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Graduation Rates of Career and Technical Education (CTE) Concentrators in Kentucky: A Comparative Study

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DEDICATION

This dissertation is dedicated to my wife Sharon Kay Bennett and my two children Eric Stephen Bennett and Lindsay Kay McFarland who have supported me without hesitation throughout all of my educational pursuits.

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Firstly, this work could not have begun without the unwavering support of my wife and my best friend Sharon Kay Hadley Bennett who has always been my inspiration and has provided me with the much needed moral support from the very beginning to the conclusion of this very demanding endeavor. I can say, of a certainty, that without her consistent patience, love, and encouragement, this educational pursuit would not have been possible. Many thanks are certainly in order to an extremely talented and caring dissertation committee chaired by Dr. Charles Hausman and Dr. James Bliss. Dr. Hausman, a faculty member of the Education Department at Eastern Kentucky University, gave me the advice and motivation to believe that I really could accomplish this goal and attain the status of "Doctor of Education." My sincere thanks goes to the remaining members of my dissertation committee: Dr. Rita Davis, Dr. Tim Ross, Dr. Robert Biggin, and Dr. Jack McElroy who were dedicated to assure that my work remained at the scholarly level required by the institution and that it met their strenuous and rigid standards as educational professionals. I am also professionally indebted to many of my colleagues in the Central Office of the Office of Career and Technical Education Kentucky as well as a number of teachers, counselors, and Principals in the Kentucky Tech. educational system within the OCTE. Special thanks go to Dr. Dale Winkler, Mrs. Sarah Galliher, Mrs. Debbie Seider, Mr. Kiley Whitaker, and Ms. Angie Fischer for their assistance and guidance concerning the acquisition of vital data for the project.

ABSTRACT

This research was driven by the desire to determine if graduation rates of high school students in Kentucky are significantly affected when they decide to concentrate on a Career and Technical Education (CTE) career pathway. To clarify, the research questions that prompted this study seek to find out if 12th grade CTE concentrator students in programs of study at (16) randomly chosen Area Technology Centers (ATCs) across the state had different graduation rates than those 12th grade students not engaged in CTE career pathways in (16) corresponding high schools for the 2012 – 2013 school year. The study also compared the graduation rates of CTE concentrators from the 53 state operated ATCs to the graduation rates of the 12th grade general academic students in all public school districts in Kentucky for the 2012 – 2013 school year. The study utilized a quantitative approach and an independent samples t-test with SPSS software to determine if there was a significant difference in the graduation rates of the two groups of students. A $p < .05$ level of significance was used for all analyses in the study to determine if the null hypotheses could be rejected.

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CHAPTER I
INTRODUCTION

Background

To become more competitive in the global economy, the United States is currently searching for strategies in the realm of education to improve secondary graduation rates. According to the National Center for Educational Statistics, (NCES) the nation's average freshman graduation rate (AFGR) for school year 2010-2011 which was 78.6% trailed the AFGR of school year 1969-70 reported as 78.7% (NCES, 2012). NCES statistics for the years between 1970 and 2012 indicated that approximately (1) of (4) students entering the ninth grade failing to graduate after the completion of four years of high school. The NCES reported that the AFGR in the U.S. for the school year 2009-2010 was 78.2%. AFGR is an estimate of the percentage of an entering freshman class graduating in four years (NCES, 2013).

In an article that ties high-school dropouts, and diplomas to dollars, Amos (2008) offered research-based statistics that show the social and monetary advantages to our nation when students graduate from high school. The article suggests that a single high-school dropout costs the nation over 260,000 dollars in lost earnings, taxes, and productivity over the course of a normal lifetime (Amos, 2008). The article explains that high-school dropouts are much more likely to be arrested and incarcerated and will cost the nation on an average $13,706.00 more in Medicaid for uninsured medical expenses in his or her lifetime than a high school graduate (Amos, 2008).

With nearly one-fourth of the nation's high-school students not graduating on time, the national focus is to implement programs of study that both increase the number of graduates, and are rigorous and relevant enough to prepare them for the challenges of higher education and/or meaningful careers after graduation. In 1970, more than 80% of the jobs in our state and nation required only a high school degree or less. Today, those numbers have almost reversed with 19 of the 30 occupations projected to grow the fastest from 2012-2022, typically requiring some form of postsecondary education for entry (U.S. Department of Labor (BLS), 2012). Labor statistics show for the years 2008- 2018 that 14 of the 20 fastest growing occupations will require skills which can be acquired with training other than a four-year post-secondary college degree (U.S. Department of Labor, 2010). According to information from higher-education entities and prospective employers in the labor market, graduation from high school alone does not necessarily guarantee a successful transition into the realm of college and/or a career. Recent reports show that among 2003–04 high school seniors who had enrolled in post-secondary education by 2006, 40 percent took remedial courses; in public two-year colleges, the remediation was needed for 51 percent of their entering students (NCES, 2010). The estimated cost for the remediation of these ill-prepared college students is 1.4 billion dollars (Alliance for Excellent Education, 2006). Nationwide, the lack of progress in producing more high school graduates has prompted U.S. education systems to establish assessment and accountability goals with the overarching goal of making each high-school student a College and/or Career Ready (CCR) graduate.

With most of the jobs in the labor-market today requiring a high level of technical skills, one national trend is to look at Career and Technical Education (CTE) as a source of providing these needed 21st-century skills (Association for Career and Technical Education, 2014). As jobs in the current labor market require more and more technical skills, our nation struggles to provide the workforce with individuals capable of exhibiting 21st century skill-sets in much the same way that we did so in the 1960s leading up to the Vocational Educational Act of 1963. The intention of the act was to increase opportunities to train and prepare individuals for a workforce that required specialized skills and talents not currently existing in the general public. The need to train an inadequate workforce was evident through reports that predicted an overabundance of uneducated workers (Dugger, 1965).

Reports show that for the 2010-2011 school year, 7,494,042 secondary students participated in CTE nation-wide. (ACTE, 2014). CTE has become a viable alternative to the traditional high school "academic-only" route and offers career pathways which include a rigorous sequence of courses that lead to valid industry credentials as well as dual credit opportunities and articulation with many post-secondary partners in CTE (ACTE, 2014). State facilitated CTE programs utilize national program accreditations and standards for all programs in which such accreditations exist. Examples of these national accreditations include: The American Welding Society (AWS), the National Institute for Metalworking Skills (NIMS), Automotive Service Excellence (ASE), Medicaid Nurse Aid (MNA) and various other trade/skill specific accrediting agencies. In like manner, CTE instructors are required to hold these same nationally recognized individual

certifications and credentials if they exist (KDE, 2014). These rigid standards ensure that CTE students have opportunities to earn valid industrial certifications in these affiliated certifying and accrediting agencies. According to the ACTE, (2014) today's CTE programs prepare students for the rigorous and relevant education required for the high wage, high skill, and high-demand careers in the labor market. CTE programs of studies provide education and training for careers in the following (16) national Career Clusters (ACTE, 2014).

1. Agriculture Food and Natural Resources
2. Arts, AV Technology and Communication
3. Architecture and Construction
4. Business Management and Administration
5. Education and Training
6. Finance
7. Government and Public Administration
8. Health Science
9. Hospitality and Tourism
10. Human Services
11. Information Technology
12. Law, Public Safety, Corrections & Security
13. Manufacturing
14. Marketing
15. Science, Technology, Engineering & Mathematics
16. Transportation, Distribution & Logistics

Statement of Problem

As the United States strives to remain globally competitive in the labor market, educators must focus on producing more high school graduates that are ready for programs of study at the post-secondary level without remediation and able to enter the workforce at entry-level positions that lead to careers. Therefore, the need exists for educational systems to concentrate on programs that meet the requirements of higher-education institutions and the previously mentioned 21st-century skills. The education systems in the U.S. must step up to the challenge of graduating more students and instilling in them the knowledge and training which are vital for the nation to remain competitive in the global labor market. DeWitt (2007) contends that CTE is overlooked or even ignored as a pathway to economic strength and growth and that we should ensure that all participants in the policy debate understand the great potential of CTE as it pertains to American competitiveness and the economy (DeWitt, 2007). DeWitt, (2007) offers the following research as evidence that CTE programs provide some of the clearest links between education, student academic success, and the needs of business and industry.

* CTE concentrators take more and higher-level math than other students;

* Students at schools with highly integrated rigorous academic and CTE programs have significantly higher student achievement in reading, mathematics and science than do students at schools with fewer integrated programs;

* CTE graduates are 10-15 percent more likely to be in the labor force, and earn 8-9 percent more than graduates of academic programs; and

* More than 80 percent of respondents in the 2005 Skills Gap Report indicated that they are experiencing a shortage of qualified workers overall, with 13 percent reporting severe shortages and 68 percent indicating moderate shortages. Also, 90 percent of respondents indicated a moderate to severe shortage of qualified skilled production employees, including front-line workers, such as machinists, operators, craft workers, distributors and technicians. (DeWitt, 2007).

