6
Delimitations .....	6
Assumptions.....	7
Definitions .....	7
Organization of the Study .....	10
Chapter 2: Literature Review.....	12
Historical Perspective .....	13
Carl D. Perkins Act .....	29
Career Technical Education Programs of Study .....	34

Career Technical Education’s Role in Workforce Development .....	39
Gender Equity in Career Technical Education .....	43
The State of Career Technical Education in Alabama .....	52
Summary .....	61
Chapter 3: Methods .....	62
Purpose of the Study .....	62
Research Questions .....	63
Research Design .....	64
Population and Sample .....	66
Instrumentation .....	67
Data Collection .....	67
Data Analysis .....	68
Summary .....	69
Chapter 4: Findings .....	70
Research Questions .....	71
Sample .....	72
Data Analysis .....	83
Summary.....	90
Chapter 5: Summary, Conclusions, Implications, and Recommendations.....	91
Research Questions .....	93
Conclusions .....	93
Implications .....	95
Recommendations.....	99

Summary .....	100
References .....	101
Appendices.....	117
Appendix A.....	118
Appendix B.....	119



## List of Tables

Table 1 Alabama Workforce Councils .....	55
Table 2 State Appropriations and 12-Month Unduplicated Enrollment – 2011– 2012.....	58
Table 3 Published In-State Tuition & Fees – 2012.....	59
Table 4 Alabama Labor Force Information – December 2012.....	60
Table 5 High-Demand Occupational Training Codes .....	65
Table 6 Traditional Occupational Training Codes.....	66
Table 7 ACCS Enrollment in Selected Programs – 2010 – 2011 .....	66
Table 8 O*Net Basic Skills Definitions.....	77
Table 9 O*Net Complex Problem Solving Skills Definitions .....	78
Table 10 O*Net Resource Management Skills Definitions .....	78
Table 11 O*Net Social Skills Definitions .....	79
Table 12 O*Net System Skills Definitions .....	79
Table 13 O*Net Technical Skills Definitions.....	80
Table 14 Electrician O*Net Skills .....	81
Table 15 Occupational Therapy Assistant O*Net Skills .....	81
Table 16 Industrial Maintenance O*Net Skills.....	82
Table 17 Medical Assistant O*Net Skills.....	82
Table 18 Descriptive Statistics for Gender and Grade Point Averages .....	83
Table 19 Descriptive Statistics for Training Programs and Grade Point Averages.....	85

Table 20 Univariate Analysis of Variance of Gender and Occupational Training Program .....	86
Table 21 Homogeneity of Variance for Gender and Occupational Training Program.....	86
Table 22 ACHE Public Two-Year and Four Year Undergraduate Enrollment – Fall 2011 .....	88
Table 23 Comparison of National and State of Alabama Employment Statistics .....	89

## List of Figures

Figure 1 Program of Study Design Framework .....	35
Figure 2 Alabama Community College System Seal .....	54
Figure 3 ACCS Graduates by Occupational Training Program – 2012.....	74
Figure 4 ACCS Program Graduates by Gender Characteristics .....	75
Figure 5 Mean Grade Point Averages for Occupational Training Programs.....	84
Figure 6 Comparison of GPA on Gender and Occupational Training Program.....	87

## List of Abbreviations

ABE	Adult Basic Education
ACCS	Alabama Community College System
CTE	Career Technical Education
ESL	English as a Second Language
GPA	Grade Point Average
VEA	Vocational Education Amendments

## Chapter 1

### Introduction

Career technical education (CTE) programs are viewed as an essential resource to addressing the economic and workforce development needs in the State of Alabama. With rapid industry changes and technological advances, Alabama depends on CTE programs to produce workers with critical skills to meet the needs of the growing workforce. The demand for colleges to train workers to be immediately productive has never been more critical than in today's technology and information based economy (American College Testing, 2012).

A considerable number of career-oriented training programs are located in high schools, technical schools, and two-year community colleges; however, for the purpose of this study, career technical education will refer to educational and occupational training in postsecondary education institutions. In Alabama, postsecondary CTE programs are governed by the State Board of Education and are housed in the Alabama Community College System (ACCS). This comprehensive system consists of community and technical colleges as well as a two-year military institute. Programs offered through this system afford adult learners the opportunity to obtain work-related training, industry-respected credentials, and associate degrees at 85 instructional sites located within the 26-member educational system (ACCS, 2011).

Due to large shares of projected job openings requiring a college education of less than a bachelor's degree, CTE programs can make a significant contribution towards reestablishing a competitive workforce. For that reason, promotion, expansion, and alignment of career training

is of paramount importance, primarily because these programs provide essential skills needed for quality jobs that can significantly impact the economy. The idea that there is a positive relationship between educational attainment, economic growth, and the distribution of income is well documented (Griliches & Mason, 1972; Hansen, 1970; Shulock & Offenstein 2012; Shultz & Hanushek 2012).

Clearly, education and job training are pivotal components of economic and community sustainability, as specialized occupations lead to higher incomes that increase revenue for local jurisdictions. Although CTE graduates typically obtain employment in their area of practice; to fill critical skill shortfalls, students need adequate training and preparation for highly specialized, high-demand professions. In Alabama, students disproportionately select programs that do not lead to high-demand, high-wage occupations. As a result, the state-wide skills gap continues to widen, because graduates are not prepared to take advantage of developing career opportunities.

Over the past four decades, there have been considerable shifts in the demographics of the national and local labor force. The number of women in the workforce is significantly higher today when compared to the 1970s, when a large share of women worked in domestic settings. According to the U.S. Department of Labor (2013), in 2011, women represented 47% of all employed persons 16 years of age or older. While national statistics are remarkably persuasive, local figures are similarly robust in nature. In a recent report from Alabama's two-year system it was revealed that 60% of the student population is comprised of female students (ACCS, 2011). These convincing figures emphasize the trend that more women are participating in the workforce and they are actively seeking career-related training and credentials.

From a historical standpoint, institutions of higher learning, especially those involving career-related training were traditionally dominated by males. It is because of this precedent that longstanding societal norms and stereotypical labels associate certain professions with specific physical characteristics. One of the challenges that CTE programs face is eradicating and demystifying the categorization of occupations by gender. Traditionally, male students that participated in work-related training were directed to train for careers that were considered masculine, such as welding, construction, and mechanical training.

Likewise, female students were encouraged to enroll in courses that would assist them with domesticated careers in sewing, food preparation, and secretarial training. Because of these biases, the Carl D. Perkins Act of 1998 required CTE programs to consider fields in which one gender comprised less than 25% of the individuals employed and implement nontraditional training efforts to reduce the partiality (Public Law 105-332). Undoubtedly this development compelled institutions to be cognizant of evolving student characteristics.

### Statement of the Problem

In the State of Alabama, the educational and training requirements for high-demand, high-growth, and high-earning occupations increase each year (Center for Business and Economic Research, 2011). Due to the complexity of these occupations, industries need workers with critical skills to meet the needs of the growing workforce. According to the most recent State of the Workforce Report VII: Alabama (2013), the state will face a worker shortfall of 307,272 through 2025. In addition, several high-demand occupations require certifications or an earned associate's degree in specialized fields. These findings suggest that there is a need for an

examination of career technical education programs and the preparation of workers for future jobs in Alabama.

Furthermore, a review of the literature revealed that a significant number of community and technical colleges are comprised of predominantly female students (Hirshy & Castellano, 2011; Surette, 2001); however, there are shortages of female workers in non-traditional, male-dominated occupations, as well as shortages of males in female-dominated professions (Joshi, Beck, & Nsiah, 2009; Padavic & Reskin, 2002). Societal norms and values have placed unwarranted stereotypes on career selection based on gender characteristics. Therefore, this study will attempt to understand the influence of gender of CTE graduates and their ability to successfully matriculate through career technical education programs in Alabama.

The current state of the workforce in Alabama has prompted career technical education leaders to evaluate all programs of study for effectiveness. The lack of alignment of programs with industry needs has led to an increase in worker shortages. Additionally, gender characteristics influence enrollment in particular occupational training programs. This study will offer insight into the occupational training types and gender characteristics of Alabama career technical education graduates.

#### Purpose of the Study

The primary impetus for this study was to determine whether students attending postsecondary career technical education programs in Alabama were adequately trained to secure employment in specialized occupational areas. Previous studies have not analyzed important variables such as gender, occupational training (high-demand occupations and traditional



occupations), and student success for community and technical college graduates (Allen & Cedja, 2007; Mullin, 2011; Van Noy & Zeidenberg, 2009).

In the face of rising levels of unemployment, labor markets forecast significant worker shortages in the near future (Kozumplik, Nyborg, Garica, et al., 2011). In order to sustain itself, the local economy depends on the imminent arrival of credentialed workers to satisfy shortfalls. While an adequate number of career technical education programs exist in Alabama, the State has consistently struggled to align education and training with labor market demands. Therefore, the intent of this study was to obtain a better understanding about the implemented training programs and the gender characteristics of students that successfully complete CTE programs in Alabama.

### Research Questions

The following research questions were used in this study:

1. What is the relationship between gender and grade point average of career technical education program graduates in Alabama?
2. What is the relationship between occupational training program and grade point average of career technical education program graduates in Alabama?
3. What is the relationship between gender, occupational training program, and grade point average of career technical education program graduates in Alabama?

## Hypotheses

The following research questions were used in this study:

1. There is a statistically significant difference in grade point averages for male and female career technical education program graduates in Alabama.
2. There is a statistically significant difference in grade point averages for high-demand occupational training programs and traditional training program graduates in Alabama.
3. There is a statistically significant difference in grade point averages and occupational training programs for male and female career technical education program graduates in Alabama.

## Limitations

This study was conducted based on the following assumptions:

1. Data were only collected for community and technical program graduates in the State of Alabama; therefore, may not be applicable to program graduates in other states.
2. The study was limited to the examination of traditional training programs and high-demand occupations as identified by the Alabama Department of Labor and the Department of Education. This limitation excluded adult basic education (ABE), English as a Second Language (ESL), remedial, and non-credit based courses and training programs without industry-recognized credentials.

## Delimitation

1. Data were collected for a cohort of students that enrolled in specific programs offered at ACCS institutions in 2010 – 2011 and graduated from those programs in academic year 2012 – 2013.

## Assumptions

This study was conducted based on the following assumptions:

1. The data were entered into the ACCS system accurately and are independent of errors.
2. Each sample analyzed was randomly sampled from the population it represents.
3. Similar gender characteristics within the student body can be found across ACCS campuses.
4. Graduates of high-demand training programs and traditional training programs are equally qualified.
5. The scores are obtained from a population of scores that are normally distributed.

## Definitions

The purpose of this section is to identify terms that frequently appear within this research document. The following language is commonly used in the field of career technical education and will be referred to frequently throughout this discussion.

*Administration* when used with respect to an eligible agency or eligible recipient, means activities necessary for the proper and efficient performance of the eligible agency or eligible recipient's duties under this Act, including supervision, but does not include curriculum development activities, personnel development, or research activities (Public Law 105-332).

*Awards* are short certificates, long certificates, diplomas or associates degree (Public Law 105-332).

*Career Guidance and Academic Counseling* means providing access to information regarding career awareness and planning with respect to an individual's occupational and

academic future that shall involve guidance and counseling with respect to career options, financial aid, and postsecondary options (Public Law 105-332).

*Career and technical education* means organized educational activities that offer a sequence of courses that provide individuals with coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in current or emerging professions. It will also include competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of an industry, including entrepreneurship, of an individual (Public Law 109-270).

*Concentrator* is a postsecondary/adult student who: (1) completes at least 12 academic or CTE credits within a single program area sequence that is comprised of 12 or more academic and technical credits and terminates in the award of an industry-recognized credential, a certificate, or a degree; or (2) completes a short-term CTE program sequence of less than 12 credit units that terminates in an industry-recognized credential, a certificate, or a degree (Public Law 109-270).

*Credential* is the formal document given by a recognized credentialing entity indicating that a student/person has met the standards of that credentialing entity (Public Law 109-270).

*Degree* means the title conferred on CTE students/concentrators by a college, university, or professional school on completion of a program of study (Public Law 109-270).

*Nontraditional training and employment* means occupations or fields of work, including careers in computer science, technology, and other emerging high skill occupations, for which

individuals from one gender comprise less than 25% of the individuals employed in each such occupation or field of work (Public Law 109-270).

*Participants* are students who have earned one (1) or more credits in any career and technical education program area (Public Law 109-270).

*Postsecondary educational institution* (A) an institution of higher education that provides not less than a 2-year program of instruction that is acceptable for credit toward a bachelor's degree; (B) a tribally controlled college or university; or (C) a nonprofit educational institution offering certificate or apprenticeship programs at the postsecondary level (Public Law 105-332).

*Special Populations* (A) individuals with disabilities; (B) individuals from economically disadvantaged families, including foster children; (C) individuals preparing for nontraditional training and employment; (D) single parents, including single pregnant women; (E) displaced homemakers; and (F) individuals with other barriers to educational achievement, including individuals with limited English proficiency (Public Law 105-332).

*Tech-Prep Program* is a program of study that (A) combines at least 2 years of secondary education (as determined under State law) and 2 years of postsecondary education in a nonduplicative sequential course of study; (B) strengthens the applied academic component of vocational and technical education through the integration of academic, and vocational and technical, instruction; (C) provides technical preparation in an area such as engineering technology, applied science, a mechanical, industrial, or practical art or trade, agriculture, a health occupation, business, or applied economics; (D) builds student competence in mathematics, science, and communications (including through applied academics) in a coherent

sequence of courses; and (E) leads to an associate degree or a certificate in a specific career field, and to high skill, high wage employment, or further education (Public Law 105-332).

*Unduplicated headcount* means the number derived when counting students in a particular population once by a determined code such as a social security number or student identifier (Public Law 105-332).

*Vocational and Technical Education* means organized educational activities that (A) offer a sequence of courses that provides individuals with the academic and technical knowledge and skills the individuals need to prepare for further education and for careers (other than careers requiring a baccalaureate, master's, or doctoral degree) in current or emerging employment sectors; and (B) include competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, of an individual (Public Law 105-332).

*Workforce education* is defined as that form of pedagogy that is provided at the pre-baccalaureate level by educational institutions, by private business and industry, or by government-sponsored, community-based organizations where the objective is to increase individual opportunity in the labor market or to solve human performance problems in the workplace (Gray & Herr, 1998).

### Organization of the Study

Chapter 1 introduces the study, presenting the problem, theoretical framework, purpose, research questions, assumptions, limitations and definitions of terms. Chapter 2 provides a review of related literature concerning career technical education, including a historical

description of the subject, an overview of relevant legislative actions, programs of study, career technical education's role in the workforce, gender equity issues, and the state of career technical education in Alabama. Chapter 3 reports the methods utilized in this study, including the population and sample, instrumentation, data collection and the data analysis. The findings of the study are presented in Chapter 4. Chapter 5 includes a summary of the study, conclusions, implications and recommendations for further practice and research.

## Chapter 2

### Review of Literature

The primary impetus for this study was to determine whether students attending postsecondary career technical education programs in Alabama were adequately trained to secure employment in specialized occupational areas. Previous studies have not analyzed important variables such as gender, occupational training (high-demand occupations and traditional occupations), and student success for community and technical college graduates (Allen & Cedja, 2007; Mullin, 2011; Van Noy & Zeidenberg, 2009).

In the face of rising levels of unemployment, labor markets forecast significant worker shortages in the near future (Kozumplik, Nyborg, Garica, et al., 2011). In order to sustain itself, the local economy depends on the imminent arrival of credentialed workers to satisfy shortfalls. While an adequate number of career technical education programs exist in Alabama, the State has consistently struggled to align education and training with labor market demands. Therefore, the intent of this study was to obtain a better understanding about the implemented training programs and the gender characteristics of students that successfully complete CTE programs in Alabama.

In this chapter, a comprehensive review of the literature regarding career technical education in the United States is presented. An in-depth description of historical occurrences and legislative actions, including the succession of the renowned Carl D. Perkins Act will be provided. The chapter will also review career technical education programs of study and its



influence on educational institutions and the labor market. Moreover, career technical education's role in workforce development will be examined and gender equity issues in career technical education will be explored. Finally, this chapter will conclude with an overview of the current state of career technical education in Alabama.

### Research Questions

The following research questions were used in this study:

1. What is the relationship between gender and grade point average of career technical education program graduates in Alabama?
2. What is the relationship between occupational training program and grade point average of career technical education program graduates in Alabama?
3. What is the relationship between gender, occupational training program, and grade point average of career technical education program graduates in Alabama?

### Historical Perspective

Career technical education, formerly known as vocational education, emerged in response to the demand for an industrialized workforce at the onset of the twentieth century. Prior to that time, vocational education initiatives were limited to state and local undertakings; however, through the passage of the Smith-Hughes Act of 1917, the federal government became an essential provider of funding when \$1.7 million was appropriated by Congress for vocational education in the United States. Hayward and Benson (1993) indicated that the federal government played a catalytic role in supporting educational efforts with the passage of this Act. Through this historic ruling, the government assumed an active role in occupational training and education. The administration influenced the structure and provision for vocational education by

financially supporting public secondary schools and establishing the Federal Board for Vocational Education, which was primarily responsible for administering the provisions of the Act (Association for Career & Technical Education, 2002).

As the first major federal legislation for vocational education, the Smith-Hughes Act signified a scheme of collaboration between the federal government and individual states. One of the key provisions of the statute was the development of a cooperative arrangement for the fields of agriculture, home economics, and trade and industry, which were all crucial building blocks in the nation's structure. Barlow (1976) formulated that the cooperative was particularly necessary as it was founded on four fundamental ideas. First, vocational education was essential to the welfare of the nation and the federal government was responsible for stimulating states to assume this service; second, the federal funding was a requisite to execute this essential service to the states and the general public; third, due to its interest and affiliation with vocational education, the government was required to purchase a degree of participation in this work; and fourth, the creation of such a relationship between federal and local government would certainly rectify the standards of educational efficiency.

At second best, vocational efforts were customarily overlooked for funding and other methods of support when compared to undertakings at the secondary education level. So naturally at first glance, the passage of the Smith-Hughes Act appeared to be a lifeline for the newly defined field of vocational education in the United States. Nevertheless, one of the paramount components of the Smith-Hughes Act was the distinction it made in aid for academic education and vocational education. Under this legislation, each state was required to operate in silos; leading to the establishment of separate funding, in addition to the development of independent teacher preparation and certification regulations, and the organization of individual

state boards for vocational education (Cohen & Besharov, 2002). While division was not the primary focal point of the Smith-Hughes Act; the stark variation in support set the tone for an ongoing disjointing of classical and vocational education endeavors.

An equally important segment of the Act was designed to address accountability and management of funding at the state level. Under this purview, states were obligated to submit a mandatory comprehensive plan to warrant federal vocational education funding. This uniquely designed plan was prescriptive in nature and offered little flexibility to the states, mainly because of the exertion of federal control. According to Roberts (1957), the Act mandated that states agreed to the following stipulations as set forth by the Federal Board:

(1) federally aided programs of vocational education would be under public supervision and control, (2) the controlling purposes would be to fit students for useful employment, (3) vocational education would be of less than college grade and designed to meet the needs of persons over 14 years of age who entered or who were preparing to enter the occupation for which they were receiving training, and (4) the state or local community would provide the necessary plant and equipment. (p. 132)

In addition to the shifts in funding and structure, the Act also modified the way in which vocational instruction was provided to students that enrolled in those programs. During the early 1920s, the universal 50-25-25 rule was implemented by the Federal Vocational Education Board. This regulation designated that 50% of students' time to be spent in shop work, 25% of time to be allotted to closely related subjects, and 25% of time to be dedicated to academic coursework (Hayward & Benson, 1993).

The unique emphasis that the government placed on dividing students' time posed an issue for vocational programs. Educators and students were on rigid schedules and were often preoccupied with time limits, rather than competence in coursework. Furthermore, the demarcation of vocational and general programs imparted contemptuous feelings between

educators and professional associations, which initiated an ongoing troubled relationship between vocational and academic leaders as well as the federal government (Hayward & Benson, 1993).