As a result of Senate Bill 1 (2009) and the recent No Child Left Behind (NCLB) waiver for the state of Kentucky; a new accountability system was formed called "Unbridled Learning" which included the newly formed College and Career Readiness (CCR) model. The CCR model received final approval by the Kentucky Board of Education in August of 2011. Within the CCR model, students can be classified in one of three categories: College Ready, Career Ready, or College and Career Ready. In order to meet the requirements of CCR in each of the three categories a student must meet a set of criteria and benchmarks set forth by the Kentucky Department of Education (KDE). The criteria for meeting each of these goals are located on the (CCR) chart in Appendix C:1. and in the definitions of terms.

Data presented in KDE's College and Career Readiness (CCR) delivery plan show why the vision for each student to graduate CCR is also a significant challenge. The Vision/Challenge section of the delivery plan offers evidence of a dire need to increase high-school graduation rates in Kentucky's public school system. In the 2010 PDK/Gallup poll, more than 90 percent of parents believe that a post- secondary experience is necessary to ensure a better quality of life, and that more than 90 percent of

2010 public high school graduates in Kentucky indicate a desire to attend post- secondary institutions. The College and Career Readiness delivery plan further noted that in 2010 with a graduation rate of 76 percent and college- and/or career-readiness rate of 34 percent, "it is a clear indicator that we are not adequately preparing students for the challenges of the world in which we live" (KDE, 2013, p.3).

According to KDE reports 80 % of all jobs in our state will require some form of training beyond high school and 63% of these jobs will require a post-secondary degree (Kentucky Department of Education, 2013). From 2009-2010 school year to 2012 -2013 school year, the CCR rate for high school graduates has increased from 34% to 50% and the graduation rate has gone from 76% to 86.1% (KDE, 2013). The above data and information shows that even though there have been significant improvements in each category, there is still an urgent need to increase the number of students who graduate and are ready for the next level of education or prepared for an entry-level position in the workforce that will lead to an enduring career.

Purpose of Study

This study will look at the effects of the programs of study within the realm of Career and Technical Education (CTE) on the graduation rates of high-school students. In this research, the graduation rates of CTE 12th grade concentrators will be compared to the mean graduation rates of all 12th -grade students in a corresponding high school for the 2012-2013 school year. This study will furthermore compare the graduation rates of CTE 12th grade concentrators to the graduation rates of all 12th grade high school graduates in the state for the 2012-2013 school year. The researcher will examine the data

to determine the effect that engaging in a prescribed career pathway in CTE (classified as a concentrator) has on the graduation rates of high-school students.

Research Questions

1. Is there a difference in the graduation rates of 12th -grade CTE concentrators in the16 participating Area Technology Centers (ATC) and the mean graduation rates of all 12th -grade students in their 16 corresponding high schools for the 2012-2013 academic school year?
2. For the 16 participating (ATC's), is there a difference in the graduation rates between male and female 12th -grade CTE concentrators for the 2012-2013 academic school year?
3. Is there a difference in the graduation rates between 12th -grade CTE concentrators in the 53 state operated ATCs and the mean graduation rate for all Kentucky 12th -graders enrolled in public high school systems for the 2012-2013 academic school year?

Framework

Much of the theory and framework for this study are guided and influenced by the national and local endeavors to increase the number of high school students that meet the criteria and therefore, can be classified as College and Career Ready (CCR) graduates. These goals are driven by our state's" No Child Left Behind" (NCLB) waiver and the new CCR delivery plan which was recently created by KDE. Data presented in KDE's CCR delivery plan show why the

vision for each student to graduate CCR is also a significant challenge. The Vision/Challenge section of the delivery plan offers evidence of a dire need to increase high-school graduation rates in Kentucky's public school system. In the 2010 PDK/Gallup poll, more than 90 percent of parents believe that a post- secondary experience is necessary to ensure a better quality of life, and that more than 90 percent of 2010 public high school graduates in Kentucky indicate a desire to attend post- secondary institutions. The College and Career Readiness delivery plan further noted that in 2010 with a graduation rate of 76 percent and college- and/or career-readiness rate of 34 percent, "it is a clear indicator that we are not adequately preparing students for the challenges of the world in which we live" (KDE, 2013, p.3).

Furthermore, supporting the idea that it is vital to increase the number of CCR graduates is the basic principle found in ideologies based on the Human Capital Theory (HCT). Although there have been many controversial issues historically with the theory, this research will utilize logic from Gary Becker's ideology, which contends that any costs associated with education will result in employment and produce a gainful return on the investment (Becker, 1975). Embedded in the HCT is the assertion that educators will adapt curriculum and related programs of studies to meet the needs of business and industry in the current society (Becker, 1993). The basic idea in the HCT follows the premise in CTE that rigorous and relevant technical education will prepare students for the high wage, high-demand jobs of the 21st century and therefore, lead to increased earning power and prosperity. Becker's research calculated a person's rate of return on human investments in human capital

and asserted that in each investment, a cost was required to acquire the capital but each investment has some impact on an individual's future earnings (Becker, 1994).

Becoming a CTE concentrator and a high school graduate provides students with two credentials that support the HCT. A high school diploma and a CCR certificate will qualify a high school graduate for a number of college-going opportunities and entry-level jobs that students without these credentials will most likely not experience (Jason, 2008).

Concept Map

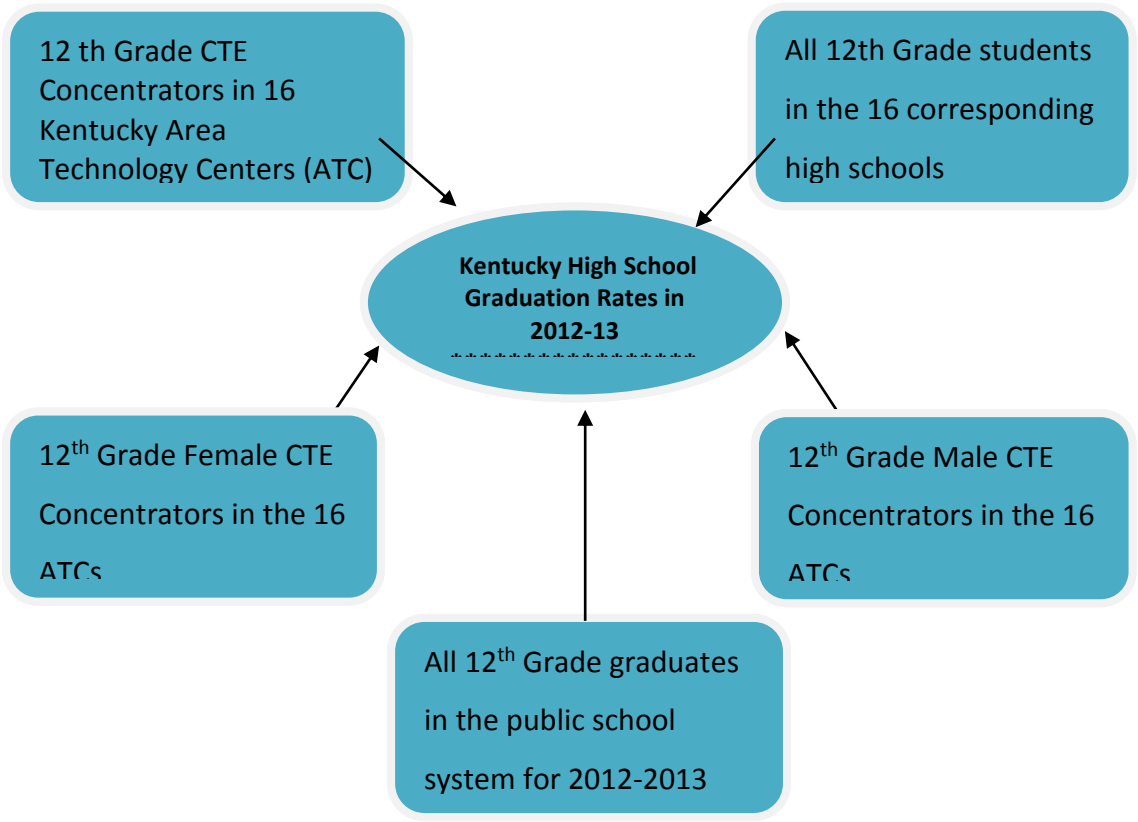

Figure 1

Illustrated framework of the impact of students attaining CTE concentrator status on overall graduation rates.

Assumptions, Limitations and Delimitations of the Study

This study replicates Shadden's 2011 study of the graduation rates of CTE concentrator and non-concentrator students in 15 northeast Tennessee school systems. As a result, this study encompasses many of the same limitations, assumptions, and delimitations. This study will assume a similar program of study exists in the realm of CTE for secondary students in both settings/studies.

The delimitations of this study include only the study of those CTE concentrators within the realm of the 53 state facilitated Area Technology Centers (ATCs). This study does not include analysis of secondary or post-secondary CTE programs outside the perimeters of the ATCs. This study excludes students earning a General-Education Diploma (GED) and includes only those students completing the prescribed programs of study within their respective ATCs and graduating at the completion of the 2012-2013 school year with at least a standard high school diploma. This research is done with the realization that the graduation rates of the CTE concentrators in the 16 Area Technology centers will be embedded in the mean graduation rates for all public schools in Kentucky as this data is intended to reflect the graduation rates of all 2012-2013 students across the state regardless of their various concentrations or career pathways.

This study assumes equal instruction, adequate facilities, and properly certified instructors for all programs in the participating ATCs. The focus of this study with regard to the independent variables will assume the utilization of a CTE curriculum and program of study that mirrors, articulates, and provides a seamless transition into post-secondary programs of studies in the Kentucky Community

Technical College System (KCTCS). This study assumes that CTE concentrator students are enrolled in programs that have established career opportunities and pathways into either a college or a career.

Significance of Study

With the recent No Child Left Behind, (NCLB) waiver, Kentucky was one of the several states given the option to reconstruct a new assessment and accountability system relieving the education system from the constraints of (NCLB). Kentucky has established an entirely new accountability system which is referred to as the "Unbridled Learning" system. This system includes strategies and approaches toward reaching two of the goals within the scope of this study; increasing the graduation rate and preparing all students for career pathways that promote the successful transition to college and/or careers.

The passing of Senate Bill 1 in 2009 mandated new academic standards in all subject areas and focused on the critical knowledge, skills and capacities needed for success in the global economy. It is vital to the health of our nation to increase the number of students who graduate from high school with a focus on a career pathway. CTE concentrator students are students who have decided to focus on a specific career goal in a program of study that leads to a clear pathway into either a relative course of study in higher education or an entry-level job that can lead to vibrant and prosperous career.

As the United States strives to remain globally competitive in the jobs that require a high level of technical knowledge and skill, educators must be the leaders and therefore, take the initiative in this continual effort. Technical skills are specialized

aptitudes necessary for acceptable performance within respective industries and current projections that demonstrate a continued need for skilled laborers despite the condition of the U.S. economy (Stone, 2009).

Because most states in the U.S. are adopting the challenge to graduate all students "College and Career Ready" (CCR), each component of the plan to do so is of utmost importance. Several states, including Kentucky, are utilizing the (NCLB) waiver and creating their own respective assessment and accountability systems. As both a benchmark criteria and an integral part of the new accountability system, CTE fits into each of the two categories (Kentucky Department of Education, 2013).

Definitions

*4S1 Report***:** the percentage of 12th-grade CTE concentrators who received a high school diploma, GED, or state certificate (Kentucky Department of Education, 2013).

Average Freshman Graduation Rate: (AFGR) is an estimate of the percentage of an entering freshman class graduating in four years (NCES, 2013).

Career and Technical Education (CTE): secondary courses that are based on practical activities related to an occupation or vocation (e.g., agriculture, health occupations, building trades) (Kentucky Department of Education, 2013).

Career and Technical Education (CTE) Concentrator: a high-school student who has completed two credits (units) in a sequential CTE program of study and is enrolled in the third (Kentucky Department of Education, 2013).

Career Ready: (KDE) defines a career ready student as a student who is a concentrator or preparatory (has completed two credits and is enrolled in the third credit) in a (CTE)

major (a sequence of progressive, non-duplicative courses that result in earning four credits) and has received either an industry certification or a Kentucky Occupational Skills Assessment (KOSSA) certificate, related to their career major, and has received either a silver certificate level on ACT "WorkKeys" or scored a 55 AFQT on the Armed Services Vocational Aptitude Battery (ASVAB). A general assessment of Career Readiness states that it "is the level of preparation a high school graduate must have in order to proceed to the next step in a chosen career, whether post-secondary course-work, industry certification, or entry into the workforce" (KDE, 2013).

College Ready: The Kentucky Department of Education (KDE) defines a college ready student as a student who met the benchmarks on ACT in English (18), Mathematics (36) and Reading (20) or passed a state-approved college placement test. These placement tests include either COMPASS English-Writing Skills (74), Mathematics (36) and Reading (35) or KYOTE –Mathematics (22). Students who fail one or more of the ACT measures but pass a corresponding measure on a placement test are college ready. A general assessment of College Readiness states that it is the level of preparation a first-time-student needs in order to succeed in a credit-bearing course at a post-secondary institution (KDE, 2013).

Graduation Rates: a federally required benchmark that calculates the percent of on-time graduates receiving a high school diploma (Kentucky Department of Education, 2013).

TEDS: Technical Education Database System maintained by the state of Kentucky for the collection and reporting of data associated with federal Carl D. Perkins funds (KDE, 2013).

Summary

The Kentucky Office of Career and Technical Education (OCTE) consists of 53 state operated Area Technology Centers (ATCs) that are designed to instill the 21st-century skills that are required to make students career ready by the above-mentioned state standards. Career and Technical Education (CTE) in Kentucky provides opportunities for students to earn valid industry certificates, which allow a seamless transition into many related occupations that lead to careers and to earn tuition-free college credit in these studies while still in high school. In order to achieve the goals that ensure success in society and the workforce, students must concentrate and focus on specific career pathways instead of considering their high school education as nothing more than an exploratory experience. This research will compare the graduation rates of 12th grade CTE concentrator students in the 16 participating Area Technology Centers (ATC) to all 12th -grade students in 16 corresponding high schools. The study will also compare the graduation rates of the CTE concentrators in all 53 state operated Area Technology Centers (ATC) to the mean graduation rate of all Kentucky 12th -grade students for the 2012-2013 school year in order to determine the effect of CTE studies on overall high-school graduation rates state-wide.

CHAPTER II

REVIEW OF LITERATURE

Introduction

This review of literature begins with the identification of Career and Technical Education (CTE) as described by reliable and documented historical facts provided by a variety of professional and scholarly sources. Information herein will explain the origin, implementation, and common objectives of CTE. Literature for this review will discuss CTE through related terms such as vocational education, career academies, shop or trade schools, etc. Contrasting views from sources for the design, purpose, and benefits of CTE as it relates to alignment to labor needs and the overall goal of high-school students graduating College and Career Ready (CCR) will be presented.

This review will examine CTE practices, curriculum, and design concerning its relationship with many important Kentucky Department of Education (KDE) strategies designed to implement the new Unbridled Learning System and increase the number of high school graduates in Kentucky (KDE, 2013). This review will look at CTE's role in the guidance counseling of students as well as the implementation of career pathways and programs of studies as they relate to the Individual Learning Plans (ILP) of each student.

The purpose of this review is to compare information herein to the following research regarding the effect of CTE concentrators on their graduation rates compared to students who are not CTE concentrators. Literature in this review will

also look at the effect of students who concentrate on CTE pathways in regard to continuing education, dual credit opportunities, and CCR in general.

Literature for this review was obtained from a variety of electronic sources and data bases accessed through Eastern Kentucky University's Crabbe library and their Educational Leadership and Policy Studies online guide. Many of the reviews herein were found through Pro-Quest, WorldCat, ERIC, Google Scholar, and other search engines, which exist as resources within the EKU library site.

CTE Origin & Development

In the early to middle 1800's children were educated to continue the family trades and practices by fathers and mothers who passed down their skills and knowledge in much the same way as their parents before them did. However, in the mid 1800's the federal government became involved in vocational education at the collegiate level with the passage of the Morrill Act.

Morrill Act. The Morrill Act of 1862 is considered the foundation on which the vocational programs of today exist. This act granted each state 30,000 acres of land for each senator and representative according to the 1860 census. The objective of the grant was for each state to use the land to establish and support at least one land grant college per state. The land was to be sold for $1.25 per acre to help establish these institutions or to maintain established institutions. The Morill Act provided for the establishment of 69 land-grant colleges with the intent to teach agriculture and mechanic arts and to promote the practical education of industrial classes (Russell, Broach, & Parker, 1938). Although the grant initiated the

groundwork for vocational education at the collegiate level, it was not without flaws. The initial grand excluded blacks from participation in the initial land college experience until the passing of the second Morrill Act of 1890. This Act required that land-grant funding be equally divided into states that maintained segregated colleges for separate races (Neyland, 1990).