Despite the immediate backlash, the government remained unmoved in its expectations. Programs were still required to abide by the prescriptive regulation to qualify for financial support in vocational efforts. Wonacott (2003) succinctly described the functions of the 50-25-25 rule as two-fold. First, the original intention of the rule was to separate programs so that traditional education students could prepare for higher education and vocational track students could prepare for employment. Notwithstanding the intent, many viewed the inflexibility of the 50-25-25 provision as a handicap, rather than an advantage, mainly due to social estrangement.

Critics of the separation (Cohen & Besharov, 2002; Grubb & Lazerson, 2005; Hayward & Benson, 1993) argued that in actuality, the division was based on educators' subjective view rather than on an objective assessment of students' academic abilities. Yet others (Barlow, 1976; Kaestle & Smith, 1982) supported the notion that vocational training was designed to promote the capacity to earn a living, while liberal education was fashioned to enhance the social life of upperclassmen.

The second function of the 50-25-25 rule was to preclude vocational programs from receiving federal funds to support state leadership and local programs of vocational education. Clearly, students were not the only ostracized group; the rule included an additional constriction that prevented salaried teachers from spending more than 50% of their time with vocational students, regardless of the nature of the encounter. This limitation further alienated vocational participants from normal interactions with others. Moreover, vocational educators were also

typecast by their elitist academic counterparts, who viewed vocational undertakings as second-rate efforts that did not warrant comparable financial support or treatment (Wonacott, 2003).

Alternatively, Palmer (1987) warned that the separation of general and vocational education was conspired by a series of underlying, competing agendas. He described the first agenda as strictly political; this idea aligned with state legislators who viewed occupational training as a means to rear productive citizens. However, in actuality, the perception was that work-related training was designed for students beneath academic realization or those who were unlikely to obtain a baccalaureate degree.

In addition, Palmer (1987) established that the second agenda for the separation of general and vocational education was purely economic; holding the belief that the labor force was improved because more individuals contributed to the financial system. The third agenda, which Palmer (1987) considered hidden, was thought to channel low-income and minority students away from academic studies, in hopes of precluding them from the upward mobility associated with academic training. As a result, the primary intention was to segregate the rich from underprivileged citizens (Palmer, 1987).

Unlike other facets of the American education system, CTE has consistently fought to remain relevant to the public as well as the federal government. Over the years, institutions experienced peaks and valleys in support and participation (Cohen & Brawer, 2008). In review of the literature, several theories emerged that attempted to explain these inconsistencies. Initially, supporters suggested that despite the variability in support, labor statistics would continually build confidence and surety in CTE participation (Hirshy, Bremer & Castellano, 2011; Mullins, 2011). However, others cautioned that despite market trends, negative

perceptions about CTE would continue to persist (Brand, 2003; Brown, 2003; Raizen, 1989). Further research (Park & Rojewski, 2006; Raizen, 1989; Sawyers, 1976) suggested that in some instances, key stakeholders, including school administrators, counselors, advisors and teachers also hold CTE in low regard.

A leading misconception of CTE programs is the notion that technical training serves as a backup plan or an avenue for students with intellectual challenges or undiagnosed learning disabilities (Cohen & Besharov, 2002). Moreover, Brand (2003) warned that the stigma associated with technical education lacking academic rigor further diminishes the credibility of such programs. Dispelling negative perceptions about CTE programs has been a continuous effort. Yet similarly, technical trainers and educators have also faced scrutiny regarding the significance of CTE programs.

The California Industrial and Technology Education Association and Foundation (2007) expressed that career technical educators have been continuously disenfranchised by their educated counterparts because of their lack of formal higher education. Furthermore, Cohen and Brawer (2008) contended that “vocational educators are criticized when their graduates do not obtain jobs or are not able to function effectively in the jobs they get” (p. 269). This type of criticism often creates friction within institutions, especially those that offer both CTE and general associate degree programs. Despite the varied beliefs about the separation of vocational and academic studies, the division ultimately altered public perception about education in the United States. As a result, the implementation of various aspects of the Smith-Hughes Act unintentionally contributed to the estrangement of academic and vocational educators as well as students. Consequently, the spiraling trend remained uninterrupted for several years.

The U.S. Department of Education (2012) acknowledged that the strength and resilience of the American economy relies on the fortitude of its education system. So naturally, the division between academic and vocational education programs produced an antagonistic relationship between the groups that permeated the public education system; however, the dissent was materialized within various levels of the technical programs as well. The impact of the separation splintered vocational programs throughout subsequent decades and led to the development of separate teacher training programs, separate teacher organizations, and separate student organizations. As a result, the governmental preference and precepts were significant in setting the stage for the future of vocational education for proceeding years.

With an earlier focus on training students for the workforce, federal legislation was shifted in the mid-1920s to concentrate on the preparedness of the nation's defense. The refocus resulted in the inundation of federal funding to strengthen knowledge in the areas of mathematics, science, and foreign languages. Prior to that time, vocational education was not of immense national importance; however, by 1926, federal funding set aside by the Smith-Hughes Act had significantly increased to \$7.2 million. It was clear that Congress was making a concerted effort to provide support to vocational efforts and the Federal Board was also looking to be more responsiveness to state vocational programs.

In a joint effort to promote the field of vocational education, the National Society for Vocational Education, and the Vocational Education Association of the Middle West, two separate, yet, similar entities amalgamated with the Federal Board to form the American Vocational Association (AVA) in 1926. The rationale of this merger was to enable vocational educators to crystallize their thinking to create a stronger voice for vocational education. Although AVA was established nearly 10 years subsequent to the passage of the Smith-Hughes

Act, just six months following its inception, 27 state vocational associations became affiliated with the organization (ACTE, 2002).

The primary objectives of AVA were to: (1) assume and maintain active national leadership in the promotion of vocational education, (2) render service to state and local communities in stabilizing and promoting vocational education, and (3) unite all vocational education interests through membership representation of the entire country (ACTE, 2002). Emerging from fairly small beginnings, the organization quickly expanded to 900,000 members that represented the fields of agricultural education, trade and industry, home economics, and commercial education.

Immediately following the creation of the AVA, the national focus was repositioned on heightened unemployment rates and widespread poverty that was experienced by many Americans (Hayward & Benson, 1993). On the eve of the Great Depression, the nation witnessed the emergence of perforated joblessness that gave way to a weakened economy. Moreover, the arrival of large groups of artisan immigrants eagerly seeking employment for themselves and an education for their children equally contributed to predicament. Advocates of vocational education were forced to work extremely hard to keep federal funding in the midst of the Great Depression (Hayward & Benson, 1993).

In response to the economic collapse, the government placed great emphasis on revitalizing employment and training opportunities through vocational programs beyond the secondary education level. Cognizant of the need to extend career preparation efforts to the adult population, the organization of the junior college was formed. Although the junior college was classified as a transformational institution, initially the schools were merely extensions of local



sponsoring high schools. Later referred to as community college, the term junior college was originally defined as an institution that offered two years of instruction of strictly collegiate grade (Cohen & Brawer, 2008). Propelled by economic, political and social forces, Pfahl, McClenney, O'Banion et al. (2010) suggested that community colleges have been designed from the ground up to serve American priorities and communities reap significant benefits as a result of their meeting emergent adult learner needs.

By the mid-1930s, the definition of junior college was revised by the newly formed American Association of Junior Colleges (AAJC). The new meaning reflected a modern description of the varied civic, social, religious, and vocational needs of the entire community in which the institution resided (Bogue, 1950). During the adjustment period, it was decided that the inclusion of skill training alone would not suffice to consider an institution a junior college. In addition to the training aspect of the school, institutions were required to implement general education instruction appropriate for high school graduates to meet the requirements for establishment. By the late 1930s, junior colleges expanded to include university branch campuses offering lower-division work that prepared individuals for the rigors of higher education. Irrespective of the historical development and progression of the junior college, the level of federal support for vocational education institutions remained significantly minimal. However, beyond the academic realm, tremendous strides were made in promoting vocational education. Congress passed the National Apprenticeship Act in 1937 to establish a national advisory committee to create standards for apprenticeship programs. The law also enabled unions and employers to receive technical assistance for non-academic vocational training.

While there were substantial developments in the 1930s, the next decade welcomed rather difficult challenges for vocational programs. As a result of the federal constraints on

teacher certification, institutions were desperately in need of trained educators to fill faculty vacancies. Due to the newness of particular training programs, institutions struggled to recruit individuals with appropriate credentials to fill shortages. Unfortunately, this limitation placed junior colleges at a disadvantage and in effect prolonged the advancement of vocational efforts at postsecondary institutions.

The 1940s also had its share of challenges and in spite of the numerous issues between the government and vocational education leaders, these groups continued their tumultuous relationship in hopes of supporting vocational training programs. However, the ultimate struggle for sustainability surfaced at the beginning of the most widespread war in history, World War II. As expected, priority for federal funding was shifted to support war efforts for the six year duration of this momentous conflict; yet, immediately following the war, there were significant expansions of federal support for education.

In 1941, the United States Office of Education's Wartime Commission was established to develop sound policies and procedures for mobilization of all educational institutions during the wartime. Vocational programs were at the forefront of those efforts as training in automotive and airplane engine mechanics, tool design and manufacturing, radio, telephone, and telegraph operation were vital to soldiers and other essential military personnel (ACTE, 2002).

As more men were deployed in wartime, the nation became dependent on women to support the armed forces through agricultural and war production jobs to sustain the struggling economy. Murdoch et al. (2006) observed that women have historically been integrated into war efforts, particularly during wartimes when there were shortages of qualified men. No longer associated with domesticated professions, women assumed positions in shipyards, plants and

factories. According to ACTE (2002), training and employment opportunities were flourishing for women as they dominated men in the workplace. For the first time, women were more visible in vocational settings and men were fearful of being replaced in the labor force.

During peacetime, postsecondary education enrollment increased as soldiers took advantage of the newly approved Serviceman's Readjustment Act, commonly referred to as the G.I. Bill of Rights, which authorized education assistance for war veterans. One of the most significant characteristic of the G.I. Bill was its accessibility to all returning servicemen, regardless of prior academic attainment. This opportunity enabled individuals with no prior interest in education to pursue career-related training and higher education.

The G.I. Bill was passed a critical time for community colleges, primarily because the institutions struggled to sustain during a time when the nation was in turmoil. Bound and Turner (1999) acknowledged an increase in community college enrollment by more than 50% from pre-war time in 1939 from 1.3 million students to over 2 million by 1946. As a result, Burrell (1967) noted that the legislation may have been considered the most important educational and social transformation in American history. Undoubtedly, the disbursement of federal funds for education and training ultimately influenced the proficiency and preparedness of the national workforce during that era.

The federal government continued to impact the status of vocational education through the passage of the George Barden Act of 1946, which provided partial federal reimbursements to states for faculty and administrator salaries. At the time, Congressional interest nation's health prompted the first amendment to the bill, Title II - Vocational Education in Practical Nursing. This modification produced a surge of health related careers during the 1950s (Hayward &

Benson, 1993); however, by 1957, the Act was amended again by way of an emergency Congressional response to Russia's successful launch of Sputnik, the world's first artificial satellite.

This historic event ushered in new political, technological, and academic developments for Americans. Immediately following the launch, the public reacted in pandemonium and it was rumored that the current education system was not preparing the youth for emerging industries and the demands of the future (Hayward & Benson, 1993). Therefore, Title VIII of the National Defense Education Act (NDEA), which amended the George Barden Act, authorized federal funding to improve educational efforts in mathematics, science, technology, and engineering fields in hopes of fortifying the nation (Hayward & Benson, 1993).

Throughout the 1960s, enrollment in vocational education programs increased rapidly. Cohen and Brawer (2008) attributed the increased enrollment to the influx of older students interested in changing careers or enrolling in programs of interest on a part-time basis. In addition, high attendance of women, low-ability, and the entrance of minority students also contributed to rising community college enrollment. Immediately following record-high enrollment, industrial advances led to the dislocation of workers in several industries. Subsequently, the cyclical pattern of an inadequate workforce in America continued to spiral. To compensate for the lack of trained workers in new industries, Congress enacted the Manpower Development and Training Act of 1961, which essentially focused on retraining workers that were displaced due to automation and mechanization of previously physical, labor-intensive employment.

Within one year, an extension of the Smith-Hughes Act was also passed, which was also referred to as the Vocational Education Act (VEA) of 1963. The most significant feature of this legislation was the introduction of set-asides, federal funding that was designated for program-specific purposes. With the passage of VEA, each state had the authority to select the manner in which funds would be appropriated. For example, the first set-aside indicated that states could expend 25% of the funds towards training for high school graduates and for those that left high school early or towards the construction of an area vocational school facility, or both.

The second set-aside was created to meet the special vocational educational needs of the youth, especially those from disadvantaged backgrounds or who had academic, socioeconomic, or other handicaps that prevented them from progressing in regular vocational education programs (Hayward & Benson, 1993). The VEA was essentially credited with transforming vocational education from its traditional focus on job preparation to a shared purpose of meeting the economic and social demands of Americans (Rojewski, 2002).

Another noteworthy characteristic of the VEA was the authorization of federal funding to employ youth on a part-time basis. The Act was instrumental in preparing students for work life that may have been traditionally unable to persist in didactic studies. Wonacott (2003) revealed that although schools were freely opened to all children, the majority of the students were unable to take advantage of schooling beyond a certain grade. It is also important to note that children from agrarian backgrounds or working-class homes were unlikely to persist beyond the sixth grade. For that reason, the enactment of the VEA was of great source of income for those particular groups as well as other disadvantaged groups.

An additional advantage of that particular era was the endorsement of the Civil Rights Act of 1964, which forbade discrimination on the basis of racial, ethnic, national, and religious minorities (Office for Civil Rights, 2000). This historic legislation marked the conclusion of segregation that was once tolerated in schools, within the workplace, and in the general public. In addition to the aforementioned improvements, the Act ushered in new career opportunities for traditionally demoralized individuals. During this time, African Americans and other minorities challenged mainstream ideals that precluded these groups from participating in certain vocational training opportunities. The Civil Rights Act essentially complemented existing legislative developments for working class Americans and opened the door for minorities to advance in society (Huff, 1974).

Another memorable Constitutional feat was the passage of the Equal Employment Opportunity Act, which was implemented to prohibit discrimination for testing, training, or employment based processes in regards to race, gender, age, or disability. This law was influential in eradicating prejudice and biased employment policies in the workplace, making higher-level occupations more accessible to disadvantaged groups and minorities. A further development for underprivileged groups during that time was the approval of the Economic Opportunity Act, which authorized local Community Action Agencies to help destitute families overcome poverty through federal assistance. The Act effectively formed a range of programs including the Neighborhood Youth Corps and the Job Corps, which were both created to train young adults with practical, work-related skills. These programs were credited with successfully placing participants into pipeline apprenticeship programs and enrolling others at junior colleges.

The 1960s were advantageous for the vocational education community; however, by the next decade, state and community leaders felt that the benefits of federal funds came with

stringent, rigid Congressional controls (Kaestle, 2001; Wonacott, 2003). While state vocational leaders considered the governmental control to be imposing, the government had concerns about the efficacy of vocational education for targeted populations. Case in point, in a national report compiled by the General Accounting Office (GAO) in 1974, it was determined that there was lack of job placement and career counseling for women, disadvantaged, and handicapped students in vocational programs. As a corrective measure, the government required states to provide 50% of the state level administrative expenses for vocational education programs. The decision was rather disturbing to state leaders, because at that time, there were no other available sources of revenue to fund administrative efforts (Hayward & Benson, 1993).

In pursuit of further clarification of the efforts of vocational education, Congress summoned the National Institute of Education to compile a national assessment of vocational education in 1976. Later identified as NAVE, the evaluation was intended to determine the extent to which vocational programs fulfilled obligations specified in federal legislation. Based on its findings, the government deemed the status of vocational programs as deplorable, citing that funding was not remitted appropriately. The efforts to elevate disadvantaged students actually further isolated students to programs that led to inaccessible or inexistent occupations. Moreover, it was exposed that most state programs had issues with the distribution of federal funds. The government addressed these concerns through the authorization of the Educational Amendments of 1976, which explicitly created set-aside distribution formulas for states.

Although the states were responsible for the misappropriation of federal funds, some found the amendments to be too constricting for state vocational programs (Kaestle, 2001; Rojewski, 2002; Wonacott, 2003). Moreover, some accused GAO and NAVE to be highly critical of the distribution of federal resources (Hayward & Benson, 1993). Based on the

amendments, vocational programs were to reserve and match 10% of the main federal grant for handicapped or disabled students, then reserve 20% for bilingual students and disadvantaged individuals, and finally the remaining 15% of funding was set-aside for postsecondary education programs. Cohen and Besharov (2002) argued that the inflexible directives of the government through the expansion of set-asides set forth in the Educational Amendments of 1976 were inconvenient for vocational programs.

In the face of the specificity in federal regulation of funds, state programs were obliged to abide by a considerable number of stipulations to receive assistance. Congress required vocational programs to assess current and future needs for job skills using projected employment data from the state for suitability. Programs were also responsible for providing descriptions of courses and other training opportunities that were executed to achieve those intended work skills. In addition, vocational programs were required to present projected enrollment figures and compose a five year plan that outlined the strategies to reach intended goals. In addition to these requirements, programs were also mandated to report access to resources that were allocated for vocational training efforts at the local, state, and federal level.

Although the government meticulously directed states to operate under legislative policies, issues surrounding the enormity of those policies continued to surface over the years. Hayward and Benson (1993) suggested that the NAVE assessments criticized the government of “trying to do too much with too little” (p.14) given the modest size of federal grants and the widespread objectives. Based on the findings it was evident that the administration needed to refocus its attention to two central themes: (1) respond to the economic demand to produce a trained workforce and (2) consider the social concerns for making vocational programs accessible to all students regardless of disability or disadvantage (Rojewski, 2002).



In 1984, the Congressional House subcommittee on vocational education sought to create a piece of legislation that would embody the two themes of expanding and improving vocational programs. Essentially, the purpose was to promote the national economic growth rate through highly skilled occupations obtained in state vocational programs; equally important, it was necessary to make certain that disabled and underserved populations were afforded access to quality vocational programs (Hayward & Benson, 1993; Park & Rojewski, 2006; Woancott, 2003). Congress believed that the execution of both tasks would ultimately advance the status of the global economy. Therefore, the subcommittee acted to create a bill that would incorporate these principles to expand and improve vocational education in the United States.

#### Carl D. Perkins Act

Heralded as the gateway for opportunity for an unprecedented group of students, the Carl D. Perkins Vocational Education Act of 1984 was named in honor of the late chair of the House subcommittee on vocational education. From a historical perspective, the Perkins Act was recognized for its strong emphasis on serving special needs groups. While it was apparent that students enrolled to train for the labor force, the government deemed it necessary to consider other subject matter that would be advantageous to the workplace and to society. The subcommittee incorporated supplemental education by mandating that vocational programs work to improve academic skills for students in addition to the job training component of vocational programs (Rojewski, 2002). The Perkins Act is essentially credited with streamlining career-related education to reflect the following definition:

The term career and technical education means organized educational activities that offer a sequence of courses that provide individuals with coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in current or emerging professions. It

will also include competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of an industry, including entrepreneurship, of an individual. (Public Law 109-270)

In addition to its focus on academics, the Perkins Act was also known for its unique structure in the authorization of federal funding. Hayward and Benson (1993) reported that the set-aside formula declared that 93% of the Perkins funds would be contained in a basic grant to the states; 57% of that basic grant consisted of set-asides, and 22% of the 57% would be arranged for disadvantaged groups; while the remaining 43% of the basic grant was for program improvement. Although the federal disbursement seemed promising, the authorization of expenditures under the Perkins Act represented less than one percent of total expenditures in public schools and colleges in the U.S. in 1985.

In spite of the nominal support, vocational leaders were in complete opposition of the constriction of the set-asides under the Perkins Act and they worked diligently to diminish governmental control. In response to the resistance, Congress reauthorized the Act in 1990, and abridged the name to simply, the Perkins II. This reauthorization eliminated specific set-asides for special populations; however, the amendment maintained strong language that required states to ensure disadvantaged groups had equal access to vocational programs (Cohen & Besharov, 2002). Although this provision was well received by the public, Dougherty and Kienzl (2006) claimed that it was not enough to obtain open access to education for students. Recognition of student preparation gaps for postsecondary education consequently prompted significant investments in achievement.