Smith Hughes Act. Vocational education (CTE) was introduced at the federal level, and later funded as policy, with what is known as the Smith-Hughes Act of 1917 also referred to as the Vocational Act of 1917. This legislation prompted the creation of the Federal Board of Vocational Education with representatives from manufacturing, agriculture, and labor (Smith-Hughes Act 1917; Dugger, 1965). This act also served to subsidize teacher salaries in the fields of agriculture, home economics, and industrial education (Smith-Hughes Act, 1917). The Smith-Hughes Act helped to identify new goals and objectives for a nation in dire need of the skills to remain an industrial leader and focused on the vocational skills not evident in a traditional academic education. It offered possible solutions for a shortage of skilled laborers in agriculture and industrial trade jobs in the aftermath of World War 1 despite increased employment of immigrants (Smith-Hughes Act 1917; Dugger, 1965; Scott & Sarkees-Wircenski, 2008). The Smith Hughes act established separate boards, funds, teacher training, and professional development in vocational education and supported the segregation of vocational educational students and their related curriculum, all of which future legislation and education would address (Friedel, 2011).

Political influence. The Smith-Hughes Act was the result of many influences from political, social, and economically driven forces. One particular political influence came from President Woodrow Wilson, who after the analysis of a 1910 census report, created the Commission on National Aid to Vocational Education in1914. The report showed the need for additional vocational education and training (Patterson, n.d.; Kleiver, 1965).

The Vocational Educational Act of 1963.

Vocational education received national attention again with the passage of the Vocational Educational Act of 1963. The main purpose of the act was to secure funding for the training of both high-school students and adults who needed specific training in order to retain their present jobs or in order to qualify for other more technical jobs for which they were not currently qualified for (Dugger, 1965). The act provided funding for vocational schools to establish a minimum of five programs designed to teach students the required skills and a balanced education for those students not intending to pursue a baccalaureate degree (Dugger, 1965, p. 15). The act concentrated on the program areas most able to provide the currently needed skills and changed the way funds were distributed in such a way as to provide specific job placement opportunities for students (Warfield, 1969).

Politics & CTE. The establishment of the Department of Education (DOE) in 1867 marked a concentrated effort to advise and support local education institutions in their goals of providing effective educational programs and opportunities in the United States (U.S. Department of Education, 2010). The 1950s and 60s marked an era of open debates as to the

role that the federal government should have in the funding and implementation of public education (Debray, 2006). The emergence of (DOE) greatly influenced educational opportunities in nation's public school systems.

The passage of the Morrill Act of 1862 &1890, the Smith Hughes Act of 1917, and the Vocational Educational Act of 1963 evidenced the continued interest of the federal government in improving vocational education in the United States. Amendments to the Vocational Education Act of 1963 occurred in 1968, 1972, and 1978. With each amendment came increasing support for the manifold objectives and goals of CTE. Among the revisions were CTE programs at the post-secondary level, cooperative education, programs for the disadvantaged, programs for those in pursuit of the Industrial Arts, and for those aiming to improve student achievement in reading, mathematics, and written and oral communications (Scott & Sarkees-Wircenski, 2008).

Carl D. Perkins Act. The Vocational Education Act of 1963 was passed in an effort to "strengthen and improve the quality of vocational education and to expand the vocational education opportunities in the nation" (Vocational Education Act, 1964, p. 1). Carl Perkins, a native of Knox County, Kentucky and U.S. congressman, was driven to improve the education of those with whom he had grown up and had witnessed firsthand the results of inadequate education for those students not inclined or planning on attending a traditional four-year college. His political and social skills as well as his motivation and work to improve vocational education served to gain the respect of politicians from both parties (Smith, 2010).

The Carl D. Perkins Act of 1984 provided the foundation for current CTE legislation and paved the way for improved education among the underprivileged and uneducated students. The act provided increased opportunities for all vocational students, especially those with special needs (Lynch, 200).

Perkins II, also known as the Carl D. Perkins Act of 1990, was designed to keep the United States competitive in the global marketplace while tightening up the accountability statement in vocational education (Finch, 1999). The 1990 act called for a closer connection between school and work as well as more integration of academics into the vocational education curriculum (Gordon, 2003). Perkins III legislation provided federal funding for CTE beginning in October 1998 and continuing to the most recent Perkins reauthorization which occurred in 2006 (Library of Congress, 2005-2006; U.S. Department of Education, n.d.).

In a recent article, the Association for Career and Technical Education (ACTE) highlights what they claim to be a very important piece of federal support for CTE funding. The article includes a link to a letter written by more than 200 business, industry, and political and trade organizations pledging their support for the Carl D. Perkins Career and Technical Education Act (ACTE, 2014, "Support Perkins"). The letter lists three key objectives that they feel should be included in the Perkins reauthorization.

1. Aligning CTE programs to the needs of the labor market.
2. Supporting collaboration between secondary and post-secondary institutions and employers.

3. Increasing student participation in experiential learning opportunities and promoting the use of industry-recognized credentials. (ACTE, 2014,"Support Perkins").

CTE Champions, Leaders & Philosophers

According to Lerwick (1979), there are only two main philosophies of vocational education. The first philosophy espoused by a lawyer named Charles Prosser advocates that separateness exists between academic and vocational education. Prosser believed that the main purpose for vocational education was to train workers for trades and industrial occupations (Prosser & Quigley, 1949). He further believed that vocational education was essential to supply the skilled workers who would allow the nation to stay competitive in the world market. The purpose of vocational education was to meet the needs of business and industry (Lerwick, 1979).

A contrasting perception from philosopher John Dewey promotes progressivism and advocates for a broader view of vocational education. Rather than just providing students with the basic entry level skills for work, Dewey advocated for an education system that provided opportunities for students to explore alternative solutions to problems and to be adaptable and self-efficient. Dewey's philosophy called for a blend of academic and vocational education in order to provide a balanced education (Demiashkevick, 1935). The two philosophies present opportunities for discussion and debate in several areas, including: teaching styles and methodology to be used in teaching, administrative

structure, school philosophy, benefits of programs, transferability of skills, school to work transition, development of problem-solving skills, overall goals of schools, and personal motivators (Griffin, D. A., & Herren, R. V. 1998).

Current CTE

According to the Association for Career and Technical Education (ACTE) today's CTE consists of programs of studies that utilize and teach the cutting-edge 21st-century skills required by current business and industry and prepares youth and adults for a wide range of high wage, high skill, high-demand careers (ACTE, 2014). The executive summary of the ACTE collaborative report involving the Partnership for 21st-Century Skills, the ACTE, and the State Directors, National Association of State Directors of Career Technical Education (NASDCTEc), states that twenty-first century skills and career and technical education are synonymous and therefore, essential in every state, district and school committed to college and career readiness for all students (ACTE, 2014).

Investing in America's Future: A Blueprint for Transforming Career and Technical Education, comes from the Office of Vocational and Adult Education and lists the many ways in which CTE prepares students for life beyond high school. The article argues that CTE provides students with the academic skills, technical knowledge, and work related skills required to be successful in postsecondary education, training and employment and is a critical investment in our future (U.S. Department of Education, 2012). In the article Education Secretary Arne Duncan, (2012) stated "Our federal investment in CTE must be dramatically reshaped to fulfill

its potential to prepare all students, regardless of their backgrounds or circumstances, for further education and cutting-edge careers. The need to strengthen and elevate CTE is urgent. This is a not a time to tinker with CTE—it is a time to transform it" (Introduction section, para. 5).

A recent study and resulting article from the Harvard graduate School of Education contends that the U.S. approach to prepare students for higher education and careers is failing to do the job. The article "Pathways to Prosperity" shows compelling research that indicate that the U.S. is falling short and behind several other countries as we attempt to meet the demands of an evolving technically advanced work community. The article points to the evidence that a more holistic approach as seen within the realm of CTE provides the edge that is making the leading educators more successful and productive. The authors offer the following statements as indicators of the seriousness of the situation:

> Yet as we end the first decade of the 21st century, there are profoundly troubling signs that the U.S. is now failing to meet its obligation to prepare millions of young adults. In an era in which education has never been more important to economic success, the U.S. has fallen behind many other nations in educational attainment and achievement. Within the U.S. economy, there is also growing evidence of a "skills gap" in which many young adults lack the skills and work ethic needed for many jobs that pay a middle-class wage. Simultaneously, there has been a dramatic decline in the ability of adolescents and young adults to find work.

> Indeed, the percentage of teens and young adults who have jobs is now at the lowest level since World War II. 2. (Symonds, Schwartz & Ferguson, 2011, p.1).

Kentucky Tech Area Technology Centers (ATC)

Kentucky Tech refers to the 53 state operated Area Technology Centers (ATC) located strategically across Kentucky. The ATCs which were once located within the state's Workforce Development Cabinet, are now housed within the Kentucky Department of Education due to a recent merger of all secondary CTE into the Office of Career and Technical Education (OCTE). The OCTE consists of 53 ATCs, 44 locally operated Career Technology Centers, and a number of CTE programs embedded within the high schools in districts across the state. Funding for the ATCs is provided primarily through two major sources, state general fund appropriations and federal funds under the Carl D. Perkins Act of 2006. Additional monetary aid is provided through the Support Education Excellence in Kentucky (SEEK) from the KDE for secondary students who attend the ATCs (KDE, 2014). The Kentucky Tech system was the first technology system in the nation to be accredited by the Southern Association of Colleges and Schools (SACS), (KDE, 2014).

According to Dr. Dale Winkler, the Associate Commissioner of the OCTE, the ATCs provide secondary students with the opportunities to gain academic, technical, and occupational skills that will help them succeed in college and a career (KDE, 2014). Winkler, (2014) further states that due to the recently

established CTE steering committee and work groups, CTE has the charge to develop a new model of secondary career and technical education, which will include innovation, integration of academics, 21st-century skills, collaboration, and will focus on creating a consolidated system of delivery that will prepare a "world –class" workforce. Duel credit opportunities, articulation agreements, and a common CTE curriculum, enhance the probabilities and possibilities of secondary ATC students continuing their programs of study on with higher education.

CTE Benefits Research

Snow & Okojie (2013) examined CTE students in a rural County District in a southern part of the U.S. to see if their CTE programs were meeting the federal requirements of Carl D. Perkins indicators for successful CTE programs. The study offered that CTE students exhibited a higher mean score in the core subjects represented in the study than non-CTE students and provided CTE students "college experience" which is a primary objective of their CTE programs (Snow & Okojie, 2013).

According to Kotamraju, (2011) Career and Technical Education (CTE) is increasingly being seen as a major contributor to the recovery of the U.S. economy. This work focuses on CTE as a key factor in the education of our youth and in securing careers that ensure the stability of our nation in the global market place The author offers a typology of CTE course-taking and estimates that nearly half of all high-school students who take three or more CTE credits and are less likely to drop out than those taking from zero to one CTE credit (Aliaga, 2011).

Another article deals directly with CTE as a way for students to focus on the 21st-century skills required for a seamless transition into the labor-market today. The article explains how academics, technical content, and employability skills are integrated into the CTE curriculum and vital to the successful transition to higher education and the work force. The author says that CTE provides work-based learning opportunities that allow students to connect their learning to real-life career scenarios (TARCZYNSKI, 2012).

A recent article featured in a National Research Center for Career and Technical Education (NRCCTE) publication examines the impact of CTE programs of studies on academic and technical achievements of 9^{th} –12^{th} -grade students from two separate districts. The longitudinal study utilizes a mixed methods study involving site visits and the collection of data in regard to the tracking two groups of students for four consecutive years of high school studies. The two groups were the treatment group (those engaged in CTE Programs of Studies) and the control group (those not engaged in CTE programs of studies). Preliminary findings of the study indicate that a significant difference exists among those students who engaged in CTE pathways and those who did not. The study revealed that after completion of only two years, the treatment students' state test scores, academic grade point averages, and progress to graduation were better than those of the control and comparison schools. The study also indicated that a culture of engagement and achievement was more evident among the treatment group (Castello, Sundell, Overman, and Aliaga, 2012).

CTE Career Readiness/Guidance

One interesting review of literature in this study regarding career ready graduates, is an article that focuses on career and technical education (CTE) and it's role of career guidance for all students (Techniques: Connecting Education and Careers, 2009). This article speaks about the role that (CTE) plays in supporting a comprehensive guidance and counseling system, providing a curriculum framework for career exploration, and fostering student engagement through applied and personalized learning, (Techniques: Connecting Education and Careers, 2009, Harris & Mahar, 1975). Many of the strategies mentioned in this article mirror those integral in Kentucky's "Next-Generation Learners" accountability model initiated originally through legislation in Senate Bill1(Kentucky Department of Education, 2009).

As our nation becomes more aware of the shortage of skilled laborers, it has become imperative that its educational systems address the issue as well. CTE offers students the opportunity to work with their hands and to challenge their minds as they learn the advanced technical and occupational skills in demand by today's society and workforce. Today's CTE has stepped up to provide exclusive training and technical skills in the areas of information technology, health occupations, and trade & industry (Scott & Sarkees-Wircenski, 2008).

Another article highlights the importance of counselors in regard to the road to creating college and career ready graduates (Gysbers, 2013).The author notes that the lack of a base knowledge, regarding CTE programs of studies hinders counselors and other educational professionals from supplying students

with crucial information regarding the many CTE careers pathways which are available that lead to rewarding career opportunities in the workforce society.

A recent report in Kentucky looks at the benefits of incorporating college and or career coaches alongside regular guidance counselors in various secondary educational facilities. In an evaluative report involving college coaches placed in several of Kentucky's Area Technology Centers (ATCs) during the 2011-2012 school year, the authors offer encouraging information regarding the graduation rates and increased interest in higher-education opportunities of students who participated in the program. Authors Nicholas & Scruton, (2012) purpose three main objectives in the coaching endeavor:

1. To increase the number of Kentucky high-school students graduating from high school;
2. To increase the number of Kentucky high school graduates choosing to pursue post-secondary education;
3. To help build a college-going culture among Kentucky high-school students.

The authors argue that results from the report indicate a significant increase in the participating students GPAs and the rate of college enrollments are the direct results of the college coaching program and consequently, the special attention given to students who wouldn't normally consider a college education. The report elaborates on how college and career coaches worked closely with educational administrators and counselors to ensure that students learn to make full use of the resources and information available from their schools and communities (Nicholas & Scruton, 2012). The report also featured statistics regarding students persisting to

graduation after entering college, showing an even greater need for students to be aware of the rigors of college and what it takes to complete a college education. For the 2003 cohort in public universities in Kentucky, the four-year graduation rate was only 18%; the five-year graduation rate was 40%, and the six-year rate was 61% (Kentucky Council of Postsecondary Education, 2013).This report supports previous research related to the benefits of college awareness and readiness among secondary students.

CTE Programs of Study and Career Pathways. A recent article featured in the National Research Center for Career and Technical education (NRCCTE) examines CTE programs of study (POS) and what effect they may have on both the career readiness and graduation rates of participating students. The article features a presentation made at a national Association for Career and Technical Education (ACTE) conference in 2013 entitled: *Programs of Study: Findings from Three National Research Studies* (Castellano, 2013). The presentation examines Perkins IV mandates and the following four elements of a POS as a required guide for meeting federal accountability and assessment benchmarks: Secondary-Postsecondary Elements, Non-Duplicative Course Sequences, Opportunities for Dual Enrollment, and an Industry-Recognized Credential or Degree as the four vital elements for a POS (Castellano, 2013). The presentation boasts that CTE students participating in a program of study earn more college credits while in high school, have higher CTE GPAs, believe that what they are learning will be useful later in life, and helps them stay in school (Castellano, 2013).

As a result of the recent merger of all of secondary CTE into what is now known as the Office of Career and Technical Education, a revised common CTE program of study (POS) is being created for each respective program area in the system. The purpose of the new POS is to ensure consistency in regard to the courses and resulting career pathways in each program area across the system (KDE, 2014). CTE career pathways are listed in each individual POS and involve the completion of a sequence of four related courses from the program's master course list. A CTE concentrator or preparatory student is defined as one who has completed two courses within a specific career pathway and is enrolled in the third (KDE, 2014). The adherence to programs of studies and the consequential completion of respective career pathways satisfy federal funding mandates for CTE vital for the continued Perkins IV funding for Kentucky ATCs (Castellano, 2013; KDE, 2014).

CTE Common Core State Standards. As our nation continually seeks to improve secondary instruction and prepare students for college and careers beyond high school many curricular revisions have ensued. One such endeavor involves the implementation of the Common Core State Standards (CCSS). A recent article concerning the implementation of these standards contends that states utilizing the standards reflect common (CTE) as well as academic educational and learning goals and as educators, we should maximize the opportunity to break down the silos between the two disciplines and collectively find ways to ensure that the new standards rigorously engage all students in both academic and CTE courses (Meeder, Suddreth , & Achieve, 2012). The concept that in times past students must choose to either be academically oriented or career and technically oriented,

according to this source, is a gross misunderstanding. The article seems to adhere to a common premise as this research continues, and that is that in order for our nation to prepare high-school students for college, careers, and life in general, their education must include a healthy blend of both (CTE) and the core academic programs of study as seen in the (CCSS).

However, the push for all states to implement the new common core standards is not without opposition and what appears to be a growing concern. In a recent article focused on the mounting opposition to the standards the author writes, "Lawmakers in roughly 15 states**,** wary of what they see as federal pressure to adopt the common core and of other problems they associate with the standards**,** have introduced legislation during their current sessions to repeal the standards or replace them with other standards" (UJIFUSA, 2014).