Another notable component of the 1990 legislation was the introduction of the 2+2 tech-prep program, which was designed to provide students with two years of challenging secondary

vocational training coupled with two non-duplicative years of postsecondary vocational training (Rojewski, 2002). High quality tech programs have proven advantageous in preparing students for the workforce. According to ACTE (2007), programs are offered at approximately 7,400 high schools and nearly all community and technical schools offer similar programs. The passage of this bill demonstrated the government's interest in career technical students acquiring additional knowledge and skills along with work-related training.

Unlike previous legislation, the passage of the Perkins Act marked a significant increase in vocational enrollment during the late 1980s and 1990s. Cohen and Brawer (2008) established that the increase in the number of older students, those with disabilities, women, disadvantaged groups, and part-time students contributed to the rise in enrollment in community and technical schools. Administrators were pleased with the rapid growth; however on the other hand, the heighten expectations of improved academics, revealed substantial deficiencies in academic skills for the targeted groups. Pulley (2008) noted that developmental courses intended to provide remedial education were often time consuming, underfunded, and experienced low success rates. State schools responded by increasing the academic courses needed to complete high school in effort to reduce the number of academically incapable applicants that applied for vocational programs. Even with the extreme, yet cautious efforts, the surge of enrollment in vocational education programs subsided by the late 1990s.

In 1994, in its final NAVE report, the Department of Education underscored the growing issues in vocational education, citing that most schools failed to meet federal requirements for a coherent sequence of academic and vocational programs. Educators often complained that a large portion of instruction time was spent on remedial lessons for unprepared students. In addition, it was also revealed that many programs continued to focus on training for specific

occupations rather than considering widespread industry opportunities. Moreover, the report also indicated that programs needed to improve preparation for postsecondary education in order to sustain and to function more resourcefully.

Following the release of the report, Congress shifted its focus to those students that completed high school, but had no interest in attending college. In an effort to close the gap of opportunity, Congress passed the School-to-Work Opportunity Act of 1994 (STWOA), which provided funding to create a comprehensive and coherent system to help the youth transition from school to career-oriented work (Cohen & Besharov, 2002). STWOA was instrumental in providing training opportunities for academic and vocational preparation, establishing work-based learning activities, and matching students based on career interests and abilities.

By 1998, Congress voted to reauthorize the Perkins Act again, identifying the law as the Perkins III. This piece of legislation preserved the nature of the Perkins II and signified the determination for improvement; however, this legislation placed emphasis on evaluating the effectiveness of vocational programs through the use of data. Under Perkins III, the government required each state to provide information on the following core performance indicators: (1) attainment of academic and vocational proficiencies; (2) attainment of a secondary education diploma or General Educational Development diploma (GED), postsecondary education degree or certificate; (3) placement in a postsecondary education program, employment placement, or military assignment; (4) participation in and completion of nontraditional training (Lynch, 2000; Wonacott, 2003). The new policy changes were assured to enhance standards, promote academics, and encourage program improvement for career technical programs.

Although a tremendous amount of attention has been placed on career education on the postsecondary education level, several secondary education programs are engaged in technical training as well. Wonacott (2003) noted that the Perkins Act served as an all-encompassing, multipurpose bill that considered the educational and occupational skills of all segments of the population. The legislation ensured that high school CTE programs were created to provide students with an opportunity to transition smoothly into the workforce or shift into postsecondary education institutions upon program completion (Maryland State Department of Education, 2009).

Despite the numerous benefits of vocational education, some (Hayward & Benson, 1993; Lynch, 2000) cautioned that vocation education was not a priority for typical education reform. Much of the national attention was refocused on the sponsorship of higher education and 4-year postsecondary education initiatives. The idea that the American dream was accessible by earning a college degree was revived and throughout the 1990s high school graduates were encouraged to further their education. In an effort to revamp the occupational training efforts, the American Vocational Association (AVA) elected to change its name to the Association for Career and Technical Education (ACTE) in hopes of reducing the stigma associated with the term vocational education. The decision to modify the way Americans viewed vocational programs was proven favorable in terms of enrollment in training programs.

By the late 1990s, CTE programs were gaining interest in states that were booming with industry developments. During his presidency, Bill Clinton was known for endorsing the American dream, which was obtainable through the pursuit of a higher education. Proponents of vocational education blamed the Clinton administration for the inequities in support of career training and vocational programs. In the face of this, President Clinton was recognized for his

support of CTE when he signed the Workforce Investment Act of 1998 (WIA), a ruling that was intended to effectively consolidate workforce and education programs (Giloith, 2000).

According to Beaulieu (1999), WIA attempted to pursue four specific goals. First, the initial intention was to invest in workforce efforts that serve to increase the employment, retention, and earnings of participants. Second, WIA sought to increase the occupational skill attainment of those who entered the workforce investment system. Third, the Act set out to improve the quality of the workforce to increase national productivity and viability. Fourth, WIA intended to reduce the dependence on welfare and other social programs so that individuals could contribute to the workforce.

As global competitiveness continued to mount at the turn of the 21<sup>st</sup> century, Congress took a more sobering look at the importance of technical training and education. The idea gained national attention, resulting in another reauthorization of the Perkins Act in 2006, also known as Perkins IV. The legislation was primarily passed to provide federal funding to states and establish CTE programs in both secondary and postsecondary institutions (U.S. Department of Education, 2011). This particular ruling had a significant impact when American businesses and industry were confronted with maintaining its preeminent role in the world economy.

### Career Technical Education Programs of Study

One of the stipulations of the Perkins IV required the implementation of common career technical programs of study (POS) to be adopted by states, educational institutions, and local academic agencies that received federal funding under the bill. This precondition was established at a time when CTE programs faced immense barriers to implementing effective secondary and postsecondary POS. While the mandate guaranteed consistency in structure within

programs, Stipanovic, Lewis and Stringfield (2012) argued that the specific changes under the Perkins Act would create unique challenges for secondary and postsecondary education systems including, the creation of standardized skill assessment criteria, changes to critical school personnel, and overcoming challenges with modifications to content.

In response to the mandate, national and state organizations and the U.S. Department of Education’s Office of Vocational and Adult Education (OVAE) collaborated to develop the POS Design Framework to be utilized by entities planning to offer CTE coursework. The POS Design Framework is presented in Figure 1. The Perkins Act required that institutions utilize the following core components when planning and implementing CTE Programs of Study:

- (1) incorporate and align secondary and postsecondary education elements, (2) include academic and CTE content in a coordinated, non-duplicative progression of courses, (3) offer opportunity for secondary students to acquire postsecondary credits, and (4) lead to an industry-recognized credential or certificate at the postsecondary level, or an associate or baccalaureate degree. (Perkins Collaborative Resource Network, 2006)

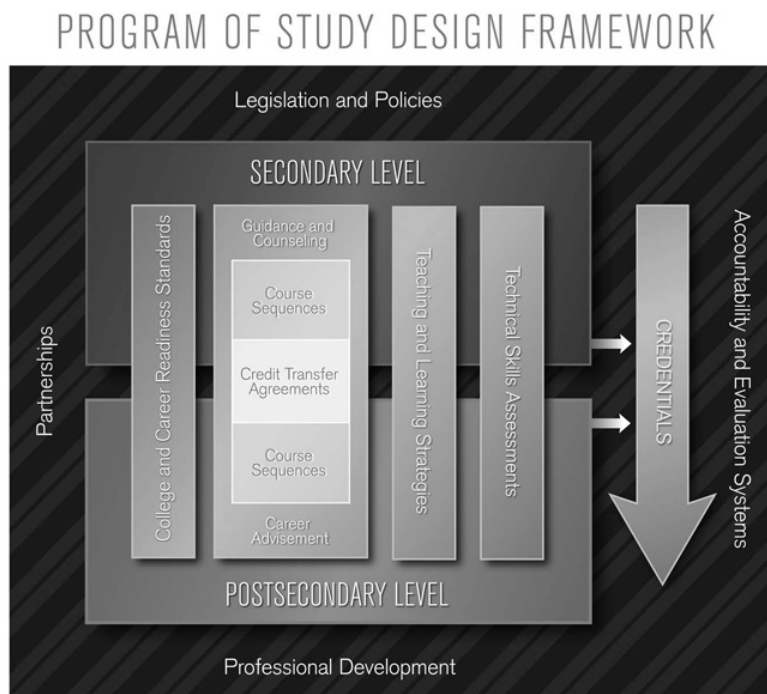


Figure 1. Program of Study Design Framework

Based on the established federal standards and the formulated guidelines created by CTE industry leaders, the POS Framework (2006) consisted of 10 integrated components that support the development and implementation of the following construct:

1. Legislation and Policies
2. Partnership
3. Professional Development
4. Accountability and Evaluation Systems
5. College and Career Readiness Standards
6. Course Sequences
7. Credit Transfer Agreements
8. Guidance Counseling and Academic Advisement
9. Teaching and Learning Strategies
10. Technical Skills Assessments

The changes implemented through the most recent amendment of the Perkins Act were instrumental in enabling CTE programs to take a more holistic approach in designing appropriate coursework to meet the needs of adult learners. Lynch (1996) cautioned that no agreed upon conceptual framework for career technical education and workforce development had been codified by vocational professionals. Yet according to Stipanovic, Lewis and Stringfield (2012) programs of study that combine academic rigor with practical experiences are a definite extension of the progressive ideals of John Dewey, whose philosophy of adult education promoted student engagement and aligned educational content with practical applications. Moreover, Elias and Merriam (1995) reinforced Dewey's position that giving learners practical knowledge and problem solving skills would promote their societal well-being.

Additionally, Gray and Herr (1998) pointed out that Dewey believed that vocational education was an important topic of study for all students, not just those who might end up in the workforce. Further research from Rojewski (2002) indicated that another significant part of Dewey's work was recognized as pragmatism, which over time has become the predominant



philosophy of career technical education. The overarching theme surrounding this philosophy is that change and the reaction to it is inevitable (Miller, 1996). Indeed, the construction of the POS system mirrors Dewey's views, which encourages all participants to take advantage of a comprehensive learning system to prepare them for the future.

While Perkins IV was effective in introducing important changes in POS, the primary focus was on improving the learning experience for students, and not necessarily on creating outcomes for graduates and meeting industry needs. In the midst of this discovery, it was apparent that the U.S. continued to lag behind South Korea, Canada, Japan, and others, ranking 16<sup>th</sup> in the world in terms of certificates and degrees awarded to adults ages 25 – 34 (U.S. Department of Education, 2012). In response, the Obama Administration proposed implementing a newly designed Blueprint for Transforming Career and Technical Education Plan, which proposed \$1 billion in competitive funds to increase the number of national career academies that exist over a three-year span. The investment would essentially reauthorize the Carl D. Perkins Career and Technical Education Act of 2006 and would usher in results-driven CTE programs that would be shaped by the following four core principles:

(1) Effective alignment between high-quality CTE programs and labor market needs to equip students with 21<sup>st</sup> century skills and prepare them for in-demand occupations in high-demand industry sectors; (2) Strong collaborations among secondary and postsecondary institutions, employers, and industry partners to improve the quality of CTE programs; (3) Meaningful accountability for improving academic outcomes and building technical and employability skills in CTE programs for all students, based upon common definitions and clear metrics for performance; and (4) Increased emphasis on innovation supported by systemic reform of state policies and practices to support CTE implementation of effective practices at the local level. (U.S. Department of Education, 2012)

The first principle of alignment would modify the way in which high-quality CTE programs are offered within each state. For example, under the Perkins IV, there are no

requirements for states to work with workforce and economic agencies to identify local industry needs. However, the proposed reform would incorporate a more active role for states, empowering local leaders to identify high-demand industries based on the locality.

The second principle would address the need to collaborate with all CTE stakeholders to ensure that CTE programs are maximizing all potential possibilities. Under the Perkins Act, each state must operate with separate funding for secondary and postsecondary institutions, which makes it difficult for programs to align resources and curriculum to maximize efficiency. The Blueprint proposed collaboration to implement consortia funding and establish private in-kind resources to share program resources. The U.S. Department of Education (2012) reported that it is important to note that career technical schools cannot repair the workforce alone. One of the primary ways that institutions help to prepare workers is through collaborative efforts. Mullins (2011) contended that partnerships with business and industry will enhance the ability of career and community colleges to respond to employers' demands to produce highly-trained workers. It is crucial that educational institutions elect not to work in self-regulating silos; instead, all stakeholders should join forces to resolve the impending educational and workforce issues at the national and local levels.

The third principle would focus on ensuring CTE programs operate with meaningful accountability practices. Perkins IV permitted funds to be distributed by states to local recipients by a specified formula and states defined accountability measures on separate terms. This process precluded recipients from receiving incentives or rewards for high performance; however, the Blueprint proposed within state competitions to distribute funds to consortia, which would provide states increased autonomy to select and fund high-quality programs that are responsive to regional needs (U.S. Department of Education, 2012).

The fourth principle was concerned with innovation in CTE programs. Previously, there were no clear identification of the state's role in revolutionizing CTE; on the other hand, the Obama Administration proposed that states should implement policies and new practices to support state reform. In essence, the Blueprint promotes a more active role for states and sovereignty to identify funding and industry needs, rather than relying on the stringent regulation imposed under the Perkins Act.

Another priority at the forefront of the Obama Administration is to offer stackable credits that provide skills for unlimited career opportunities rather than providing skills for a single occupation. While attending the Community College Career Fund campaign event in Northern Virginia Dale, Virginia President Barack Obama (February 2012) stated that, "An economy built to last demands that we keep doing everything we can to help students learn the skills that businesses are looking for" (p.1). This statement extended the notion that the nation's primary objective must be directed towards safeguarding its position in the dynamic global economy through workforce development and career technical initiatives.

#### Career Technical Education's Role in Workforce Development

The recent economic downturn emphatically altered the nation when businesses were forced to downsize or shut down completely. Hall (2006) found that in the typical recession, unemployment rises by several percentage points and remains relatively high for several years. Based on recent findings, the 2007 downward spiral was not any different. According to the Bureau of Labor Statistics (2012) at the onset of the most recent recession the national unemployment rate was 5.0%, however two years following the downturn, the rate spiked to 10.0%. Accordingly, the collapse of major corporations and small businesses caused an influx of

Americans to look to educational institutions to develop skills that would prepare them to thrive during uncertain times. Career training programs at the postsecondary level have been a resource to the local and national economy through retraining dislocated workers and providing opportunities for those seeking specialized credentials and workforce education.

Cognizant of the linkage between industry-recognized credentials and economic success, the Bill and Melinda Gates Foundation, the Lumina Foundation, and other national initiatives have emerged to increase the number of CTE program completions (Giloth, 2000). While some researchers (Katsinas, 1994; Waddell, 1991) implied that the pace of training should increase tremendously to meet impending economic and workforce needs, Van Noy and Jacobs (2012) warned that less attention should be on credential attainment and more on understanding how credentials align with employer needs. The authors maintained that the lack of alignment of CTE programs with industry needs is a recurring theme that has been largely ignored and misunderstood. Gray and Herr (1998) recognized that there are several fallacies regarding labor market needs and a fraction of these misconceptions are derived from the confusion and anxiety of the public. For example, the leading misunderstanding is that college graduates are the only individuals competent and qualified to compete for future jobs. Instead, the U.S. Bureau of Labor Statistics (2013) reported that in 2012, one-third of jobs were in occupations that typically needed some postsecondary education for entry, yet, a significant number of those jobs required less than a bachelor's degree.

The recession was undoubtedly an ambiguous time and as more perplexing concerns were unearthed, CTE programs were forced to view program planning through a different lens. Policymakers, industry leaders and educators alike were conscious of the need to address the challenges head on. In light of the skepticism about program alignment with employer demands,

there was little doubt that the first objective was to perform ongoing market analysis to eradicate uncertainties. The American College Testing, Inc. (2012) revealed that community and technical institutions play a vital role in predicting and stabilizing economic outcomes through analyses of labor market and conditions.

Another integral component of CTE that contributes greatly to the advancement of students and varied industries is noncredit bearing workforce education. Often held as a hidden asset, these programs have been serving the needs of program participants and local businesses for several decades (Van Noy, Jacobs, Korey, et al., 2008). Although noncredit education is considered important; programs have struggled to demonstrate their value when compared to for-credit programs. This is true primarily, because there are no program completions or standard measurements of direct economic benefit associated with these courses. The underlying issue is that existing data collection systems are not designed to capture the most basic information about noncredit activities, therefore these undertakings are not systematically evaluated (Business Roundtable, 2009).

In this age of accountability and organizational intelligence, noncredit programs continue to be unrecognized and undervalued by traditional measures. Voorhees and Hinds (2012) acknowledged that institutional research or assessment has become a “four-letter word” (p.80) on many higher education campuses, although many assessment activities are conducted unknowingly on a daily basis. Understandably, the cynicism surrounding assessment is shared at the community college level as critics increasingly criticize the institutions for the lack of such practices (Hall, 2006). Despite the obvious shortcomings, many community colleges continue to enroll more students in noncredit education programs than in credit-bearing programs. Van Noy, Jacobs, Korey, et al., (2008) revealed that noncredit workforce education has become

increasingly common and is pivotal in the promotion of workforce development. This is true primarily, because businesses depend on community colleges to offer exclusive training and workforce education. One of the chief advantages of offering noncredit courses is that organizations have the ability to collaborate with institutions to customize training modules to meet individual needs. In addition, by offering courses outside of the degree track, community colleges can respond rapidly to local employer demands, a trend that is often referred as just-in-time training (Business Roundtable, 2009).

Moreover, noncredit education serves as a revenue generator for community colleges, predominantly because institutions are at liberty to charge what the market will tolerate for noncredit coursework and to-date, only a limited number of states impose limits on the market value for noncredit coursework (Hall, 2006). While these programs are appropriately recompensing, Duke, Martinson and Strawn (2006) boasted that states without incumbent workers or customized training programs can take advantage of revenue sources that are unavailable to noncredit workforce programs, including, state institutional support, Pell grants and other federal aid programs. Still, Van Noy, Jacobs, Korey, et al., (2008) surmised that the lucrative return of noncredit programs surpasses that of for-credit coursework. As a result, institutions that offer noncredit workforce programs stand to gain substantial profits.

Noncredit workforce education also serves as a recruitment tool for community colleges, because most institutions link noncredit programs with credit-bearing programs, in an effort to attract students to obtain industry-recognized degrees and credentials in a comparable field of study. By bridging the two, institutions are enabling noncredit participants the opportunity to obtain tangible recognition for their efforts. Alternatively, disadvantaged groups have the opportunity to gain exposure in custom-made, noncredit training programs that they may not

have otherwise been privy to in the traditional community and technical college environment (Van Noy, Jacobs, Korey, et al., 2008).

Another equally interesting gain associated with noncredit education is the flexibility in the completion of coursework. In most cases, noncredit students can forego the traditional class structure in order to accommodate work schedules. Many employer-sponsored noncredit courses are extended beyond traditional classroom settings. Depending on the nature of the course, career technical educators provide some noncredit education in the workplace for hands-on application and training. Another advantage of participating in a noncredit education program is the omission of standard college admissions processes, including enrollment, financial aid, academic advisement, and other institutional services that are required for traditional students (Van Noy, Jacobs, Korey, et al., 2008).

### Gender Equity in Career Technical Education

In recent years, the previously masculine image of the American workforce became distorted as more women permeated the nation's workforce and educational systems (Wade & Brittan-Powell, 2001). Historically, women were minor contributors to the labor force on national and local levels until they were thrust into the workforce during the bleakest days of the Great Depression and the arduous years of World War II. Following the war, women maintained employment and were chronicled as fundamental components of the American labor force for subsequent decades. Yet, despite their illimitable efforts, women were still unduly discounted in value and compensation in the workplace when compared to men. Nearly 24 years after the war, President John F. Kennedy signed the Equal Pay Act of 1963, when women were earning an average of 59 cents on the dollar compared to men. Blau and Kahn (2000) recognized that the

gender pay gap has narrowed considerably as compensation for women and men have begun to converge. More recently, the 2014 second quarter report from the Current Population Survey, a nationwide sample survey of household earnings, revealed that women reported median weekly earnings of \$716, compared to men who reported median weekly earnings of \$857 (U.S. Department of Labor, 2014). The primary function of the Act was to prohibit discrimination and advocate for equality in salaries and fringe benefits for all members of the workforce, including women (U.S. Department of Labor, 2013). The legislation was the forerunner for equal employment rights and it unequivocally ushered in a series of other major federal and state laws that addressed equal compensation in the workplace for women (Blau & Kahn, 2000).