Dual Credit for College. This review looks at a variety of articles that show how different states and Career and Technical institutions approach the problem of making sure their high school graduates are ready for entry-level jobs that lead to careers or ready to enter studies in higher education with a minimal number of remedial classes. One such study reviewed included an article by Eugenia Newall, (2013), regarding several strategies to increase (CCR) in their "Will Roger's College High School" WRCHS, located in Tulsa, Oklahoma. One of their strategies included partnering with Tulsa Community College (TCC) to bring college courses on the high school campus (Newall, 2013). The article boasts of advising programs at (WRCHS) designed to increase communication between students, their parents, and the teachers who will ensure higher numbers of

students that feel comfortable pursuing related college courses and subsequent degrees in their respective programs of study. Newall, (2013) states that these and other strategies are ways to decrease the dropout rate while increasing the number of students considered "College Ready." Their focus was to build a culture to support college and career readiness within their innovative college high school (Newall, 2013).

Another article touts the importance of articulation agreements and dual credit courses as a way for rural and underprivileged students to obtain an advantage regarding enrolling and becoming successful in a related course of study in a community college setting (Hirschy, Bremer, & Castellano, 2011). One author contends that "college knowledge" is a key factor in CTE students pursuing higher-education opportunities (Hooker & Brand, 2010).

Data retrieved through another recent NCES report, *Post-secondary and Labor Force Transitions among Public High School Career and Technical Education Participants,* NCES, (2011) states that more than 70 percent of secondary CTE concentrators pursued post-secondary education shortly after high school. These statistics support the premise that students who concentrate on completing a CTE pathway are much more likely to accrue dual credit and/or participate in articulation agreements that promote studies in higher education and the pursuit of related careers.

Gender and CTE Participation. The Educational Amendments of 1972 states that "no person in the United States shall, based on sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under

any education program or activity receiving federal financial assistance" (Kaplin & Lee, 2006, p. 1462). However, Toglia, (2013), found that now 35 years after the initial implementation of these gender focused amendments the divide in Career and Technical Education (CTE) has narrowed barely at all. Toglia, (2013) reported that while a large number of females participate in the traditional programs such as Cosmetology, Childcare, and Health-related courses (86-87%), they are still grossly misrepresented in the non-traditional programs. Programs that have historically been male dominate such as Heating and AC, Welding, Electrician, and Plumbing, show female participation percentages in the single digits. A related report contends that historically, the problem of gender equity in technical education existed in part due to our own societies "elitist biases" (Sanders & Lubetkin, 1989). These authors highlight the need for gender equity efforts to overcome these biases and to promote technical careers for girls in the United States. The authors contend that without these efforts, many girls would not pursue a variety of technical and math-related courses that lead to rewarding careers. Although legislation in the U.S. regarding the Carl D. Perkins Act of 1984 required states to assign an individual known as the sex equity coordinator to help overcome the gender equity problems in vocational education, when Perkins was re-authorized in 1990 only 3% of federal funds were allocated to gender equity programs (Gathercoal & Stern, 1987: NWLC, 2005).

Secondary Graduation Rates

High-school graduation rates have long been considered as important social and economic statistics. In the United States, a high school diploma is an important factor in the growth and prosperity of our nation's economy. One article pertaining to the readiness of our U.S. students to pursue successful avenues of higher education recently stated that some 50 years beyond "Brown" our nation's number of college ready students had remained much the same. The article further mentions the lack of progress regarding proper and valid assessment methods in our secondary school systems as a key factor in the lack of progress (Katinas & Bush, 2006).

From the late 1990s until around 2008, our nation's graduation rates have fluctuated only by a few percent, and according to some reports have gone in both directions. A leading source for educational statistics is the National Center for Educational Statistics (NCES). In a recent report, NCES statistics report the following information in regard to U.S. graduation rates.

> Across the United States, a total of 3,128,022 public school students received a high school diploma in 2009–10, resulting in a calculated Averaged Freshman Graduation Rate (AFGR) of 78.2 percent (table1). This rate ranged from 57.8 percent in Nevada and 59.9 percent in the District of Columbia to 91.1 in Wisconsin and 91.4 percent in Vermont. The median state AFGR was 78.6 percent (Stillwell & Sable, 2013).

Average Freshman Graduation Rate. According to a recent report from the National Center for Educational Statistics (NCES) in the school year 2009-10, some 3.1 million public high-school students, or 78.2 percent, graduated on time with a regular diploma. These data represent information based on what is known as the "Average Freshman Graduation Rate" (AFGR). : The Averaged Freshman Graduation Rate is the number of graduates divided by the estimated freshman enrollment count four years earlier. This count is the sum of the number of 8th-graders five years earlier, the number of 9th -graders four years earlier, and the number of 10th -graders three years earlier, divided by 3. Ungraded students are allocated to individual grades proportional to each state's enrollment in those grades. Graduates include only those who earned regular diplomas or diplomas for advanced academic achievement (e.g., honors diploma) as defined by the state or jurisdiction (U.S. Department of education, 2012).

Cohort Graduation System: According to Kentucky Department of Education (KDE) beginning with the 2012-2013 school year Kentucky will adopt and utilize the "Four-Year Adjusted Cohort Graduation Rate" system. This new system provides a more accurate graduation model that follows students from their first year in high school through their expected cohort graduation school year. Federal regulations define the system as the number of students who graduate in four years divided by the number of students who entered high school four years earlier (KDE, 2013).

In 2013, Kentucky's graduation rates reached 77.2%, which surpassed the national average of 74.7% (Stevenson, 2013). In the local news report, Stevenson

also contended that with the rise in graduation rates, there is an even greater need to establish a college-going culture and to assist students in all demographics with preparing for college (Stevenson, 2013).

Data released in a "*Consolidated Annual Report for the Carl D. Perkins Act of 2006 Program Year 2007-2008*" and published by the National Center for Educational Statistics, (2010) states that the average high-school graduation rate for students concentrating in CTE programs is 90.18 percent, compared to an average national freshman graduation rate of 74.9 percent (as cited in ACTE, 2014, CTE Today, p.1).

Graduation Rate Inconsistencies. High-School Graduation Rates, (2006) reports that even though graduation rates constitute a requirement for measuring school and district performance under the No Child Left Behind Act, states use different methods by which to calculate them, and this leads to inflation of the rates. The article states that using a common Cumulative Promotion Index (CPI), the Editorial Projects Education Research Center reported state graduation rates that ranged from a low of 21.7% in Detroit to a high of 82.5% in Fairfax.VA. The CPI consistently found inflation among the reported rates across the states. (High-School Graduation Rates, 2006).

Literature Conclusion

As the United States searches for new strategies to increase the number of high school graduates and to grow a more technically advanced workforce, our education systems must look at each available option. Many laws and initiatives

regarding CTE have been implemented in order to provide the nation with high school graduates that are ready for the rigors of higher education and/or the world of work in specialized fields that lead to careers. According to many previously mentioned educational and industrial professionals, CTE provides a variety of programs and career pathways that should provide these continuous and rapidly evolving 21st-century skills upon graduation.

As our nation, and our state, struggle to bounce back from a very long and drawn-out time of economic recession many predictions of job growth abound. According to Price & Reeves, (2003) one of the most challenging tasks for student reform is to increase the number of college-going students from poverty stricken and rural communities where their focus is not primarily on higher education. Youmans, (1958) reinforced the idea of how hard it is for rural youth to pursue post-secondary education when their backgrounds and family histories often discourage this pursuit. A recent article in CNBC's "Today Money" touted that government analysts predict a 14.3% growth in overall jobs between 2010 and 2020. A more recent Bureau of Labor prediction states that from 2012 to 2020 there will be a 10.8% increase in total employment (BLS, 2012). Adding to the problem of unemployment rates, Harris & Mahar (1975) contend that a lack of resources in poorer and often more rural areas, compound the problem of graduating career ready students and that these problems are even more evident among the exceptional children in those settings.

In order for our educational systems to produce high school graduates that are indeed college and career ready many strategies are underway to focus on the

skills and education that will be required for these fast-growing occupations. CTE will play a vital role in preparing secondary students to graduate meeting the "career ready" benchmarks that make up KDE's new "Unbridled Learning" delivery plan (KDE, 2013).This This study examines CTE as a viable method to engage students, increase graduation rates, decrease drop-out rates, and prepare high school graduates for future college and career opportunities in Kentucky and across the nation.

CHAPTER III

METHODOLOGY

Introduction

This chapter describes the methodology incorporated in the examination and comparison of the graduation rates of two groups of secondary students, Career and Technical Education (CTE) students who have decided to focus their studies in a specific field of study for at least three high school credits, and those that have not made this commitment. This research will consist of a quantitative approach and utilize a descriptive analysis of the researched data for the study.

For the purpose of this study, the two groups of students will be 12th grade CTE concentrators from 16 Area Technology Centers (ATCs) and all 12th -grade students in each of the 16 corresponding high schools in their respective districts. The majority of ATCs are located in rural school districts and are equally distributed among four quadrants/regions of Kentucky. Like many rural communities, the students who attend schools in these districts often contend with limited educational resources with which to prepare them for a limited number of job opportunities. As a CTE central office administrator, I have personally visited most if not all of our 53 state operated ATCs and offer that these entities are not exempt from the ailing state budget deficits that plague other state agencies and organizations.

This research compares the graduation rates of 12th grade CTE concentrator students enrolled in each of the sixteen Area Technology Centers (ATCs) to the graduation rates of the general body of 12th -grade students in each of the ATC's

corresponding high schools. To ensure that the two groups were indeed independent, data for the corresponding high schools was gathered and any CTE concentrator students from the corresponding ATCs were extracted. CTE concentrator students are those secondary students who have completed two high school credits in a specific CTE career pathway and have enrolled in the third course within the program of study. Another term which applies respectively to the concentrator group (in regard to federal Perkins accountability) is preparatory. CTE students who persist on to graduation with (4) high school credits in a specific CTE program of study are also referred to as completers according to the definitions from the Kentucky Department of Education (KDE, 2013). This chapter includes research information regarding the following topics: research questions, design, data collection, analysis of data, researcher subjectivities, trustworthiness of the study, benefits and risks, timeline, significance, and key terms of the study.

Purpose of Study

The purpose of this study is to compare the graduation rates of 12th grade Career and Technical Education (CTE) concentrator students to the graduation rates of 12th -grade students in the 16 corresponding high schools from their respective districts during the 2012-2013 school year. The research focuses on (16) Area Technology Centers (ATCs) and their respective high schools equally chosen to represent the four geographical quadrants and regions in the state. The research also examines a comparison of the graduation rates of these CTE concentrators to the rates of all high school 2012-2013 graduates in Kentucky. The study places a specific emphasis on the career readiness of these CTE concentrators compared to non CTE concentrators. This study also

compares the graduation rates of male and female CTE concentrator graduate during the 2012 -2013 school year. The intent of this research was to research and analyze data in regard to students who have concentrated on a specific CTE career pathway and those that have not done so, and to compare the graduation rates of each group. This study replicates a similar study conducted in Tennessee regarding "The Graduation Rates of Career and Technical Education Concentrators in Tennessee" (Shadden, 2011).

Research Design and Analysis

This study utilized a quantitative design to research and gather data for an individual group comparison of the graduation rates of the two groups, CTE concentrators from 16 separate ATCs randomly chosen across the state, and high school graduates from 16 corresponding high schools in respective districts from across the state. In order to maintain the independence of the two groups, data for the high-school students was mined and all ATC concentrator students extracted from the group. This method of data mining provided two groups of students, CTE concentrators from the 16 ATCs and non-CTE concentrators from 16 corresponding high schools. This research also utilized a descriptive statistical analysis process for comparing the means of the CTE concentrators by gender. This research incorporated the use of SSPS v. 22, a widely used program for statistical analysis in social science, to compare the researched data. Data was analyzed and compared utilizing quantitative descriptive analysis procedures within the scope of the statistical software SSPS v.22. An individual group t-test was used to compare the means and standard deviation for the study. Statistical significance was assessed at the 5% level of significance (p-value < 0.05).

Population and Sample

This research utilized the SSPS program to analyze the data retrieved from a sample of CTE students in 16 Area Technology Centers geographically located in such a way as to provide equal distribution across the state. This sample will serve to provide information for the population of CTE students throughout Kentucky in regard to the effect of CTE students classified as concentrators within the 16 participating school districts. This research compares the graduation rates of these CTE concentrator students to the graduation rates of 16 corresponding high schools in respective districts, which do not include the ATC concentrator students. The comparison of graduation rates of CTE concentrators to the rates of all other high school graduates in Kentucky will provide a generalization as to the overall effect of CTE on the statewide graduation rates of students in Kentucky's public school system.

Research Questions and Null Hypotheses

1. Is there a difference in the graduation rates of 12th -grade CTE concentrators in the16 participating Area Technology Centers (ATC) and the mean graduation rates of all 12th -grade students in their 16 corresponding school districts for the 2012-2013 academic school year?

Ho1: There is no significant difference in the graduation rates of 12th -grade students between CTE concentrators and all other 12th -grade students in the 16 corresponding districts for the 2012-2013 academic school year.

2. For the 16 participating (ATC's), is there a difference in the graduation rates between male and female 12th -grade CTE concentrators for the 2012-2013 academic school year? Ho2: There is no difference in the graduation rates

between male and female 12th -grade CTE concentrators in the 16 ATCs for the 2012-2013 academic school year.

3. Is there a difference in the graduation rates between 12th -grade CTE concentrators in the 53 state operated ATCs and the mean graduation rate for all Kentucky 12th graders enrolled in public high school systems for the 2012-2013 academic school year?

Ho3: There is no difference in the graduation rates between 12th -grade, CTE concentrators and the state's mean graduation rate for all 12th -grade students in public school systems in Kentucky for the 2012-2013 academic school year.

Data Collection

This study used existing data sets retrieved from the Kentucky Department of Education's Technical Education Data System (TEDS). The TEDS system tracks CTE students' graduation rates, preparatory/concentrator students, and other vital information required by the federal Perkins Act. No human participants were used in this study, which therefore qualified the study for exempt status from Eastern Kentucky University's Institutional Review Board. This exempt is authorized under Protocol Number 16-123. As a precautionary measure, any data required of the participating ATCs will be retrieved directly from the schools in accordance with permissions granted through the International Review Board (IRB). This research will also utilize public information available from the Kentucky School Report Card accessed through the website for the Kentucky Department of Education (KDE), 2013.

Researcher Subjectivities

As a career employee with the Office of Career and Technical Education (OCTE) and a member of the central office leadership team for the KY Tech school system, I am aware of my views and biases in regard to the overall benefits of (CTE). I am also conscious that in order to gather information as to precisely how (CTE) helps students to become high school graduates; I will need solid empirical evidence from the data collected within this study. I will strive to define the points in this study where my particular involvement in the realm of CTE should be considered and understood regarding the object of discussion on a particular point of view, and how my subjectivities may project bias opinions within a given topic of discussion. I remain aware of my experience of teaching in a small rural community for 12 years and seeing first-hand the obstacles that the students in these poorer communities encounter during their educational pursuit of a high school diploma. While this study is based on a comparison and analysis of the data for the two previously defined groups, I am aware that an inevitable viewpoint exists as an internal factor because of my direct involvement with Career and Technical Education on multiple levels for the past twenty years. The researcher has made every effort to research, gather, and analyze data without bias.

Trustworthiness

This study will serve to inform readers regarding any benefits that exist among CTE whereby high-school students might become more prepared for higher education and/or an entry-level position in the workforce upon completion of a program of study in a CTE setting/school. All International Review Board (IRB) rules, regulations, and

guidelines will be followed to ensure that any risks be kept to a minimum. All participants will be given a copy of the "informed consent form" mandated by IRB.

Benefits and Risks of Study

This research will provide secondary educational administrators with information as to what programs serve to engage and retain students thereby improving the school or district's graduation rates. This research will benefit all secondary students as they endeavor to take courses that offer the needed skills and knowledge which will allow for seamless to the next level of education or opportunities to enter the workforce in fields leading to rewarding careers. The study will have the inherit risks of supporting the null hypotheses that CTE does not affect the graduation rates of high-school students. There will be no known risks to any participating educational agencies as the study's objectives are limited to essentially examining the statistics of graduation rates of before mentioned groups of CTE concentrator and non-CTE concentrator students and making comparisons to the general graduation rate mean of high-school students for the same period of time.

Timeline

I am completing my dissertation during the fall semester of 2015 and plan to graduate in May 2016. I utilized an independent study to structure the prospectus for my dissertation during the fall 2014 semester and continued this process until my prospectus defense was successful and accepted.

Significance of the Study

This study will benefit every stakeholder involved in secondary education. The outcomes rendered in this study will show how (CTE) fits into the bigger picture of making Kentucky students career ready high school graduates. It will show all interested, students, parents, teachers, educational administrators, and our related business and industries how the concentration on a CTE pathway can capture the interest of students, decrease dropout rates, and therefore, improve graduation rates among secondary students. The study will also bring a more direct focus on the CTE community and make transparent the significance of students choosing and adhering to a specific career pathway while in high school.