Later reforms, such as Title IX of the Education Amendments of 1972 have been credited with affording women unprecedented opportunities in education. When Congress passed this landmark legislation, the chief objective was to eliminate prejudices, but more specifically, to ensure that no person in the United States would be excluded, denied, or subjected to discrimination on the basis of sex. Although the bill initially gained popularity because of the vast developments it made in secondary public school athletics, Killman (2012) noted that the main goal was to provide access to education for girls and women as broadly as imaginable. In essence, Title IX pried open the doors of higher education for generations of women to come.

Koenig (2012) acknowledged that prior to the passage of this bill, there were many colleges and universities that refused to admit women. The amendment resulted in institutions required obligation to provide equal consideration to all students, regardless of gender characteristics. In a report from the White House's National Equal Pay Task Force (2013) it was noted that Title IX came of age with a wide range of educational and workforce opportunities as young and older women pursued higher education. While the amendments welcomed several



educational advances, Teddlie (1993) acknowledged that there was still a great distance to go in terms of equal pay and gender equality in higher education.

Perhaps one of the most remarkable legislative reforms in regard to equality in postsecondary institutions was the Vocational Education Amendments (VEA) of 1976. This was the first attempt to specifically address gender equity in vocational education programs. Before that time, career and guidance counselors were known to steer students down career paths that aligned with societal norms and beliefs. Lease (2003) specified that occupational choices have been differentiated by gender characteristics, causing individuals to seek careers that are dominated by their gender. Likewise, Pressley and McCormick (2007) concluded that gender affects much of what happens in life, including experiences in educational institutions. Conversely, other researchers (Domenico & Jones, 2007; Jackson, Wright, & Perrone-McGovern, 2010) acknowledged that career selection due to gender role socialization begins at an early age and childhood influences play a major role in eliminating particular career options. Some of the factors that impact career selection include the students' socioeconomic status, the parents' work experience and educational attainment, and expectations of other relatives and friends (Joshi, Beck, & Nsiah, 2009; Pressley & McCormick, 2007).

With the passage of VEA, provisions were made for students entering programs that were not traditionally pursued by their gender. According to Public Law 101-392, a portion of this notable legislation was originally designed to eliminate sex bias and discrimination in vocational education programs; encourage males and females to prepare for employment in nontraditional occupations; and provide support services necessary for individuals to participate in and succeed in nontraditional vocational education programs. VEA gained national attention when changes were implemented that required students participating in sex equity programs to be classified as

special populations. In addition, because of their unique classification, these individuals would be qualified to receive support and supplemental services. Under Section 222, which amended Public Law 101-392, the law stipulated that special funding could be used for:

Programs, services, comprehensive career guidance and counseling, and activities to eliminate sex bias and stereotyping in secondary and postsecondary vocational education; preparatory services and vocational education program services, and activities for girls and women, aged 14 through 25, designed to enable the participants to support themselves and their families; and support services for individuals participating in vocational education programs, services, and activities, including dependent-care services and transportation. (Public Law 101-392)

While these changes were advantageous for women, some researchers (Lovelace & Teddlie, 1993; Stevenson, 1977) considered the federal amendments overbearingly prescriptive in nature, because a great deal of the commitment was placed upon the states to carry out additional obligations to meet federal standards. For example, Section 222 required states to assess and evaluate expenditures for sex equity programs in a meticulous manner to ensure that the funds were managed appropriately. Additionally, Section 235 of Public Law 101-392 required states to gather, analyze, and disseminate data on overall effectiveness of vocational programs to eradicate sexual discrimination. Even with the specificity associated with the various amendments to the legislation, the incentives were contributory to the advancement of gender equity in participating vocational programs.

The National Advisory Council on Vocational Education (1980) articulated that VEA was enacted during the nation's period of greatest growth in women's employment; yet, in spite of the increase in the number of working women in the United States, there were still blatant inequities in terms of employment patterns and compensation when compared to men. According to the White House's National Equal Pay Task Force (2013) in 1983, nearly twenty years after equal pay for equal work legislation passed, women in managerial positions still earned 64% of

the pay compared to men. While attempts were made to level the playing field since that time, more recent figures demonstrate that progress is yet to be made. According to the U.S. Department of Labor (2011) in 2010, women represented 53.6% of the number of adults employed; however, they were reported as earning \$669 per week when compared to men who earned \$824 on average each week. These figures indicate that women are still paid at a disproportionate rate when compared to their male counterparts.

Toglia (2013) warned that inequity in pay directly impacts the socioeconomic status of women, which has significant economic and social implications. Further research from Daines, Hartenstein, and Birch (2000) also cautioned that the lack of equality for women influences the expansion of human resources, and as a result, these injustices limit the nation's ability to have a healthy economy. To fully grasp the extent to which women influence national economic and societal trends, it is necessary to consider the composition of the American labor force. In 2011, 63% of women in the civilian workforce reported that they have never married (Bureau of Labor Statistics, 2012). These findings demonstrate that a significant number of American households are headed by single women. Moreover, because women comprise such a large portion of the labor force, it is imperative to contemplate the enormity of equal pay and equal rights for women in the economy as well as in society.

Kerka (1999) argued that while tremendous efforts have been expended to ensure equal rights and comparable employment opportunities, a popular misconception that the equity battle has been won still exists. This idea is substantiated primarily because women continue to face barriers in accessing nontraditional occupations. Case in point, women who matriculate and persist in male-dominated programs often graduate and endure obstacles in the workplace, including experiencing disproportionate compensation (Teddlie, 1993; Toglia, 2013), gender

discrimination and isolation (Corbett & Hill, 2012; Padavic & Reskin, 2002), lower self-efficacy (Stickel & Bonett, 1989), and sexual harassment (Kerka, 1999; Padavic & Reskin, 2002).

Although these barriers to gender equality remain prevalent, the literature (Sinkele & Mupinga, 2011; Stevenson, 1977; Teddlie, 1993; Zeidenberg & Bailey, 2010) has shown that CTE programs serve as a gateway to preparing women to compete in today's workforce. In an effort to increase the number of female CTE participants, the Perkins Act of 1984 required states to assign a sex equity coordinator to help programs overcome gender bias and stereotyping; however, just six years later, the Act was reauthorized and only 3% of funding was allocated to gender equity programs and initiatives under Perkins II (Toglia, 2013). However, by 1998, Perkins III had eliminated the federal reserves that were previously provided to institutions and the term gender equity was replaced with nontraditional training, to create a more gender-neutral approach to equality in vocational education programs (Silverman, 1990). Although funding streams were drastically reduced, the Act did offer some support to vocational programs and participants. The legislation mandated states to spend \$60,000 on activities related to gender equity and set aside 10.5% of funding for sex equity programs for single parents, single pregnant women, and displaced homemakers (Toglia, 2013).

By 2006, Perkins IV continued to support gender equity issues by focusing on performance indicators for secondary and postsecondary student participation and completion of nontraditional programs (ACTE, 2007). In order to maintain federal funding, state programs were required to meet enrollment and completion targets in nontraditional training. The federal government made a concerted effort to support gender equality through successive legislative actions for vocational education. However, Teddlie (1993) hinted that there is still a long way to

go in terms of the nation's willingness to consider the importance of gender equity in education and the workplace.

Recently, the call for more access to nontraditional training has been echoed across various professions in hopes of diversifying CTE programs. Kerka (1999) claimed that although women have increased enrollment in postsecondary education overall, their numbers remain low in some programs. For example, there are shortages of women enrolling in programs in science, technology, engineering, and mathematics (STEM), which comprise a large portion of technical education and training courses. Considering this, Rosenthal, London, Levy, and Lobel (2011) formulated that gender disparities in STEM programs seem to be due in part to the marginalization and biases faced by women. Perhaps Sinkele and Mupinga (2011) said it best when the authors noted that, "engineering continues to be man's world" (p.37). This is primarily true because women continue to be underrepresented in STEM programs, despite the fact that these occupations are projected to be among high-demand, high-wage jobs in the future (Sinkele & Mupinga, 2011).

In light of the issues surrounding female participation in predominantly male-dominated programs, Toglia (2013) demonstrated that several strategies can be employed to improve access to nontraditional careers for women. First, mentoring programs that connect girls with experienced female role models to help guide them through the selection process has been advantageous to institutions in terms of increased enrollment of female students. Second, the authors believed that providing institutional and peer support to female students is a prerequisite to ensuring successful matriculation and completion in nontraditional training programs. Without proper guidance and support, students struggle to succeed in uncharted territory. Third,

institutions should host recruitment events so female students can observe and participate in nontraditional training activities to spur interest in those particular fields of study.

While the push for more women in male-dominated professions has been argued for decades; less attention has been placed on males seeking to enter traditionally female-dominated professions. Gender segregation remains prevalent in the American workforce as men slowly cross gender lines to pursue professions conventionally saturated by women. Hayes (1998) implied that women that choose to enter traditionally male-dominated occupations are viewed as making a positive career move that offers increased opportunity for pay, advancement, and status, however, the same perceptions do not hold true for men. According to Chusmir (1990) men entering nontraditional occupations gain less financially, obtain lower status in the workplace (Gransee, 2005; Lease, 2003; Padavic & Reskin, 2002), and they are left to cope with assumptions regarding their masculinity and sexuality (Brady & Sherrod, 2003).

In contrast, Lupton (2006) pointed out that men carry gender advantages with them into female-concentrated occupations. Further research from Williams (1995) implied that men progress more quickly on the glass escalator in female-dominated professions when compared to women that are often restrained by the glass ceiling in male-dominated professions. Moreover, Simpson (2005) supported the notion that men entering female-dominated professions fare better than women in terms of occupying high level administrative positions. Likewise, other researchers (Jackson, Wright, & Perrone-McGovern, 2010; Morgan, 1992) recognized that there is a growing trend of men overshadowing women in female-centered professions, indicating that as more men infiltrate traditionally female occupations, the labor markets become more gender-neutral and balanced.

In an attempt to understand the motives of men entering female-dominated professions, Williams and Villemez (1993) founded a theory that indicated that there are three distinctive subgroups among men in these occupations. The first group was identified as the seekers; these are the individuals that openly pursued careers in professions obtained by women. The second group was referred to as the finders; these individuals sought male-dominated careers; however, they ended up working in a female-dominated career by happenstance. The third group was characterized as the leavers, because these individuals were once in a female-dominated career and decided to leave that profession. Simpson (2005) later modified this theory and formulated that the three categories of men in nontraditional occupations are seekers, finders, and settlers. The latter group was identified as individuals who actively chose the feminine occupations as a result of dissatisfaction with more masculine career experiences.

The nursing profession is leading the way in terms of welcoming men into traditionally female dominated occupations. Like other professions, the field of nursing is faced with worker shortages due to increased health concerns associated with an aging society; yet still programs continue to struggle with a number of issues, including attracting men to nursing school (Gransee, 2005), retaining them in programs that were designed for women (Brady & Sherron, 2003), and eliminating the psychological discomfort associated with being the token in an all female classroom (Galbraith, 1987). Male nursing students are often criticized and classified as incapable of being a physician; therefore they are forced to pursue the lesser role as a nurse. In addition, men are subject to stereotyping (Brady & Sherron, 2003) that also leads to reduced self-efficacy (Stickel & Bonett, 1989), and limited achievement in academic programs (Cunanan & Maddy-Bernstein, 1993).

It is quite obvious that men and women share similar barriers to success in career training programs. Campbell and Chapman (1982) identified five recruitment strategies that can be employed to assist men in obtaining nontraditional training credentials or degrees. First, programs are encouraged to use role models to reduce major barriers and enable access. Second, by providing self-assessment activities, students are able to determine if nontraditional training is appropriate for their individual needs. Third, by providing access to current labor market information, students have the opportunity to explore career options and employment trends in areas of interest. Fourth, programs are encouraged to provide hands-on activities to enable men to get experience in nontraditional training. Fifth, programs are urged to publicly advertise individual and collective programs in hopes of recruiting interested students to nontraditional occupations.

Although several studies have addressed the warranted national attention on gender equity in vocational education and the invalidity associated gender characteristics and student success (Cunanan & Maddy-Bernstein, 1993; Surette, 2001; Zeidenberg & Bailey, 2010); Stevenson (1977) recognized that the most difficult aspect of the legislation “calls for a change in us and not simply in programs” (p. 9). Each progression toward gender equity in education and in the workforce demands ongoing evaluation of processes and practices to ensure inclusion and equality for all individuals, regardless of their respective gender.

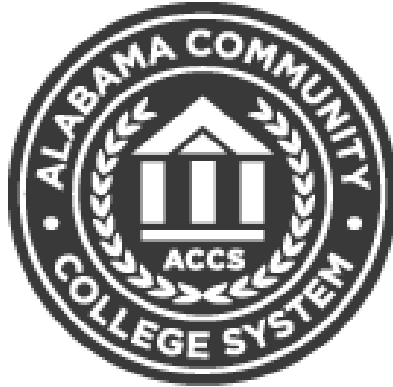
#### The State of Career Technical Education in Alabama

In 1982, nearly 57 years after Alabama’s first public two-year college opened, the Alabama legislature created the Department of Postsecondary Education (DPE) as a separate, yet parallel organization to the secondary system, the Alabama State Department of Education



(SDE). Both entities are directly responsible to the State Board of Education (SBE). SDE serves as the fiscal agent for Perkins IV funds and is assigned as the principal Electronic Data Collection point for educational undertakings in Alabama. All public postsecondary education institutions, including two-year and four-year colleges are required to provide accurate data in a timely manner for federal reporting using methods prescribed by DPE. Additionally, SBE is tasked with appointing the Chancellor who would be responsible for managing the operation of the state's community and technical colleges. On the recommendation of the DPE and the Chancellor, the SBE sets regulations for the Alabama Community College System (ACCS) and prescribes the courses of study to be offered and conditions for granting certificates, diplomas, and degrees.

The organization's mission is to provide a unified system of institutions dedicated to excellence in delivering academic education, adult education, and workforce development (ACCS, 2011). Its vision is to develop an educated, prosperous population by providing an affordable pathway to help citizens of any walk or stage of life succeed through quality education and training; a community college system where education works for all (ACCS, 2011). Founded on the values of integrity, excellence, accessibility, accountability, and diversity, the institution consists of twenty five public two-year community and technical colleges and the Marion Military Institute, the oldest private military junior college in the nation. ACCS has collaborated with the Alabama Technology Network (ATN), an organization designed to provide technical assistance and training to improve Alabama businesses and industries, and the Alabama Industrial Development Institute (AIDT), an entity involved in actively recruiting new businesses for the state and training the workforce (Alabama Department of Postsecondary Education, 2012). Figure 2 illustrates the Alabama Community College System Seal.



*Figure 2. Alabama Community College System Seal*

Recognizing the need to support Alabama’s workforce development initiatives, Governor Bob Riley signed Executive Order 37 in 2008 to create the state’s first workforce development office, referred to as the Governor’s Office of Workforce Development (GOWD). One of the primary functions of this entity is to foster collaboration within the varied agencies providing workforce training and development in Alabama. Through the passage of Executive Order 37, ACCS was inaugurated as the primary provider of workforce development services in the State of Alabama. Furthermore, the Order established 10 regional planning councils that would be responsible for recommending funding for workforce development projects within the respective regions throughout the state (ACCS, 2011). Table 1 contains a listing of the 10 regional workforce councils in Alabama.

The GOWD is responsible for developing activities that enable the state to provide a wide range of CTE courses and short-term training for job specific certification. Through its 10 regional councils, GOWD allocated over \$10 million to fund 97 projects to affect skill upgrades for incumbent workers during 2010 – 2011 fiscal year. In addition, 1,241 businesses were provided with developmental services by ACCS, AIDT, and ATN (ACCS, 2011). Although these statistics indicate that the state is investing in its workforce, according to the State of the

Workforce Report VII: Alabama (2013), workforce development efforts alone cannot sustain the economy. The report suggested that diversifying the state’s economy will strengthen it. In essence, economic developers will have to rely upon postsecondary education institutions to ensure a ready and available workforce for new and expanding businesses.

Table 1

*Alabama Workforce Councils*

---

Region	Counties
Region 1	Colbert, Franklin, Lauderdale, Lawrence, Marion, and Winston
Region 2	Cullman, DeKalb, Jackson, Madison, Limestone, Marshall, and Morgan
Region 3	Bibb, Fayette, Greene, Pickens, Hale, Lamar, and Tuscaloosa
Region 4	Blount, Chilton, Jefferson, Shelby, St. Clair, and Walker
Region 5	Calhoun, Cherokee, Clay, Cleburne, Coosa, Etowah, Randolph, Talladega, and Tallapoosa
Region 6	Dallas, Marengo, Perry, Sumter, and Wilcox
Region 7	Autauga, Butler, Crenshaw, Elmore, Lowndes, and Montgomery
Region 8	Bullock, Chambers, Lee, Macon, and Russell
Region 9	Baldwin, Choctaw, Clarke, Conecuh, Escambia, Mobile, Monroe, and Washington
Region 10	Barbour, Coffee, Covington, Dale Geneva, Henry, Houston, and Pike

---

As the state's premiere workforce training resource, ACCS plays a significant role in improving Alabama's outlook by preparing students for high-wage, high-skill, and high-demand jobs. Despite its commitment to improve the state's economic status, ACCS faces its share of challenges. Since fiscal year 2007 – 2008, ACCS has lost over \$124 million in state funding, which equates to a decrease of 25.3%; and although the system educated 44% of the state's undergraduates during 2010 – 2011, ACCS only received 25% of the state's higher education funding during that period (ACCS, 2011). ACCS reported similar figures during subsequent academic years.

A comparison of state appropriations and 12-month unduplicated enrollment in 2011-2012 for Alabama's two-year and four-year institutions from the National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS) is presented in Table 2. The data revealed that John C. Calhoun State Community College, a public two-year institution located in the north Alabama enrolled 17,612 in 2011-2012 and received \$20,617,533 in state appropriations during that year; however, the nearby four-year institution, the University of Alabama in Huntsville, enrolled less than half of the number of undergraduate students (6,983) when compared to John C. Calhoun State Community College, yet the institution received more than double the state appropriations, receiving \$43,240,587 during that year. Furthermore, Jefferson State Community College had similar enrollment figures (14,398) in 2011-2012 when compared to the University of Alabama at Birmingham (12,962); however, Jefferson State was appropriated \$19,393,724, while the University of Alabama at Birmingham received the highest state appropriations (\$268,640,355) that year. Although it is important to note that public four-year institutions offer graduate and professional programs, two-year institutions have to service more students with less funding from the State of Alabama.

It is obvious that former ACCS Chancellor, Frieda Hill understood firsthand what 2-year institutions endure when she stated, “The core mission of the Alabama Community College System is endangered by the lack of adequate funding to support access for students most in need of the education provided by the system” (ACCS, 2011). Researchers (Duncan & Ball, 2011; Katsinas, D’Amico, & Friedel, 2011) agreed that there are fewer resources from governmental sources; there are more students to serve; and there are more defined expectations for certificate and degree completion at public 2-year institutions.

From a local perspective, ACCS simultaneously experienced increased enrollments and reductions in state and local funding, which forced the system to increase tuition rates to meet the growing demand for workforce education and training. Case in point, in 2011, the State Board of Education authorized an adjustment in tuition expenses from \$92 to \$107 per credit hour; however, even with the increase, ACCS (2011) boasted that Alabama’s two year colleges tuition remains a bargain when compared to other public institutions. A comparison of 2012 – 2013 in-state tuition and fees for a sample of Alabama’s four-year colleges and two-year colleges from the National Center for Education Statistics, IPEDS is presented in Table 3.

According to the Center for Business and Economic Research (2011), the educational and training requirements for high-demand occupations clearly demonstrates the importance of CTE in preparing the future workforce. The State of the Workforce Report VII: Alabama (2013) indicated that improving education and training has its share of advantages. First, the report indicated that a highly educated and productive workforce is a critical economic development asset. From 2007 to 2011, there were 986,404 Alabama residents over the age of 25 with a minimum of a high school diploma or equivalent. Based on these findings, approximately 31% of Alabamians were ineligible for high-demand occupations that ultimately impact the local

economy. Unruh (2011) formulated that middle skill jobs, requiring more than a high school education, but less than a four-year degree currently make up nearly half of the jobs in the United States. Furthermore, other studies (Giloith, 2000; Kozumplik, Nyborg, Garica, et al. 2011) agreed that middle skill jobs will account for the largest portion of jobs in the next decade; therefore, it is imperative for institutions to align programs of study with industry needs.

Next, the report indicated that productivity rises with education. Grubb (1995) asserted that occupational degrees have components that enhance productivity and earnings, even in occupations unrelated to the field of study. Similarly, French and Fisher (2009) admitted that educated individuals are more likely to participate in the job market, work more hours, and earn higher wages, when compared to those lacking formal education and training. Likewise, other scholars (Hansen, 1970; Shulock & Offenstein, 2012; Shultz & Hanushek, 2012) argued that the benefits of education are cyclic in nature and the return on investment is beyond measure. Gray and Herr (1998) explained that workforce education is the essential glue that enables individuals to compete for economic prosperity, upward mobility, and personal satisfaction.

Table 2

*2011 – 2012 State Appropriations and 12-month Unduplicated Enrollment*

Institution	State Appropriation	12-month Unduplicated Enrollment
University of Alabama at Birmingham	268,640,355	12,962
Auburn University	224,952,740	21,429
The University of Alabama	145,951,239	28,718
University of South Alabama	105,639,000	13,366
Alabama State University	44,313,221	5,541
University of Alabama in Huntsville	43,240,587	6,983
Alabama A & M University	40,405,340	4,582
Jacksonville State University	36,689,864	9,671
John C Calhoun State Community College	20,617,533	17,612
Jefferson State Community College	19,393,724	14,398

Table 3

*Published In-State Tuition & Fees – 2012*

Institution	Annual Tuition & Fees
Auburn University	\$9,446
University of Montevallo	\$9,280
The University of Alabama	\$9,200
University of Alabama in Huntsville	\$8,794
Marion Military Institute	\$8,570
Auburn University at Montgomery	\$8,150
Alabama State University	\$7,932
University of West Alabama	\$7,320
Alabama A & M University	\$7,182
Troy University	\$6,844
University of Alabama at Birmingham	\$6,798
University of South Alabama	\$6,660
University of North Alabama	\$6,528
Jacksonville State University	\$6,360
J F Ingram State Technical College	\$4,608
Chattahoochee Valley Community College	\$4,200
Jefferson State Community College	\$4,200
Reid State Technical College	\$4,200
James H Faulkner State Community College	\$4,182
Bevill State Community College	\$4,170
Lawson State Community College	\$4,170
Shelton State Community College	\$4,140
Alabama Southern Community College	\$4,140
Bishop State Community College	\$4,140
Central Alabama Community College	\$4,140
George C Wallace State Community College- Hanceville	\$4,140
Northeast Alabama Community College	\$4,140
Shelton State Community College	\$4,140
Snead State Community College	\$4,140
Northwest-Shoals Community College	\$4,080
John C Calhoun State Community College	\$3,990
Lurleen B Wallace Community College	\$3,960
Jefferson Davis Community College	\$3,848
George C Wallace State Community College-Dothan	\$3,840
George C Wallace State Community College-Selma	\$3,840
Enterprise State Community College	\$3,724
Southern Union State Community College	\$3,584
H Councill Trenholm State Technical College	\$3,240
J F Drake State Technical College	\$3,192

The data presented in Table 4 indicate that Alabama has an adequate available labor force in each of the 10 workforce regions; yet the findings also suggest that there are a significant number of unemployed residents across the state (Alabama Department of Labor, 2013). As of December 2012, the unemployment rate in Alabama was 6.5%, which included a total of 140,897 unemployed residents and an underemployment rate of 23.8%, including 479,296 residents seeking better employment opportunities. While the findings suggest that there is a significant applicant pool to assume impending job opportunities, Alabama is faced with a shortage of workers with critical skills that are necessary for high-demand occupations.

Table 4

*Alabama Labor Force Data – December 2012*

Region	Labor Force	Employed	Unemployed
Region 1	119,704	111,486	8,218
Region 2	401,382	377,814	23,568
Region 3	126,196	117,701	8,495
Region 4	520,430	490,680	29,750
Region 5	189,368	176,372	12,996
Region 6	33,350	29,610	3,740
Region 7	184,035	171,675	12,360
Region 8	116,669	108,470	8,199
Region 9	322,588	299,015	23,573
Region 10	148,745	138,898	9,847
Alabama	2,154,744	2,013,847	140,897



## Summary

The review of literature provided an overview of topics related to the research questions to be answered in this document. These topics included a historical account of federal legislation, programs of study, role of career technical education in the workforce, gender equity issues, and the state of career technical education in Alabama. Derived from a rich history in vocational training, career technical education has evolved from secondary educational efforts to critical workforce training and education, affording adults the opportunity to obtain industry-recognized credentials that are required for high-demand occupations. The Carl D. Perkins Act of 2006 and the Workforce Investment Act have been instrumental in requiring career technical education programs to be effective in its mission of offering coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed for further education and careers in current or emerging professions (Public Law 109-270). The methods used to conduct this study will be discussed in Chapter 3.

## Chapter 3

### Methods

Career technical education (CTE) programs are viewed as an essential resource to addressing the economic and workforce development needs in the State of Alabama. With rapid industry changes and technological advances, Alabama depends on CTE programs to produce workers with critical skills to meet the needs of the growing workforce. The demand for colleges to train workers to be immediately productive has never been more critical than in today's technology and information based economy (American College Testing, 2012).

### Purpose of the Study

The primary impetus for this study was to determine whether students attending postsecondary career technical education programs in Alabama were adequately trained to secure employment in specialized occupational areas. Previous studies have not analyzed important variables such as gender, occupational training (high-demand occupations and traditional occupations), and student success for community and technical college graduates (Allen & Cedja, 2007; Mullin, 2011; Van Noy & Zeidenberg, 2009).

In the face of rising levels of unemployment, labor markets forecast significant worker shortages in the near future (Kozumplik, Nyborg, Garica, et al., 2011). In order to sustain itself, the local economy depends on the imminent arrival of credentialed workers to satisfy shortfalls. While an adequate number of career technical education programs exist in Alabama, the State

has consistently struggled to align education and training with labor market demands. Therefore, the intent of this study was to obtain a better understanding about the implemented training programs and the gender characteristics of students that successfully complete CTE programs in Alabama.

### Research Questions

The following research questions were used in this study:

1. What is the relationship between gender and grade point average of career technical education program graduates in Alabama?
2. What is the relationship between occupational training program and grade point average of career technical education program graduates in Alabama?
3. What is the relationship between gender, occupational training program, and grade point average of career technical education program graduates in Alabama?

To answer the first research question, the researcher analyzed the gender characteristics of students that have enrolled and matriculated through Alabama's two-year community college system. The analysis was performed to determine the composition of the overall student body and the number of male and female students that were enrolled in ACCS institutions.

Subsequently, the researcher executed a query to ascertain the cumulative GPAs for the respective students. To answer the second research question, the researcher examined the occupational training programs offered in ACCS institutions. To answer the third research question, the research examined the gender characteristics, occupational training program, and cumulative grade point averages for the selected sample of ACCS students.

## Research Design

The Alabama Department of Postsecondary Education identified two levels of career technical education students for the purpose of the Carl D. Perkins Act of 2006. The first level represents participants. These individuals include students who have earned one or more credits in any career technical education area. This includes individuals with a declared major other than CTE who are participating in a CTE course. The second level represents concentrators. These individuals are postsecondary education students who complete at least 12 academic or CTE credits within a single program area sequence that is comprised of 12 or more academic and technical credits and terminates in the award of an industry-recognized credential, a certificate, or a degree; or completes a short-term CTE program sequence of less than 12 credit units that terminates in an industry-recognized credential, a certificate, or a degree. Students were tracked by utilizing their student unit record (SUR) identification number from ACCS.

Using local labor market data, the Alabama Department of Labor identified a listing of high-demand occupations in the state by education level. This study examined the training programs for identified high-demand occupations and selected traditional occupations requiring an associate's degree within the Alabama Community College System. Additionally, this study examined and tracked high-demand occupations and selected traditional training programs using the Classification of Instructional Programs (CIP) codes retrieved from the U.S. Department of Education's National Center for Education Statistics (NCES) database. Developed in the 1980s, CIP was designed to provide a taxonomic scheme to assist with tracking, assessing, and reporting instructional program completions (NCES, 2010).

The first high-demand occupational training program represents occupational therapy assistants. These licensed professionals work under the direction of occupational therapists by

supporting patients in recovering, developing, and improving their daily skills through therapeutic activities. Occupational therapy assistants can work in a variety of settings, including nursing homes, rehabilitation centers, hospitals, and school systems. The second high-demand occupation presents electricians. In this profession, individuals install and maintain power, communications, and control systems in commercial and personal structures. Electricians are employed by utility companies, public and private businesses, and educational institutions.

The first traditional training program represents industrial maintenance workers. These individuals maintain and repair factory equipment and other industrial machinery, such as conveying systems, production machinery, and packaging equipment. This group typically works in manufacturing plants and industrial parks. The second traditional training program identified in this study is medical assistants. These workers provide clinical and administrative assistance for healthcare professionals, including physicians, chiropractors, and other healthcare environments. Table 5 and Table 6 provide a summary of the CIP codes for high-demand and traditional training occupations, respectively.

Table 5

*High-Demand Occupational Training Codes*

Occupational Training Program	USDE – CIP Code
Electrician	46.0302
Occupational Therapy Assistant	51.0803

Table 6

*Traditional Occupational Training Codes*

Occupational Training Program	USDE – CIP Code
Industrial Maintenance	47.0303
Medical Assistant	51.0801

## Population and Sample

For the purpose of this study, a sample of 200 students was drawn from a population of 896 concentrators enrolled in four associate degree programs offered at ACCS institutions in Alabama. Students that participated in remedial, adult basic education (ABE), English as a Second Language (ESL), and noncredit workforce education courses were eliminated from the study to ensure a consistent cohort of students entering selected programs of study in 2010 – 2011 and graduating in academic year 2012 - 2013. In addition, the sample was also reduced due to attrition and the presence of outliers based on earned grade point averages. The data in Table 7 indicate the process by which the sample of 100 male and 100 female graduates were selected.

Table 7

*ACCS Enrollment in Selected Programs– 2010 – 2011*

	Total Concentrators	Remedial Coursework	ABE	Attrition	ESL	Noncredit Coursework	Selected Cohort
Male	526	183	146	43	38	16	100
Female	370	91	87	54	27	11	100
Total	896	274	233	97	65	27	200

## Instrumentation

The researcher obtained permission from the Alabama Department of Postsecondary Education's Assistant Director of Career and Technical Education to obtain preexisting student data and performance indicator data to conduct this study (see Appendix A). The Carl D. Perkins Act of 2006 and the Workforce Investment Act require a means for measuring the effectiveness of career technical education and adult education programs. ACCS institutions systematically collect, compile, and report data to the Alabama Department of Postsecondary Education. The information is used to compile the Consolidated Annual Report (CAR) for the National Reporting System (NRS) for the Office of Vocational and Adult Education. This expansive repository has comprehensive data from the federal and state level and has been utilized to study a wide range of issues related to funding (U.S. Department of Education, 2005); technical skill attainment (Staklis & Klein, 2010); and evaluation in assessment practices (Bartlett, Schleif, & Bowen, 2011). Further research (Council of Chief State School, 2011; WestEd, 1999) indicated that multiple assessment measures are preferred to demonstrate validity, soundness, and, appropriateness of secondary data sources.

## Data Collection

Utilizing data from ACCS, the researcher collected information pertaining to total student enrollment, gender characteristics, occupational training type, major program of study, graduation and completion rates, and grade point averages for students entering ACCS institutions in 2010 – 2011 and graduating in academic year 2012 – 2013. The researcher obtained permission from the Auburn University Institutional Review Board (see Appendix B) to collect and examine these data points.

## Data Analysis

The researcher employed quantitative methods using both inferential and descriptive statistical analyses. This study employed two separate one-way analyses of variance (ANOVA) and a two-way (univariate) ANOVA. It is important to note that ANOVAs are commonly used in educational research for several reasons. First, ANOVAs are versatile and can adapt to a variety of research designs (Rojewski, Lee, & Gemici, 2012). Ross and Shannon (2011) indicated that one advantage of utilizing an ANOVA is the ability to assess three or more groups in one analysis, unlike the t-tests, which are limited to the comparison of only two group means.

Secondly, ANOVAs lack theoretical limits on populations that can be compared in a study (Fraenkel, Wallen, & Hyun, 2011; Rojewski, Lee, & Gemici, 2012). Finally, ANOVAs aid in controlling for Type I error, which is the rejection of the null hypothesis when it is actually true (Rojewski, Lee, & Gemici, 2012). Ross and Shannon (2011) noted that ANOVAs protect against Type I error across all means compared by considering all the groups in the analysis.

The first independent variable examined in this study was gender. This categorical variable consisted of two levels: (1) male and (2) female. The dependent variable for this study was grade point averages and is considered a continuous variable. A one-way ANOVA was conducted to determine if differences in grade point averages exist across occupational training type. The second independent variable examined in this study was occupational training programs. This categorical variable consisted of two levels: (1) traditional training programs and (2) high-demand training programs. Furthermore, a two-way ANOVA was conducted to examine the effect of gender and occupational training type on grade point averages.



## Summary

This chapter discussed the methods used to conduct the research study as well as the research questions that were used to guide this study. This study was designed to determine the relationship between occupational training type, gender and grade point averages for career technical program graduates in Alabama. The instrumentation as well as its validity and reliability were examined in this chapter and finally, data collection and analysis was discussed.

## Chapter 4

### Findings

#### Introduction

The primary impetus for this study was to determine whether students attending postsecondary career technical education programs in Alabama were adequately trained to secure employment in specialized occupational areas. Previous studies have not analyzed important variables such as gender, occupational training (high-demand occupations and traditional occupations), and student success for community and technical college graduates (Allen & Cedja, 2007; Mullin, 2011; Van Noy & Zeidenberg, 2009).

In the face of rising levels of unemployment, labor markets forecast significant worker shortages in the near future (Kozumplik, Nyborg, Garica, et al., 2011). In order to sustain itself, the local economy depends on the imminent arrival of credentialed workers to satisfy shortfalls. While an adequate number of career technical education programs exist in Alabama, the State has consistently struggled to align education and training with labor market demands. Therefore, the intent of this study was to obtain a better understanding about the implemented training programs and the gender characteristics of students that successfully complete CTE programs in Alabama.

This study is a secondary analysis of data, as the data used were provided by the Alabama Community College System (ACCS) – Career and Technical Education Division. This chapter

presents a review of the research questions, sample population, analysis of data, results and summary.

### Research Questions

The following research questions were used in this study:

1. What is the relationship between gender and grade point average of career technical education program graduates in Alabama?
2. What is the relationship between occupational training program and grade point average of career technical education program graduates in Alabama?
3. What is the relationship between gender, occupational training program, and grade point average of career technical education program graduates in Alabama?

To answer the first research question, the researcher analyzed the gender characteristics of students that have enrolled and matriculated through Alabama's two-year community college system. The analysis was performed to determine the composition of the overall student body and the number of male and female students that were enrolled in ACCS institutions.

Subsequently, the researcher executed a query to ascertain the cumulative GPAs for the respective students. To answer the second research question, the researcher examined the occupational training programs offered in ACCS institutions. To answer the third research question, the research examined the gender characteristics, occupational training program, and cumulative grade point averages for the selected sample of ACCS students.

## Sample

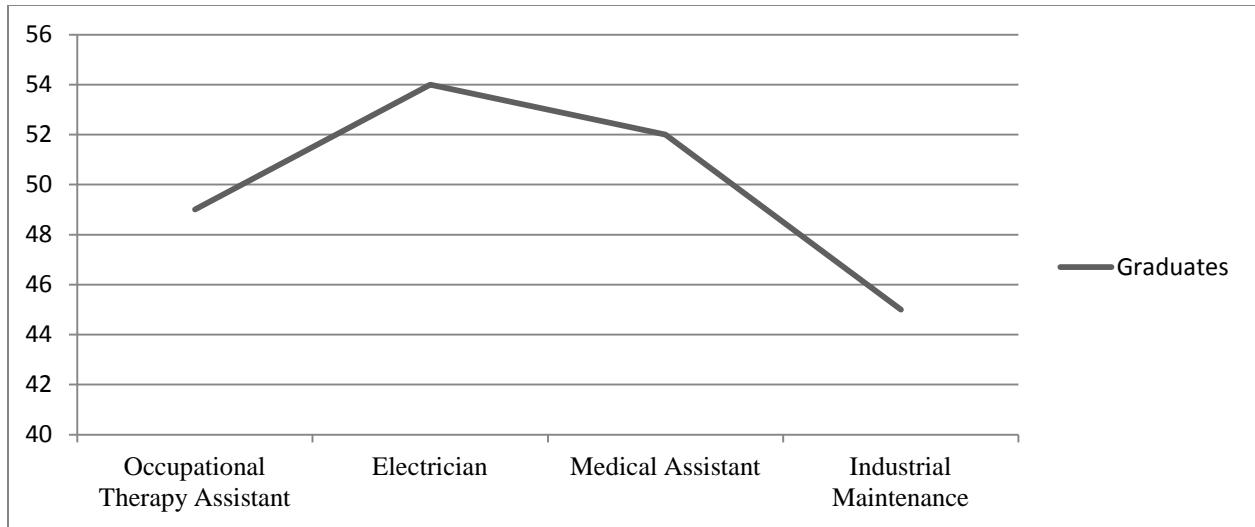
The researcher selected students that enrolled in the Alabama Community College System (ACCS) in academic year 2010 – 2011 and graduated in academic year 2012 – 2013. For the purpose of this study, two high-demand occupational training programs were selected and two traditional occupational programs were selected. Several programs of study have been identified as high-demand occupations, meaning that there is a demand to fill such positions across the State of Alabama. Alternatively, programs that are not typically in high-demand were considered as traditional occupational training programs. Students that participated in remedial coursework, adult basic education (ABE), English as a Second Language (ESL), or noncredit workforce education courses were removed from the sample. In addition, students were removed from the study due to outlying grade point averages and attrition. By eliminating students that were enrolled in special courses, the researcher was able to obtain a well-defined cohort of 200 students for the sample population. The SUR identification numbers were removed from the data.

The high-demand occupational training programs selected for this study were electrician and occupational therapy assistant associate degree programs. Based on the analysis, the following institutions offer an associate's degree in electrician: (1) Beville State Community College, (2) Wallace State Community College – Dothan Campus, (3) Wallace State Community College – Selma Campus, (4) H. Councill Trenholm State Technical College, (5) John C. Calhoun State Community College, and (6) Shelton State Community College. There were a total of 54 students that enrolled in academic year 2010 – 2011 and completed the two-year program in 2012 – 2013. In regard to the associate's degree program in occupational therapy assistant, there was only one institution within the State of Alabama offering this program: (1)

Wallace State Community College – Hanceville Campus. There were a total of 49 students that enrolled in academic year 2010 – 2011 and completed the two-year program in 2012 – 2013.

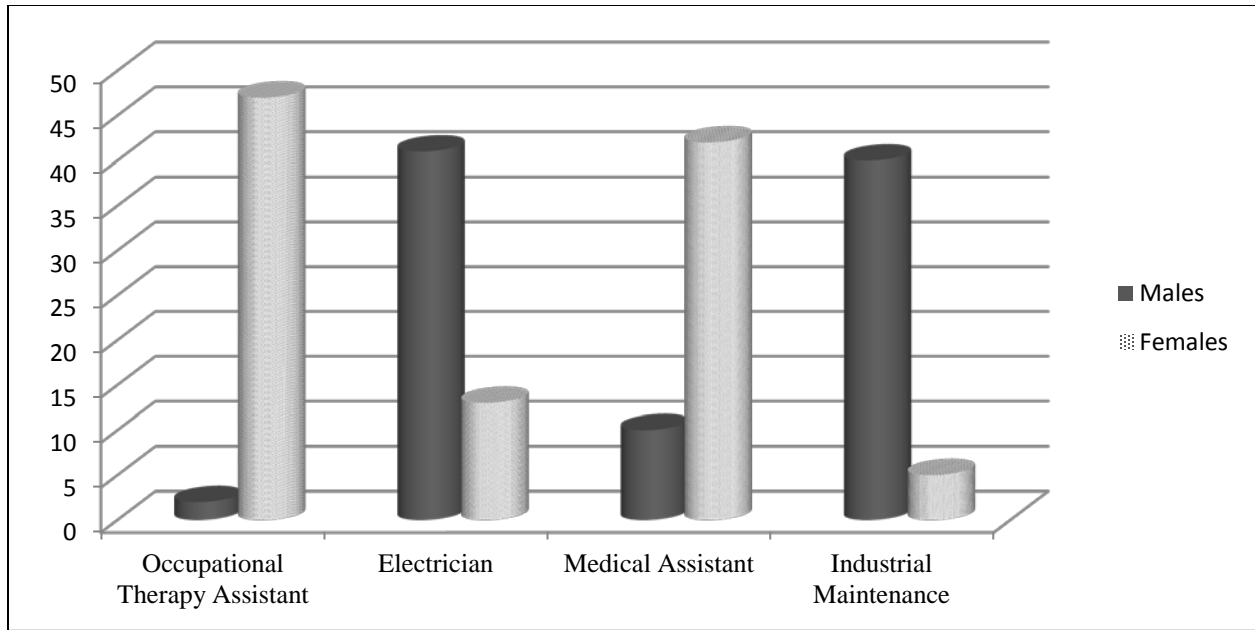
The traditional training programs selected for this study were associate degree programs in industrial maintenance and medical assisting. Based on the analysis, there were several programs that offered the associate’s degree program in industrial maintenance, including: (1) Wallace State Community College – Dothan Campus, (2) Wallace State Community College – Selma Campus, (3) Gadsden State Community College, (4) H. Council Trenholm State Technical College, (5) JF Drake State Technical College, (6) James H. Faulkner State Community College, (7) Northeast Alabama Community College, and (8) Northwest-Shoals Community College. There were a total of 45 students that enrolled in academic year 2010 – 2011 and completed the two-year program in 2012 – 2013.

In regard to the associate’s degree program in medical assisting, the following institutions offered this two-year program: (1) Wallace State Community College – Hanceville Campus, (2) Wallace State Community College – Dothan Campus, (3) Chattahoochee Valley Community College, (4) H. Council Trenholm State Technical College, and (5) Northeast Alabama Community College. There were a total of 52 students that enrolled in academic year 2010 – 2011 and completed the two-year program in 2012 – 2013. The composition of degrees obtained for the sample population is presented in Figure 3.



*Figure 3. ACCS Graduates by Occupational Training Program – 2012*

Each of the four programs is comprised of both male and female graduates. An analysis of the gender characteristics revealed that the occupational therapy assistant program graduated 95.91% female students and 4.09% males in 2012 – 2013. In addition, the findings indicate that the electrician program graduated 75.92% male students and 24.08% female students following the two-year period of review. Moreover, it was determined that the medical assisting program boasted that 80.76% females and 19.24% males completed the program during that academic year 2012 – 2013. Furthermore, the industrial maintenance program reported 88.88% of their graduates were male and 11.12% of their graduates were female during 2012 – 2013. The composition of gender characteristics and program of study is presented in Figure 4.



*Figure 4. ACCS Program Graduates by Gender Characteristics*

Similar to other states, Alabama utilizes the Occupational Information Network, O\*Net to classify occupations based on job characteristics. O\*Net was developed to replace the Dictionary of Occupational Titles (DOT) that was utilized to standardized descriptions of occupations since the late 1930s (National Crosswalk Service Center, 2007). This comprehensive database was developed in 1998 under the sponsorship of the United States Department of Labor/Employment and Training Administration and an advisory group of experts from various organizations (National Crosswalk Service Center, 2007). As the nation’s primary source of occupational information, O\*Net has identified the following domains to categorize work-related skills: (1) Basic Skills, (2) Complex Problem Solving Skills, (3) Resource Management Skills, (4) Social Skills, (5) System Skills, and (6) Technical Skills.

In an effort to establish a common language, the O\*Net program developed the taxonomy known as the Standard Occupational Classification system (SOC) to differentiate various

occupational titles throughout the O\*Net system. O\*Net described basic skills as developed capacities that facilitate learning or the more rapid acquisition of knowledge (see Table 8). Complex problem solving skills are referred to as developed capacities used to solve novel, ill-defined problems in complex, real-world settings (see Table 9). Resource management skills are identified as developed capacities used to allocate resources efficiently (see Table 10). Social skills are described as developed capacities used to work with people to achieve goals (see Table 11). O\*Net defined system skills as developed capacities used to understand, monitor, and improve socio-technical systems (see Table 12). Technical skills were identified as developed capacities used to design, set-up, operate, and correct malfunctions involving application of machines or technological systems (see Table 13).

Utilizing the O\*Net Database, the Alabama Department of Labor has identified critical skills necessary to operate within various occupations within the state. Table 14 presents a listing of the skills necessary to perform functions of an electrician. In Table 15 the required skills for an occupational therapy assistant is presented. The information presented in Table 16 reveals the essential skills needed to work in industrial maintenance and Table 17 indicate skills required to be employed as a medical assistant. It is important to note that all occupations require some degree of basic skills such as critical thinking; however, the only occupation that requires complex problem solving skills is electrician. Another interesting finding is that health-related occupations rely heavily upon essential social skills to carry out work-related responsibilities. It was also determined that with the exception of the medical assistant occupation, all other occupations require a great deal of judgment and decision making skills. Moreover, the occupational therapy assistant position was observed as the only profession that identified time



management skills as an occupational prerequisite. Finally, technical skills are imperative in highly-technical occupations such as industrial maintenance and electrician.

Table 8

*O\*Net Basic Skills*

Skills	Description
Active Learning	Understanding the implications of new information for both current and future problem-solving and decision-making.
Active Listening	Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.
Critical Thinking	Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions, or approaches to problems.
Learning Strategies	Selecting and using training/instructional methods and procedures appropriate for the situation when learning or teaching new things.
Mathematics	Using mathematics to solve problems.
Monitoring	Monitoring /assessing your performance and other individuals, or organizations to make improvements or take corrective action.
Reading Comprehension	Understanding written sentences and paragraphs in work-related documents.
Science	Using scientific rules and methods to solve problems.
Speaking	Talking to others to convey information effectively.
Writing	Communicating effectively in writing as appropriate for the needs of the audience.

Table 9

*O\*Net Complex Problem Solving Skills*

Skill	Description
Complex Problem Solving	Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.

Table 10

*O\*Net Resource Management Skills*

Skills	Description
Management of Financial Resources	Determining how money will be spent to get the work done and accounting for these expenditures.
Management of Material Resources	Obtaining and seeing to the appropriate use of equipment, facilities, and materials needed to do certain work.
Management of Personnel Resources	Motivating, developing, and directing people as they work, identifying the best people for the job.
Time Management	Managing one's own time and the time of others.

Table 11

*O\*Net Social Skills*

Skills	Description
Coordination	Adjusting actions in relation to others' actions.
Instructing	Teaching others how to do something.
Negotiation	Bringing others together and trying to reconcile differences.
Persuasion	Persuading others to change their minds or behavior.
Service Orientation	Actively looking for ways to help people.
Social Perceptiveness	Being aware of others' reactions and understanding why they react as they do.

Table 12

*O\*Net System Skills*

Skills	Description
Judgment and Decision Making	Considering the relative costs and benefits of potential actions to choose the most appropriate one.
Systems Analysis	Determining how a system should work and how changes in conditions, operations, and the environment will affect outcomes.
Systems Evaluation	Identifying measures or indicators of system performance and the actions needed to improve or correct performance, relative to the goals of the system.

Table 13

*O\*Net Technical Skills*

Skills	Description
Equipment Maintenance	Performing routine maintenance on equipment and determining when and what kind of maintenance is needed.
Equipment Selection	Determining the kind of tools and equipment needed to do a job.
Installation	Installing equipment, machines, wiring, or programs to meet specifications.
Operation and Control	Controlling operations of equipment or systems.
Operation Monitoring	Watching gauges, dials, or other indicators to make sure machines are working properly.
Operations Analysis	Analyzing needs and product requirements to create a design.
Programming	Writing computer programs for various purposes.
Quality Control Analysis	Conducting tests and inspections of products, services, or processes to evaluate quality or performance.
Repairing	Repairing machines or systems using the needed tools.
Technology Design	Generating or adapting equipment and technology to serve user needs.
Troubleshooting	Determining causes of operating errors and deciding what to do about it.

Table 14

*Electrician O\*Net Skills*

SOC-Code	Basic	Complex Problem Solving	System	Technical Skills
472111	Active Learning	Complex Problem Solving	Judgment and Decision Making	Equipment Maintenance
	Active Listening			Installation
	Critical Thinking			Operation Monitoring
				Quality Control Analysis
				Troubleshooting

Table 15

*Occupational Therapy Assistant O\*Net Skills*

SOC-Code	Basic	Resource Management	Social	System
312011	Active Listening	Time Management	Coordination	Judgment and Decision Making
	Critical Thinking		Service Orientation	
	Monitoring		Social Perceptiveness	
	Reading Comprehension			
	Speaking			
	Writing			

Table 16

*Industrial Maintenance O\*Net Skills*

SOC-Code	Basic	System	Technical
499041	Critical Thinking Monitoring	Judgment and Decision Making	Equipment Maintenance Equipment Selection Installation Operation Monitoring Operations and Control Quality Control Analysis Repairing Troubleshooting

Table 17

*Medical Assistant O\*Net Skills*

SOC-Code	Basic	Social
319092	Active Learning Active Listening Comprehension Critical Thinking Monitoring Reading Speaking Writing	Coordination Service Orientation Social Perceptiveness

## Data Analysis

The first ANOVA was conducted to address the research hypothesis that there is a difference in grade point averages for male and female CTE program graduates. Gender acted as the independent variable in the analysis and GPA acted as the dependent variable. The ANOVA was statistically significant,  $F(1,198) = 6.961, p < .05$ . This indicates that difference in GPA scores actually exist between male and female students. Although the effect size was small, eta squared  $\eta^2 = 0.03$ , indicating that the means of both males and females were very similar; in comparison of mean GPAs, females performed better academically when compared to males. See Table 18 for group means and standard deviations on the dependent variable.

Table 18

*Descriptive Statistics for Gender and Grade Point Averages*

Occupational Training Programs	<i>n</i>	<i>M</i>	<i>SD</i>
Male	100	2.714	.4266
Female	100	2.892	.5226

Next, the second ANOVA was conducted to address the second research hypothesis that there is a difference in grade point averages for students based on occupational training programs (high-demand and traditional training) they selected. Occupational training programs acted as the independent variable in the analysis and GPA as the dependent variable. No significant group differences were found for training programs,  $F(3,196) = .110, p > .05$ . Additionally, the effect size was small, eta squared  $\eta^2 = 0.01$ , indicating that the mean GPAs of the occupational therapy assistant, electrician, medical assistant, and the industrial maintenance graduates were very

similar. As depicted in Figure 5, the mean GPA was highest for students enrolled in the occupational therapy assistant program.

In addition, the lowest GPAs were reported for medical assistant students. Moreover, the mean score for electrician (M=2.822) was higher than the mean score for medical assistant (M=2.772); yet, the Post hoc comparisons showed that the difference was not statistically significant. Contrary to the hypothesis, there were no significant differences in GPA based on occupational training program type. See Table 19 for group means and standard deviations on the dependent variable.

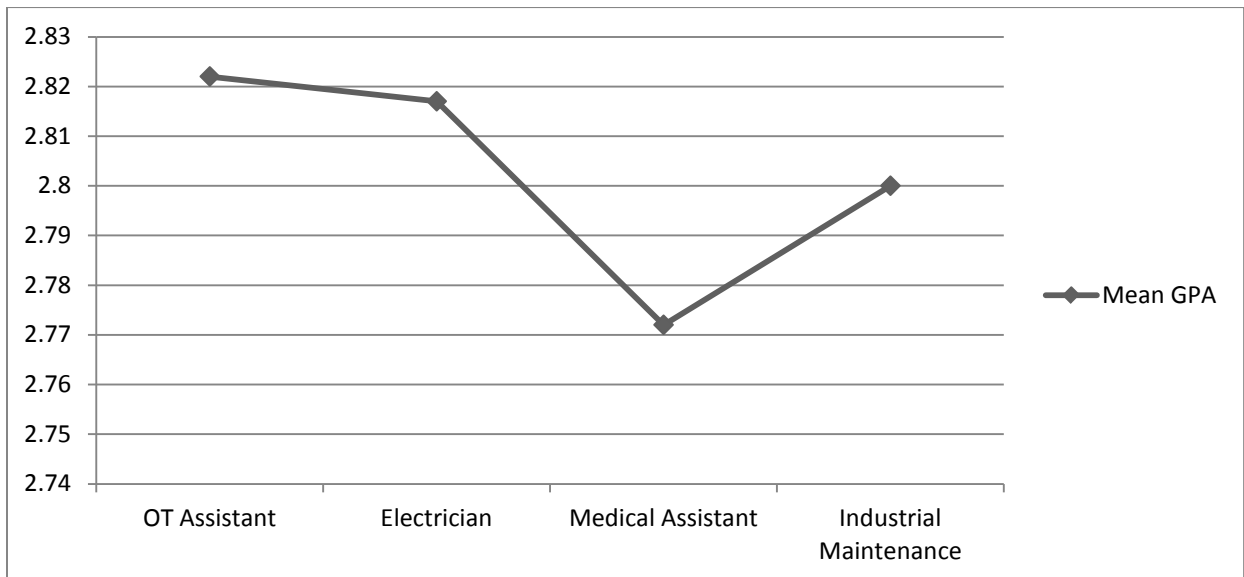


Figure 5. Mean Grade Point Averages for Occupational Training Program Graduates



Table 19

*Descriptive Statistics for Training Programs and Grade Point Averages*

Occupational Training Programs	<i>n</i>	<i>M</i>	<i>SD</i>
Electrician	54	2.817	.4963
Occupational Therapy Assistant	49	2.822	.4891
Industrial Maintenance	45	2.800	.5177
Medical Assistant	52	2.772	.4480

Next, the researcher utilized a two-way ANOVA, also known as univariate analysis of variance to analyze the third hypothesis that indicated that no differences exist among gender, occupational training program, and grade point averages for CTE program graduates in Alabama. A statistically significant difference was observed following the test of between-subjects effects for gender,  $F(1,192) = 7.120, p < .05$  which indicates that the gender of the student effects the grade point average earned in school. The researcher determined that females had higher GPAs when compared to males. In contrast, no significant group differences were found for the effect of training programs,  $F(3,192) = .102, p > .05$ , which indicates that the occupational training program does not have an influence on the grade point average earned in school. Table 20 presents the results of the two-way ANOVA.

Using an alpha level of .05, the Levene's test was not significant, which indicates that the assumption of homogeneity of variances was not violated and the variances of the dependent variable within each group is equal. Therefore, Type I error was not present throughout the study. Table 21 provides an overview of the Levene's test that was conducted for this study.

Table 20

*Univariate Analysis of Variance of Gender and Occupational Training Program*

Source	<i>df</i>	<i>F</i>	<i>n</i> <sup>2</sup>	<i>p</i>
Gender (G)	1	7.120	.036	.008
Occupational Training Program (O)	3	.102	.002	.959
G x O	3	.461	.007	.710

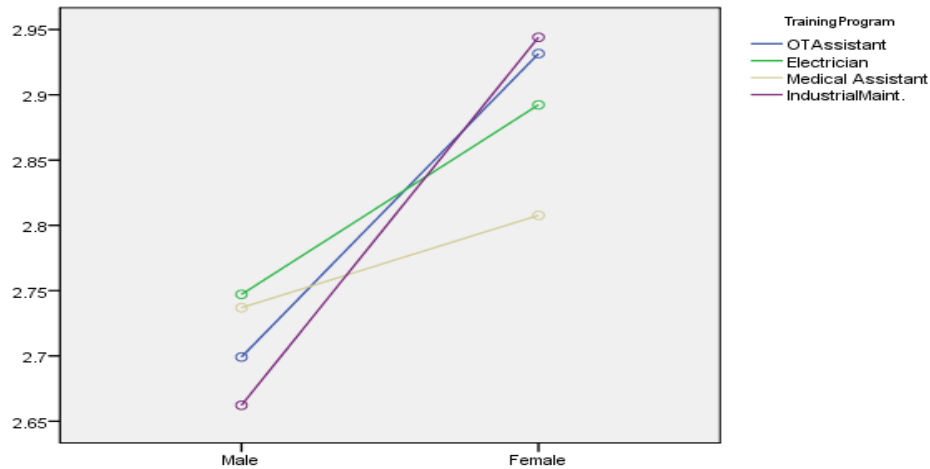
Table 21

*Homogeneity of Variance for Gender and Occupational Training Program*

<i>F</i>	<i>df1</i>	<i>df2</i>	<i>Sig.</i>
1.010	7	192	.425

The analysis also revealed that there were differences in GPA scores for males that completed traditionally female-dominated programs and in females that completed traditionally male-dominated programs. For example, the mean GPA for a male occupational therapy assistant student enrolled in the female-dominated program was lower ( $M=2.699$ ) when compared to the mean GPA of male students in the male-dominated electrician program ( $M=2.747$ ). Conversely, the mean GPA ( $M=2.944$ ) for female students in industrial maintenance was reportedly higher in this male-dominated profession, when compared to mean GPA of female students in a female-

dominated profession, such as medical assisting (M=2.808). Furthermore, the findings indicated that female students earned higher GPAs when compared to the male students, regardless of the program of study. The comparison of GPAs based on gender and occupational training program are presented in Figure 6.



*Figure 6.* Comparison of GPAs based on Gender and Occupational Training Program

According to the Alabama Commission on Higher Education (ACHE), the number of students enrolled in the four selected programs for this study varies. Table 22 presents a comparison of the dissimilarities in enrollment across programs. Despite the fact that programs are classified as high-demand, fewer students across the State of Alabama make an effort to enroll in occupational therapy assistant degree programs. However, the largest number of students enrolled in public two-year and four-year institutions selected medical assisting programs of study, which are not currently in high-demand in Alabama.

Occupational therapy assistants are considered to be high-demand on both national and local levels. The annual median income for occupational therapy assistants in Alabama (\$51,710) surpasses the national annual median wage by \$2,770 annually. Additionally the profession has

a national job outlook of 41%, which lags behind local figures at robust 65% change rate from 2012 to 2022. These assessments, coupled with the analyses from the Alabama Department of Labor indicate that occupational therapy assistants are in high-demand in Alabama.

Table 22

*ACHE Public Two-Year and Four-Year Undergraduate Enrollment – Fall 2011*

Program	N Undergraduate Students	First-Time Freshmen
Occupational Therapy Assistant	73	5
Electrician	528	144
Industrial Maintenance	676	160
Medical Assistant	719	131

National figures regarding the projected outlook for electricians are comparable to local statistics. The U.S. Bureau of Labor (2013) suggested a 20% job outlook for electricians, which resembled the 19.10% change reported by the Alabama Department of Labor from 2012 to 2022. This indicates that individuals seeking careers as an electrician can be optimistic in searching within this high-demand career. The national median annual income is approximately \$49,840, which is slightly higher than the median income for electricians in Alabama that earn roughly \$41,160 annually.

As of May 2012, the national median annual wage for industrial maintenance workers was \$45,840 which was slightly lower compared to median annual income of \$47,300 earned by industrial maintenance workers in Alabama. When compared to similar professions, industrial maintenance jobs are classified as a high-growth occupation nationally, meaning that the need to repair sophisticated machinery will drive the need for this occupation. Although the national

figures project an increase by 77,400 industrial maintenance workers by 2022, this is not the case in the State of Alabama. While the national employment outlook is projected to grow 17% from 2012 to 2022; Alabama’s average annual growth rate for industrial maintenance careers is only 2.38%. Therefore, this finding and the data obtained from the Alabama Department of Labor quantified the associate degree program in industrial maintenance was categorized as a traditional training program.

According to the U.S. Bureau of Labor Statistics (2013), there were approximately 560,800 medical assisting jobs nationally in 2012 and this figure is expected to increase by 162,900 openings by 2022, resulting in a projected outlook of 29%. Despite the favorable national statistics, Alabama’s labor market does not suggest a high-demand for medical assistants. In actuality, local figures indicate that the net change in the number of medical assistants in Alabama will only increase by 2,360 workers over a decade. See Table 23 for a comparison of national and state employment statistics.

Table 23

*Comparison of National and State of Alabama Employment Statistics*

Program	National Median Salary	State Median Salary	National Percent Change	State Percent Change
Occupational Therapy Assistant	\$48,940	\$51,710	41%	65%
Electrician	\$49,840	\$41,160	20%	19%
Industrial Maintenance	\$45,840	\$47,300	17%	26%
Medical Assistant	\$29,370	\$25,060	29%	34%

## Summary

The findings from this study are intended to examine the gender characteristics of a sample of 2012 – 2013 Alabama career technical education program graduates and determine how their selected programs of study align with academic performance (grade point averages). Three separate analyses were conducted for this study. The first analysis was conducted using a one-way ANOVA to determine if differences exist in grade point averages based on the gender characteristics of CTE program graduates in Alabama. The researcher determined that females outperformed males academically.

The second analysis was conducted using a one-way ANOVA to determine if differences exist in grade point averages based on the occupational training program of CTE program graduates in Alabama. The researcher determined that there were no significant differences found among the selected occupational training programs examined in this study. Finally, the third analysis was conducted using a univariate ANOVA to determine if differences exist in grade point averages based on gender characteristics and occupational training program of CTE program graduates in Alabama. The researcher determined that differences were significant for between subjects (gender characteristics); however, there were no statistically significant difference in grade point averages based on occupational training program. The summary, conclusions, implications, and recommendations for further research are presented in Chapter 5.

## Chapter 5

### Summary, Conclusions, Implications, and Recommendations

#### Introduction

The primary impetus for this study was to determine whether students attending postsecondary career technical education programs in Alabama are adequately trained to secure employment in specialized occupational areas. Previous studies have not analyzed important variables such as gender, occupational training (high-demand occupations and traditional occupations), and student success for community and technical college graduates (Allen & Cedja, 2007; Mullin, 2011; Van Noy & Zeidenberg, 2009).

In the face of rising levels of unemployment, labor markets forecast significant worker shortages in the near future (Kozumplik, Nyborg, Garica, et al. 2011). In order to sustain itself, the local economy depends on the imminent arrival of credentialed workers to satisfy shortfalls. While an adequate number of career technical education programs exist in Alabama, the State has consistently struggled to align education and training with labor market demands. Therefore, the intent of this study is to obtain a better understanding about the implemented training programs and the gender characteristics of students that successfully complete CTE programs in Alabama.

This chapter provides a summary of the study, implications, and conclusions drawn by the researcher about the influence of gender and occupational training programs on grade point averages. Societal norms and values have placed unwarranted stereotypes on career selection based on gender characteristics. This can be largely attributed to the period of time in which males and females were appraised not by their academic aptitude, but merely by their masculinity or femininity. Through the passage of a series of Federal rulings, workforce education and training became accessible for groups that were previously precluded from participating in such programs. In recent years, there have been tremendous efforts to eradicate biases and inculcate gender equity in American educational systems. As a result those initiatives have provided opportunities for CTE students to participate in specialized programs of study, regardless of their gender characteristics.

In the State of Alabama, the demand for a skilled workforce is on the rise and the information presented in this study has demonstrated the importance of career technical education in Alabama. The review of literature provided a historical perspective of career technical education, including developments that were a direct result of federal legislation. This study also provided an overview of the current Federal program of study that was developed to ensure consistency in curriculum and structure of programs. Moreover, this study considered career technical education's role in the local workforce and the implications CTE has on the economy. Furthermore, the study examined gender equity issues in CTE programs to fully understand the dynamic of gender socialization in career selection. Finally, the study provided an overview of the current state of career technical education in Alabama and its impact on the local economy.



## Research Questions

The following research questions were used in this study:

1. What is the relationship between gender and grade point average of career technical education program graduates in Alabama?
2. What is the relationship between occupational training program and grade point average of career technical education program graduates in Alabama?
3. What is the relationship between gender, occupational training program, and grade point average of career technical education program graduates in Alabama?

## Conclusions

There were two separate one-way ANOVAs and one factorial ANOVA conducted in this study. Gender and occupational training program were the independent variables and both factors consisted of two levels. The dependent variable for this study was grade point averages. The first analysis sought to determine if differences exist in grade point average based on gender characteristics of CTE program graduates in Alabama. There was a statistically significant difference in the grade point averages of males and females  $F(1,198) = 6.961, p < .05$ .

The second analysis sought to determine if differences exist in grade point averages based on occupational training programs (high-demand and traditional programs) of CTE program graduates in Alabama. No significant group differences were found for training programs  $F(3,196) = .110, p > .05$ , indicating that there was no difference in the GPAs for CTE graduates, regardless of the program of study. The final analysis sought to determine the

relationship between gender, occupational training program, and grade point averages for CTE program graduates in Alabama. A statistically significant difference was observed following the test of between-subjects effects for gender,  $F(1,192) = 7.120, p < .05$  which indicates that the gender of the student affects the grade point average earned in school; however, in contrast, no significant group differences were found for the effect of training programs,  $F(3,192) = .102, p > .05$ , which indicates that the occupational training program does not have an influence on the grade point average earned in school.

From the data cited in this study, a conclusion can be drawn that the gender characteristics actually influence the grade point average earned in CTE programs of study. The first analysis revealed that female students scored higher GPAs when compared to male students. The findings from this study support the idea that students can succeed in traditional and non-traditional occupational training programs based on their respective gender. Another conclusion that can be drawn pertains to the occupational training types. Based on cited data, there are no differences in GPAs based on high-demand or traditional occupational training programs. Perhaps it is noteworthy to reveal that although there are impending industry needs in Alabama; student success is not attributed to the selection of the training program based on demand. Yet, despite these results, what must not be lost is the importance of preparing CTE graduates for occupations with projected employment needs. It is imperative that industries have an adequate supply of qualified, trained workers to fill available positions. The final conclusion for this study revealed that there is no relationship between the three variables of interest. However, there is a relationship between GPA and gender.

## Implications

According to the most recent State of the Workforce Report VII: Alabama (2013), the state will face a worker shortfall of 307,272 through 2025. With a labor force of 2,154,744 and a total of 140,897 unemployed residents, the current state of the economy demands a solution for recruiting and maintaining credentialed workers with essential work-related skills. As previously indicated, previous research has supported the notion that there is a positive relationship between educational attainment, economic growth, and the distribution of income (Griliches & Mason, 1972; Hansen, 1970; Shulock & Offenstein 2012; Shultz & Hanushek 2012). Therefore, it is imperative that efforts are made to improve the outcomes of CTE graduates in Alabama.

One of the most important implications to address this issue is to improve funding for postsecondary education and training programs. Addressing deficiencies in resources and funding are essential to the local economy as these programs help prepare workers to fill worker shortages. With two-year public institutions reporting record-high enrollments and record-low financial support, institutions are forced to struggle to sustain with more students, less faculty and staff, and less funding to meet instructional and institutional needs. Likewise, students are forced to endure heightened tuition expenses. This is an unfortunate situation primarily because a great deal of the student population is comprised of working adult students with families. The lack of sufficient financial support precludes two-year institutions from meeting impending workforce and economic development needs and the increase cost of education may rule out the option of career technical education for prospective students. It is crucial for CTE leaders and administrators to foster the support of the state legislature in hopes of obtaining additional support for career technical education endeavors.

Another noteworthy implication for CTE programs is to continue in efforts of aligning programs of study with industry needs. Although this is an ongoing practice that will take time, it is important to note that there are a considerable number of certificate and degree programs offered within the Alabama Community College System that do not lead to careers. There are several ACCS institutions that offered programs that are considered as sharp-declining occupations. For example, ACCS currently offers a program in commercial sewing. According to the U.S. Bureau of Labor (2013), individuals in this occupation operate sewing machines for manufacturing companies. Many of these industries are declining as a result of automation and recent technological advances. The Alabama Department of Labor reported a decline (-31.65%) in the number of sewing machine operators that will be needed by 2020. For this reason, it is important that institutions reevaluate current labor market data to determine the demand and relevance for current program offerings.

Likewise, it is equally important for CTE institutions, AIDT, and economic developers to work diligently to attract and retain more high-demand, high-wage industries to Alabama. This will afford community and technical colleges the opportunity to continue to offer customized training programs based on current and emerging workforce needs. As the labor force becomes more educated and equipped with high-demand specialized skills, businesses will likely consider the feasibility of locating to Alabama. Strengthening connections between educational institutions, businesses, and industries is a crucial strategy to improving Alabama's workforce.

Alabama community and technical colleges can also benefit from increased offerings in programs related to Science, Technology, Engineering, and Mathematics (STEM). As previously indicated, substantial research studies have been conducted to substantiate the increased focus on STEM-related careers in the future. It is necessary for Alabama career technical institutions to

increase course offerings in these areas to increase competitiveness and preparedness for STEM occupations.

A further implication for Alabama CTE institutions is to highlight and promote nontraditional career options for incoming students and future generations. This process will require collaboration with secondary institutions to promote awareness and visibility of male and females working in nontraditional settings. In order to create a pipeline of students seeking enrollment in nontraditional training programs, institutions will need to offer job shadowing and observation opportunities to expose students to occupations that are not typically pursued by their specific gender. Additionally, institutions will need to ensure that nontraditional career guidance becomes a priority at the secondary and postsecondary level. As nontraditional enrollments increase at the postsecondary education level, the long-established gender lines will become indeterminate. As a result, the discrimination and typecast associated with nontraditional careers will diminish over time.

As the national and local population continues to age, CTE programs will need to consider offering programs of study that attract mature students. With rapid industry changes, older adults will need to stay abreast of the latest technological advances and devices needed to remain relevant in the workforce. Additionally, CTE programs will need to take into account informal educational opportunities for adults that are no longer in the labor force, but may be interested in learning in their leisure. It is important to note that many older adults are accustomed to acquiring knowledge and will need an avenue to continue the pursuit of lifelong learning. Therefore, CTE institutions could benefit from serving this population.

CTE enrollments and completions are also directly influenced by the number of students requiring Adult Basic Education and remedial coursework. It is imperative that the Alabama Department of Postsecondary Education continues to work closely with the Alabama State Department of Education at the secondary education level to improve academic performance of students enrolled in public high schools in Alabama. CTE institutions spend a tremendous amount of time providing fundamental instruction to adult students, which prolongs the length of time necessary to complete an academic degree or certification program. Although community and technical schools are designed to serve students with unique, yet distinctive needs, remedial education can be time-consuming, underfunded, and extremely costly for two-year public institutions.

Similarly, Alabama CTE institutions must be cognizant of the influx of immigrants that are currently residing and relocating to the State. As the population becomes more diverse, educational institutions must be cognizant of the need to employ additional faculty and staff to meet the needs of non-English speaking students. Immigrant students must first become acclimated to the English language and American culture before they can participate in academic and career technical training programs. Therefore, it would be advantageous for institutions to expand program offerings to ESL students.

As a result of the recent wars in Iraq and Afghanistan, more veterans will seek opportunities to further their education or acquire career-related training. CTE institutions will need to be cognizant of the need to assist individuals with disabilities. Institutions should be prepared to offer assistive technology equipment and devices that will aid in the learning process for wounded veterans or individuals with vision and hearing impairments. Furthermore,

institutions will be tasked with providing adequate counseling services to those with physical and mental disabilities resultant from the recent wars.

While there are a number of practical suggestions for addressing issues related to career technical education, perhaps one of the most significant implications calls for improved practices in tracking and collecting employment outcome data. Due to the nature of the study and its inclusion of CTE graduates, it was important to have measurable data to quantify student success. Grade point averages were utilized for this study; however, to vividly illustrate the impact of career technical education programs in Alabama would require complete employment outcomes or job placements data from individual student records. In light of recent calls for increased accountability, it is imperative that CTE administrators develop more rigorous strategies to obtain student and program evaluation data. Although this shortcoming could be attributed to lack of student response to exit survey instruments or other evaluation tools, it is absolutely necessary to gather and analyze the student outcomes to measure institutional effectiveness.

### Recommendations

The following recommendations for future research are offered to continue the study of the examination of gender, occupational training, and grade point averages for CTE graduates in Alabama:

1. This study should be replicated outside of Alabama. By considering only CTE graduates in Alabama, it is difficult to make findings generalizable on a national level.
2. This study should be replicated comparing high-growth and high-wage occupations to determine if statistically significant differences exist across these groups.

3. This study should be replicated considering additional demographic information including race/ethnicity, age, and socioeconomic characteristics.
4. This study should be replicated without the use of cohort-based enrollments and completions. This will enable the researcher to determine the impact of attrition throughout the two-year reporting period. For the purpose of this study, students were eliminated based on participation in other programs and attrition. Therefore, observing student participation in other programs including noncredit workforce education and certificate programs requiring less than one year may be useful in further research.

### Summary

Clearly, career technical education has been instrumental in affecting change in the way work-related training is developed, supported, and administered in community and technical institutions. The literature revealed that career technical education has evolved significantly and an infinite number of individuals have benefited from its existence on both personal and professional levels. Career technical education plays an integral role in affording women, minorities, and individuals with disabilities the opportunity to participate in workforce training and education that was traditionally inaccessible to these groups. Furthermore, career technical education is credited with overcoming longstanding gender equity barriers that have plagued the workplace and education system for several decades. Today, career technical education is considered to be the fiber that connects qualified workers with industries to strengthen the local and national economy.



## References

- Alabama Community College System (2011). Fast facts: By the numbers 2010-11. Retrieved from [https://www.accs.cc/default/assets/File/DPE\\_Stat/2011fastfacts.pdf](https://www.accs.cc/default/assets/File/DPE_Stat/2011fastfacts.pdf)
- Alabama Department of Labor (2013). Labor Market Information. Retrieved from <https://www.accs.cc/index.cfm/workforce-development/workforce-councils/>
- Alabama Department of Postsecondary Education (2012). Functional Analysis & Records Disposition Authority. Presented to the State Records Commission on April 25, 2012.
- Allen, N.T., & Cejda, B.D. (2007). The Rural Community College as an Administrative Labor Market. *Community College Journal of Research and Practice*, 31(4), 261-269.
- American College Testing, Inc. (2012). Changing lives, building a workforce: preparing community college students for jobs and careers. Retrieved from [http://www.act.org/research/policymakers/pdf/changing\\_lives.pdf](http://www.act.org/research/policymakers/pdf/changing_lives.pdf).
- Association for Career and Technical Education (2002). *A new association is born*. ACTE Issue Brief. Retrieved from [www.acteonline.org](http://www.acteonline.org)
- Association for Career and Technical Education (2007). *CTE's role in secondary-postsecondary transitions*. ACTE Issue Brief. Retrieved from [www.acteonline.org](http://www.acteonline.org)
- Barlow, M.L. (1976). 200 Years of vocational education, 1776 – 1976: The vocational age emerges, 1876-1926, *American Vocational Journal*, 51(5), 45-58.

- Bartlett, K.R., Schleif, N.L., & Bowen, M.M. (2011). The use of workforce assessment as a component of career and technical education program evaluation. *Career and Technical Education Research*, 36(2), 105-118.
- Beaulieu, L.J., & Southern Rural Development Center, M.S. (1999). Improving Job Opportunities for Low-income People: The Hope of the Workforce Investment Act of 1998. SRDC Information Brief: A Special Series on Welfare Reform in the South.
- Blau, F. D., & Kahn, L. M. (2000). *Gender differences in pay* (No. w7732). National bureau of economic research.
- Bogue, J. P. (1950). *The Community College*. New York: McGraw – Hill.
- Bound, J., & Turner, S. E. (1999). *Going to war and going to college: Did World War II and the GI Bill increase educational attainment for returning veterans?* (No. w7452). National Bureau of Economic Research.
- Brown, B., & ERIC Clearinghouse on Adult, C. (2003). *The image of career technical education*. Retrieved from ERIC database.
- Brady, M.S. & Sherrod, D.R. (2003). Retaining men in nursing programs designed for women. *Faculty Forum*, 42(4), 159-162.
- Brand, B. (2003). *Rigor and relevance: A new vision for career technical education*. A white paper. American Youth Policy Forum. Retrieved from ERIC database.
- Burrell, S. (1967). The G.I. bill and the great American transformation. *Boston University Graduate Journal* 15, Spring.

Business Roundtable (2009). *Counting the hidden assets: First steps in assessing the impact of community college noncredit education programs on the workforce and local economies.*

A white paper. Business Roundtable. Retrieved from Eric database.

California Industrial and Technology Education Association and Foundation (2007). Career

Technical Education: Problems and Solutions. Retrieved from:

<http://www.citea.org/about-citea/Career%20Technical%20Education%20-%20Problems%20and%20Solutions%20022807.pdf/view>.

Campbell, K.K. & Chapman, J.H. (1982). Work options: A guide for community colleges regarding recruitment, retention, and job placement of men and women in occupations not traditional for their sex. California Community Colleges, Sacramento, CA.

Center for Business and Economic Research (2013). State of the Workforce Report VII: Alabama.

Chusmir, L.H. (1990). Men who make nontraditional career choices. *Journal of Counseling & Development*, 69(1), 11-16.

Cohen, A. & Brawer, F. (2008). *The American Community College*, 5<sup>th</sup> ed. San Francisco, CA: John Wiley & Sons, Inc.

Cohen, M. & Besharov, D. (2002). *The Role of Career and Technical Education: Implications for the Federal Government*. Retrieved from ERIC database.

Corbett, C. & Hill, C. (2012). Graduating to a pay gap: The earnings of women and men one year after college graduation. American Association of University Women. Retrieved from Eric Database.

- Council of Chief State School, O. (2011). The Future of Career Technical Education (CTE) Assessment. Executive Summary. Council of Chief State School Officers. Retrieved from Eric Database.
- Cunanan, E.S., & Maddy-Bernstein, C. (1993). *Working together for sex equity: Nontraditional programs that make a difference*. National Center for Research in Vocational Education. Retrieved from Eric Database.
- Daines J., Hartenstein, A., & Birch, M. (2000). Women, education, and training: Old challenges in a new age. In D. R. Herschbach & C. P. Campbell (Eds.), *Workforce preparation: An international perspective* (pp. 22-33). Ann Arbor, MI: Prakken Publications, Inc.
- Department of Education, W.C., & Office of English Language Acquisition, L.C. (2005). Biennial Evaluation Report to Congress on the Implementation of the State Formula Grant Program, 2002 – 2004. Retrieved from Eric Database.
- Domenico, D. M., & Jones, K. H. (2007, Spring). Career aspirations of women in the 20th century. *Journal of Career and Technical Education*, (22) 2, 18-25.
- Doughtery, K.J., & Kienzl, G.S. (2006). It's not enough to get through the open door: Inequalities by social background in transfer from community college to four-year colleges. *Teachers College Record*, 108(3), 452-487.
- Duncan, M.E. & Ball, C. (2011). Giving voice: Advocating for the community college. *New Directions for Community Colleges*, 156(1), 61-72.
- Elias, J., & Merriam, S. (1995). *Philosophical Foundations of Adult Education*, 2<sup>nd</sup> ed. Malabar, FL: Krieger.

- Fraenkel, J.R., Wallen, N.E., Hyun, H.H. (2011). *How to Design and Evaluate Research in Education* (8<sup>th</sup> Ed). New York, NY: McGraw-Hill.
- French, L. & Fisher, P.S. (2009). *Education pays in Iowa: The state's return on investment in workforce education*. The Iowa Policy Project. Retrieved from <http://www.iowapolicyproject.org/2009docs/090528-ROI-educ.pdf>
- Galbraith, M. (1987). The comparative importance of relationship orientation vs. nonrelationship oriented factors for men in the nontraditional employment of nursing. A White Paper. Retrieved from Eric Database.
- Giloth, R.P. (2000). Learning from the field: Economic growth and workforce development in the 1990s. *Economic Development Quarterly*, 14(4), 340-359.
- Grantee, L.J. (2005). Navigating into nursing school and the gender gap: Second Choices, second careers and second incomes. *Online Submissions*. Retrieved from Eric Database.
- Gray, K.C., & Herr, E.L. (1998). *Workforce Education: The Basics*. Needham Heights, MA: Allyn and Bacon.
- Griliches, Z., & Mason, W. M. (1972). *Education, income and ability*. Harvard Institute of Economic Research.
- Grubb, W.N. (1995). *The returns to education and training in the sub-baccalaureate labor market: Evidence from the survey of income and program participation, 1984-1990*. National Center for Research in Vocational Education. Retrieved from ERIC database.
- Grubb, W.N., & Lazerson, M. (2005). The education gospel and role of vocationalism in American education. *American Journal of Education*, 111(3), 297-319.

- Hall, R.E. (2006). Jobs loss, job finding, and unemployment in the U.S. economy over the past fifty years. *National Bureau of Economic Research*, 20(3), 101-166.
- Hansen, W.L. (1970). *Education, Income, and Human Capital*. New York, NY: Columbia University Press.
- Hayes, R. (1986). Men's decisions to enter or avoid nontraditional programs. *Journal of Organizational Behavior*, 10(1), 201-212.
- Hayward, G. & Benson, C. (1993). *Vocational-Technical Education: Major Reforms and Debated 1917 – Present*. U.S. Department of Education Office of Vocational and Adult Education. ED/OVAE-93-7.
- Hirshy, A., Bremer, C., & Castellano, M. (2011). Career technical education (CTE) student success in community colleges: a conceptual model. *Community College Review*, 39(3) 296-318.
- Huff, S. (1974). Credentialing by tests or by degrees: Title VII of the Civil Rights Act and Griggs v. Duke Power Company. *Harvard Educational Review*, 44(2), 246-269.
- Jackson, Z., Wright, S. L., & Perrone-McGovern, K. M. (2010). Work-Family Interface for Men in Nontraditional Careers. *Journal Of Employment Counseling*, 47(4), 157-166.
- Joshi, P. V., Beck, K. A., & Nsiah, C. (2009). Student characteristics affecting the decision to enroll in a community college: Economic rationale and empirical evidence. *Community College Journal of Research and Practice*, 33(10), 805-822.

- Kaestle, C. F. (2001). Federal aid to education since World War II: Purposes and politics. *The Future of the Federal Role in Elementary and Secondary Education*. Washington, DC: Center for Education Policy.
- Kaestle, C.F. & Smith, M. S. (1982). The federal role in elementary and secondary education, 1940-1980. *Harvard Educational Review*, 52(4), 384-408.
- Katsinas, S.G. (1994). A review of literature related to economic development and community colleges. *Community College Review* 21(4), 67-80.
- Katsinas, S.G., D'Amico, M.M., & Friedel, J.N. (2011). Access and funding in public higher education – the 2011 National Survey. University of Alabama, Education Policy Center. Retrieved from Eric Database.
- Kerka, S. (1999). Has nontraditional training worked for women? Myths and Realities No. 1. *Office of Educational Research and Improvement*. Retrieved from Eric Database.
- Killman, C. (2012). Title IX at 40. *Teaching Tolerance*, (42), 29-33.
- Kozumplik, R., Nyborg, A., Garica, D., Cantu, L., Larsen, C. (2011). *Career Pathways Toolkit*. U.S. Department of Labor, Employment and Training Administration. Retrieved from <http://www.workforceinfodb.org/PDF/CareerPathwaysToolkit2011.pdf>
- Lease, S.H. (2003). Testing a model of men's nontraditional occupational choices. *The Career Development Quarterly*, 51, 244-258.
- Lester, J. (2010). Women in male-dominated career and technical education programs at community colleges: Barriers to participation and success. *Journal of Women and Minorities in Science and Engineering*, 16, 51-66. doi:10.1615/JWomenMinorScienEng.v16.i1.40.

- Lovelace, B.E., & Teddlie, J. (1993). Evaluation of gender in career and applied technology education programs. Texas Higher Education Coordinating Board. Retrieved from Eric Database.
- Lupton, B. (2006). Explaining men's entry into female-concentrated occupations: Issues of masculinity and social class. *Gender, Work, & Organization*, 13(2), 103-128.
- Lynch, R.L. (1996). In search of a vocational and technical education teacher education. *Journal of Vocational and Technical Education*, 13(1). Retrieved from Eric Database.
- Lynch, R. L. (2000). New directions for high school career and technical education in the 21st century (Information Series No. 384). Columbus: The Ohio State University, ERIC Clearinghouse on Adult, Career, and Vocational Education. (ERIC Document Reproduction Service No. ED 444 037).
- Maryland State Department of Education (2009). Maryland High School Career Technical Education Programs of Study, 2<sup>nd</sup> ed. Retrieved from:  
<http://www.marylandpublicschools.org/NR/rdonlyres/F8A34712-B21E-4DC2-A186-9144565375F2/34007/CTEBlueBook2012Web.pdf>.
- Miller, M.D. (1996). Philosophy: The conceptual framework for designing a system of teacher education. In N.K. Hartley & T.L. Wentling (Eds.), *Beyond tradition: Preparing the teachers of tomorrow's workforce* (pp. 53-72). Columbia, MO: University Council for Vocational Education.
- Morgan, D.J. (1992). *Discovering Men*. Routledge: London, UK.



Mullin, C. M. (2011). *The road ahead: A look at trends in the educational attainment of community college students* (Policy Brief 2011-04PBL). Washington, DC: American Association of Community Colleges.

Murdoch, M., Bradley, A., Mather, S. H., Klein, R. E., Turner, C. L., & Yano, E. M. (2006). Women and war. *Journal of General Internal Medicine*, 21(S3), S5-S10.

National Advisory Council on Vocational Education, W.C., National Advisory Council on Women's Educational Programs, W.C., & Institute for Women's Concerns, A.A. (1980). *Increasing Sex Equity. The Impact of the 1976 Vocational Educational Amendments on Sex Equity in Vocational Education.*

National Association of State Directors of Career Technical Education Consortium (2010). *Reflect, transform, lead: A new vision for Career Technical Education.* Retrieved from: <http://www.careertech.org/career-technical-education/cte-vision.html>.

National Center for Education Statistics (2010). *What is the CIP?* Retrieved from <http://nces.ed.gov/ipeds/cipcode/Default.aspx?y=55>

National Crosswalk Service Center (2007). *O\*Net Occupations Reference Guide.* Iowa Department of Education. Retrieved from <ftp://ftp.xwalkcenter.org/download/onet12/ONET12UserGuide.pdf>.

Obama, B. (2012, February). *Community College to Career Fund.* Speech presented at Northern Virginia Dale, VA.

Office for Civil Rights (ED), W.C. (ED), Washington, DC. (2000). Part 100 – Nondiscrimination Under Programs Receiving Federal Assistance Through The Department of Educational Effectuation of Title VI of The Civil Rights Act Of 1964.

Padavic, I. & Reskin, B.F. (2002). *Women and Men at Work*. Thousand Oaks, CA: Pine Forge Press.

Palmer, J. (1987). *Community, technical, and junior colleges: A summary of selected national data*. Washington, D.C.: American Association of Community and Junior Colleges.

Park, J., & Rojewski, J. (2006). The learning organizations model across vocational and academic teacher groups. *Career Technical Education Research*, 31(1), 23-48.

Pfahl, N.L., McClenney, K.M., O'Banion, T., Sullivan, L.G., Wilson, C.D. (2010). The learning landscape of community colleges. In Kasworm, C.E., Rose, A.D., & Ross-Gordon, J.M. (Eds), *Handbook of Adult and Continuing Education* .Thousand Oaks, CA: Sage.

Pressley, M. & McCormick, C.B. (2007). *Child and Adolescent Development for Educators*. New York, NY: Guilford Press.

Public Law 101-391., 101<sup>st</sup> Congress, Carl D. Perkins Career and Technical Education Vocational Amendments of 1976.

Public Law 105-332., 105<sup>th</sup> Congress, Carl D. Perkins Vocational and Applied Technology Education Amendments of 1998.

Public Law 109-270., 109<sup>th</sup> Congress, Carl D. Perkins Career and Technical Education Improvement Act of 2006.

Pulley, J.L. (2008). In need of remediation. *Community College Week*, pp. 7-12.

- Raizen, S. (1989). *Reforming education for work: A cognitive science perspective*. National Center for Research in Vocational Education. Retrieved from ERIC database.
- Roberts, R.W. (1957). *Vocational and Practical Arts Education*. New York: Harper and Row Publishers.
- Rojewski, J.W. (2002). *Preparing the workforce of tomorrow: A conceptual framework for career technical education*. Statistical Analysis Report. Washington, DC: United States Department of Education.
- Rojewski, J. W., Lee, I. H., & Gemici, S. (2012). Use of t-test and ANOVA in Career-Technical Education Research. *Career and Technical Education Research*, 37(3), 263-275.
- Rosenthal, L., London, B., Levy, S. R., & Lobel, M. (2011). The roles of perceived identity compatibility and social support for women in a single-sex STEM program at a co-educational university. *Sex Roles*, 65(9-10), 725-736.
- Ross, M.E., Shannon, D.M. (2011). *Handbook on Applied Quantitative Methods in Education* (2<sup>nd</sup> Ed). Dubuque, IA: Kendal Hunt.
- Sawyers, B. (1976). *Assessment and evaluation of the public's perception of vocational education in Indiana*. A Technical Report. Retrieved from ERIC database.
- Shulock, N. & Offenstein, J. (2012). *Career opportunities: career technical education and the college completion agenda*. Part I: Structure and Funding of Career Technical Education in the California Community Colleges. Retrieved from Institute for Higher Education Leadership & Policy website:  
[http://www.csus.edu/ihelp/PDFs/R\\_Career\\_Opportunities\\_part1\\_0112.pdf](http://www.csus.edu/ihelp/PDFs/R_Career_Opportunities_part1_0112.pdf).

- Shultz, G.P. & Hanushek, E.A. (2012, April 30). Education is the key to a health economy. *The Wall Street Journal*. Retrieved from <http://online.wsj.com/article/SB10001424052702303513404577356422025164482.html>.
- Silverman, S. (1999). Gender equity and school-to-career. A guide to strengthening the links to nontraditional careers. *Connecticut Women's Education and Legal Fund*. Retrieved from Eric Database.
- Simpson, R. (2005). Men in non-traditional occupations: Career entry, career orientation and experience of role strain. *Gender, Work, and Organization*, 12(4), 364-380.
- Sinkele, C.N., Mupinga, D.M. (2011). The effectiveness of engineering workshops in attracting females into engineering fields: A review of the literature. *The Clearing House*, 84(1), 37-42.
- Staklis, S, Klein, S., & National Research Center for Career and Technical, E. (2010). Technical Skill Attainment and Post-program Outcomes: An Analysis of Pennsylvania Secondary Career and Technical Education Graduates. *National Research Center for Career and Technical Education*. Retrieved from Eric Database.
- Stevenson, W.W. (1977). The educational amendments of 1976 and their implications for vocational education. *National Center for Research in Vocational Education*. Retrieved from Eric Database.
- Stickel, S.A., & Bonett, R.M. (1989). Sex differences in career self-efficacy. *American Educational Research Association*. Retrieved from Eric Database.

- Stipanovic, N., Lewis, M.V., & Stringfield, S. (2012). Situating programs of study within current and historical career and technical educational reform efforts. *International Journal of Educational Reform*, 21(2), 80-97.
- Surette, B. (2001). Transfer from two-year to four-year college: An analysis of gender differences. *Economics of Education Review*, 20(2), 151-163.
- Teddle, J. (1993). Improving sex equity in postsecondary vocational/technical programs: A resource manual. *Texas Higher Education Coordinating Board*. Retrieved from Eric Database.
- Toglia, T.V. (2013). Gender equity issues in CTE and STEM education: economic and social implications. *Tech Directions* 11(1), 14-17.
- Unruh, R. (2011). Driving innovation from the middle: Middle skill jobs in the American South's economy. National Skills Coalition, Southern Governors' Association.
- United States Department of Education, Office of Vocational and Adult Education. (2012). *Investing in America's Future: A Blueprint for Transforming Career and Technical Education*. Retrieved from <http://www2.ed.gov/about/offices/list/ovae/pi/cte/transforming-career-technical-education.pdf>.
- United States Department of Education, Office of Vocational and Adult Education. (2011). Perkins Collaborative Resource Network FAQs. Retrieved from: <http://cte.ed.gov/faq.cfm>.

United States Department of Education, U.S. Department of Health and Human Services, and U.S. Department of Labor. (2012). *Joint Committee Letter*. Retrieved from <http://www2.ed.gov/about/offices/list/ovae/ten-attachment.pdf>.

United States Department of Labor (2011). *Women's Employment During the Recovery*. Retrieved from Eric Database.

United States Bureau of Labor Statistics (2013). *Education and training outlook for occupations, 2012 – 2022. Employment Projections Program*. Retrieved from [http://www.bls.gov/emp/ep\\_edtrain\\_outlook.pdf](http://www.bls.gov/emp/ep_edtrain_outlook.pdf).

United States Bureau of Labor Statistics (2013). *U.S. Weekly Earnings of Wage and Salary Workers Second Quarter 2014* Retrieved from <http://www.bls.gov/news.release/pdf/wkyeng.pdf>

United States Department of Labor (2013). *Women in the Labor Force: A Data Book*. Retrieved from [www.bls.gov/cps/wlf-databook-2012.pdf](http://www.bls.gov/cps/wlf-databook-2012.pdf).

Van Noy, M. & Jacobs, J. (2012). *Employer perceptions of associate degrees in local labor markets: A case study of the employment of information technology technicians in Detroit and Seattle* (CCRC Working Paper No. 39). New York, NY: Columbia University, Teachers College, Community College Research Center.

Van Noy, M., Jacobs, J., Korey, S., Bailey, T., Hughes, L. (2008). *The landscape of noncredit workforce education: State policies and community college practices* (CCRC Working Paper No. 22). New York, NY: Columbia University, Teachers College, Community College Research Center.

- Van Noy, M. & Weiss, M. (2010). *The role of community college education in the employment of information technology workers in Washington State* (CCRC Working Paper No. 23). New York, NY: Columbia University, Teachers College, Community College Research Center.
- Van Noy, M. & Zeidenberg, M. (2009). American community colleges in the downturn: can education save the economy? *Country Perspective*, 6(9). Retrieved from <http://digitalllearning.letsonline.com/2009/06/american-community-colleges-in-the-downturn-2/>.
- Voorhees, R.A. & Hinds, T. (2012). Out of the Box and Out of the Office: Institutional Research for Changing Times. In Howard, R.D., McLaughlin, G.W., Knight, W.E. (Eds.), *The Handbook of Institutional Research* (pp. 73-85).
- Wade, J. C., & Brittan-Powell, C. (2001). Men's attitudes toward race and gender equity: The importance of masculinity ideology, gender-related traits, and reference group identity dependence. *Psychology of Men & Masculinity*, 2(1), 42.
- Waddell, G. (1991). Economic and workforce development. *New Directions for Community Colleges*, 19(3), 2-115.
- WestEd, S.A. (1999). A comparison of career – related assessment tools/models. Final Report. Office of Educational Research and Improvement. Retrieved from Eric Database.
- Wonacott, M., & ERIC Clearinghouse on Adult, C. (2003). *History and evolution of vocational and career-technical education*. A Compilation. Retrieved from ERIC database.

White House (2013). Assessing the Past, Taking Stock of the Future. National Equal Pay Task Force. Retrieved from Eric Database.

Williams, C.L. (1993). *Doing Men's Work: Men in Nontraditionally Occupations*. Newbury Park, California: Sage Publications.

Williams, C.L. (1995). *Still a Man's World: Men who Do Women's Work*. University of California Press: London, UK.

Zeidenberg, M. & Bailey, T. (2010). Human resource development and career and technical education in American community colleges. New York, NY: Columbia University, Teachers College, Community College Research Center.

Zinn, L.M. (1990). Exploring Your Philosophical Orientation. In Galbraith, M.W. (Eds.), *Adult Learning Methods: A Guide for Effective Instruction* (pp. 39-58).



## Appendices

Appendix A  
Permission to Access ACCS Data Files

Post Office Box 302130  
Montgomery, AL 36130-2130



T 334.293.4500 F 334.293.4504  
www.accs.edu

MARK A. HEINRICH, PH.D.  
Chancellor

May 8, 2014

Ms. Teresa McCall,

It is my pleasure to assist you in any way we can with your graduate studies. Recently we provided you with various items of data and support documentation regarding our processes for the Carl D. Perkins Act of 2006. Please feel free to use this information for your graduate studies as you deem appropriate.

Please don't hesitate to contact me if you have any further need of information for this or any of our processes related to the Alabama Community College System.

Sincerely,

A handwritten signature in black ink that reads 'David E. Laton'.

David E. Laton  
Assistant Director for Career and Technical Education  
Alabama Department of Postsecondary Education  
P.O. Box 302130  
Montgomery, AL 36130

---

**ALABAMA DEPARTMENT OF POSTSECONDARY EDUCATION**

Gov. Robert Bentley President, Tracy Roberts District 1, Betty Peters District 2, Stephanie Bell District 3, Yvette M. Richardson District 4,  
Ella B. Bell District 5, Charles E. Elliott District 6, Jeff Newman District 7, Mary Scott Hunter District 8

Appendix B  
Research Approval by Institutional Review Board



AUBURN  
UNIVERSITY

Office of Research Compliance  
115 Ramsay Hall, basement  
Auburn University, AL 36849

Telephone: 334-844-5966  
Fax: 334-844-4391  
[IRBadmin@auburn.edu](mailto:IRBadmin@auburn.edu)  
[IRBsubmit@auburn.edu](mailto:IRBsubmit@auburn.edu)

September 10, 2014

MEMORANDUM TO: Ms. Teresa McCall  
Department of Educational Foundations, Leadership, and Technology

PROTOCOL TITLE: "An Examination of Gender and Occupational Training on Grade Point Averages of Postsecondary Career and Technical Education Graduates in Alabama"

IRB FILE NO.: 14-213 EX 1405

ORIGINAL APPROVAL DATE: May 27, 2014  
MODIFICATION APPROVAL: August 4, 2014  
EXPIRATION DATE: May 26, 2017

Your modifications to this protocol were approved, continuing as "Exempt" by the IRB under 45 CFR 46.101 (b) (4):

Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.

Note the following:

1. CONSENTS AND/OR INFORMATION LETTERS: Only use documents that have been approved by the IRB with an approval stamp or approval information added.
2. RECORDS: Keep this and all protocol approval documents in your files. Please reference the complete protocol number in any correspondence.
3. MODIFICATIONS: You must request approval of any changes to your protocol before implementation. Some changes may affect the assigned review category.
4. RENEWAL: Your protocol will expire in three (3) years. Submit a renewal a month before expiration. If your protocol expires and is administratively closed, you will have to submit a new protocol.
5. CLOSING THE PROTOCOL: When your study is complete, please notify the Office of Research Compliance, Human Subjects.

If you have any questions concerning this Board action, please contact the Office of Research Compliance.

Bernie R. Olin, Ph.D.  
Chair of the Institutional Review Board #2  
for the Use of Human Subjects in Research

cc: Maria Witte