This research will serve to show how CTE fits into the bigger picture of Transforming Education in Kentucky (TEK) which is a direct result of the recent passage of Senate Bill #1 and consequently, the states newly developed educational delivery plan (KDE, 2013). The educational mandates (issued as a result of the recent TEK report) coupled with a waiver from the No Child Left Behind (NCLB) initiative, required the Kentucky Department of Education to develop their own unique assessment and accountability system to replace the requirements found within NCLB. The new delivery system will include benchmarks to track student's growth, achievements, CCR, Gap student growth, and graduation rates. The plan will also monitor the Professional Growth and Effectiveness (PGES) of each teacher, Principal, and Superintendent in the state's public school systems. The main goal and priority of the delivery plan is to make each Kentucky Kentuckyian College and Career Ready (CCR) upon graduation from high school (KDE, 2013). This study will showcase the important role that CTE has in

reaching the CCR state-wide goal. It is the hope of the researcher that the study will highlight the possible benefits of focusing/concentrating on a particular CTE program of study as high school graduates begin the pursuit for a higher level of education or entry level in the workforce leading to a career. This study will include a majority of rural school districts in Kentucky, which face even greater obstacles concerning building a culture of CCR students when backgrounds and family histories never made going to college a priority (Newall, 2013).

Key Terms

Career and Technical Education (CTE) students. In this study CTE, students represent secondary students typically in a high school setting who have completed two high school credits and are enrolled in the third CTE course within a specific career pathway. These students are classified as "preparatory" in CTE education. This program of study is integral to their Individual Learning Plan (ILP) which directs their course of study culminating in their high-school graduation.

CTE Concentrator. A CTE student who has completed at least two high school credits in a CTE career pathway (aka a program of study) and is enrolled in the third course.

College and Career Ready (CCR) student. A student is classified as college and career ready when they meet the criteria established by the Kentucky Department of Education (KDE). These criteria include the passing of various state college and employment examinations (ACT, COMPASS, KYOTE, KOSSA, etc.,) as well as completion of a prescribed course of study as outlined in their program of studies or (ILPs). A chart describing this (CCR) criteria can be found in the Appendix A of this study.

NCLB. No Child Left Behind is a federally imposed mandate of assessment and accountability measures for state educational systems in the U.S.

TEK. Transforming Education in Kentucky- state legislated mandates as a result of a focus-group study regarding the education systems in Kentucky and proposed reforms brought about by Senate Bill One, 2009.

21st-Century skills. These are the skills that have been determined by local, state, and national businesses and industries to be necessary for the successful transaction from secondary education to a job/career in today's competitive labor market. These skills include: occupational, employability, and technical skills as well as the many attributes associated with these skills such as the abilities to be team-players, problem solvers, and overall good work ethics.

Summary

This research will provide data to determine the overall effect of CTE concentrators on the graduation rates of high-school students in Kentucky during the 2012-2013 school year. The statistical analysis and comparison of the means and standard deviations of CTE concentrators and non- CTE concentrators will provide data to determine if significant CTE studies significantly increase or decrease these graduation rates among students and to what degree the rates were affected. This research will provide information not readily available for educators, students, and all other stakeholders in the educational community and various rural districts as to the effects of CTE studies on overall graduation rates. This study examines both the theoretical and practical effects of students that pursue career pathways and their respective programs of

studies compared to those students who don't. The study will also show if and how participation in rigorous and relevant programs of study within the CTE realm increase high school student's chances of graduating from high school with the training and skills that enhance their opportunities for a successful transition into college and or a career.

CHAPTER IV

RESULTS

Introduction

The primary purpose of this study was to determine if there was a statistically significant difference in the graduation rates of 12th grade Career and Technical Education (CTE) concentrator students in (16) Area Technology Centers (ATC) and the graduation rates of all 12th grade non- CTE concentrator students enrolled in the (16) corresponding high schools for the 2012 - 2013 school year. The study also examined and compared the graduation rates of the male and female graduates from the 16 ATC concentrators. Lastly, in order to examine and compare a larger population of each group, this study compared the graduation rates of all CTE concentrator students from the 53 state operated Area Technology Centers to the overall graduation rates of all 12th -grade students in the public school system for the 2012-2013 school year. This chapter is divided into three separate phases intended to answer the three research questions that initiated and continue to drive this study.

Phase one explains the research methods to gather and examine the data for the graduation rates of CTE concentrators from the (16) ATCs and compare them to the graduation rates of non-CTE concentrators from (16) corresponding high schools for the 2012 - 2013 school year. Data for this phase was retrieved from existing data sets from both the Office of Career and Technical Education's exclusive Technical Education Data System (TEDS) and KDE's "School Report Card."

Phase two of this study examines and separates and compares the graduation rate data for 12th grade CTE concentrator students for the (16) ATCs according to gender for the 2012 - 2013 school year. This information was retrieved from TEDS reports for the respective ATCs.

Phase three of this research compares the graduation rate mean for the 12th -grade students in the 53 state operated ATCs with the graduation rate mean of all 12th -grade students enrolled in public schools for the 2012-2013 school year. Data for this comparison was also retrieved from existing data sets from both TEDS and the Kentucky Department of Education's online "School Report Card" (See all relative tables and figures in the appendix).

Phase I

In phase I, the researcher examines the TEDS reports for the graduation rates of concentrators in each of the (16) Kentucky Tech. Area Technology Centers (ATCs) for the 2012 -2013 school year. These ATCs were randomly chosen due to their location and therefore, include four ATCs in each of the four main geographical sections of the state. The researcher then located the graduation rates of all 12th -grade students in the 2012 – 2013 school year for each of the (16) corresponding school districts.

Graduation rates for the Non-CTE concentrators from the sixteen comparable high schools was mined utilizing both the KDE state report card and the state Technical Education Data System (TEDS). CTE concentrator students who attended the corresponding ATCs were extracted from the matching high schools so that a true graduation rate of the high schools, excluding CTE concentrators, could be compared to

the ATC concentrators. Graduation rate data for the students in the two groups, ATC Concentrators and non-CTE concentrators from the comparable high schools were then compiled, and an independent sample's T-Test was generated using the Statistical Package for the Social Sciences (SPSS) version 22. The output from SPSS relates directly to Null hypothesis and research question number (1) as listed below.

1. Is there a difference in the graduation rates of 12th -grade CTE concentrators in the16 participating Area Technology Centers (ATC) and the mean graduation rates of all 12th -grade non-CTE concentrator students in their 16 corresponding high schools for the 2012-2013 academic school year?

Ho1: There is no significant difference in the graduation rates of 12th -grade students between CTE concentrators and non-CTE concentrator 12th -grade students in the 16 corresponding high schools for the 2012-2013 academic school year.

Results

An Independent Samples T-Test was conducted to determine if there was a statistically significant difference in the graduation rates of the CTE concentrator students and the general students in the corresponding high schools (Table 1). Using a two-tailed, .05 criterion, we reject the null hypothesis. The CTE concentrator group (M = 97.20, SD = 2.69) scored significantly higher graduation rates than the general 12th grade non-CTE students (M = 85.51, SD = 5.10) (Table 1). In Levene's Test for Equality of Variances showing the significant value of .282 (which is less than .05) means that the variability of the two conditions is not significantly different. SPSS output data from the actual "t-test for Equality of Means" result's section shows the "sig" (also known as the P value) at

.000, which is below .05 and indicative that there is a statistical difference between the two groups. The mean difference between the groups indicates that the CTE group's graduation rates were 11.69% higher than the non-CTE group.

Table 1

Independent Samples Test, Graduation rate by Group, 2012-13

Group	N	Mean	Standard Deviation
CTE Concentrators	16	97.20	2.69
Non-CTE Concentrators	16	85.51	5.10

Note: Effect size *Cohen's d* = 5.93.

Sources retrieved from the Technical Education Data System and Kentucky Department of Education (KDE). (2013). *Graduation Data.* Retrieved from http://education.ky.gov/AA/Reports/Pages/Graduation-Rate-Data.aspx

The statistical analysis, therefore, rejects the null hypothesis, Ho:$\mu_{\text{♂}} = \mu_{\text{♀}}$ which stated that there was no significant difference in the graduation rates of the two groups and consequently, supports the alternative hypothesis due to the t-test results which indicate that the graduation rates of the CTE concentrator students were significantly higher than the graduation rates of the non-CTE concentrator students for the 2012 -2013 school year.

Phase II

Phase II of the study compares the data for male and female CTE concentrator students from the 16 Area Technology Centers (ATCs) to see if there is a significant difference in the graduation rate percentages for the two groups. This comparison used existing data from the Technical Education Data System (TEDS). The Independent Samples T-Test was once again utilized to compare the means of the groups. This phase answers research question #2, which is stated as follows:

> 2. For the 16 participating (ATC's), is there a difference in the graduation rates between male and female 12th-grade CTE concentrators for the 2012-2013 academic school year? Ho2: There is no difference in the graduation rates between male and female 12th-grade CTE concentrators in the 16 ATCs for the 2012-2013 academic school year.

Results

An Independent Samples T-Test was conducted to determine if there was a statistically significant difference in the graduation rates of the CTE concentrator male and CTE concentrator female students. Using a two-tailed .05 criterion, SPSS failed to reject the null hypothesis showing no significant statistical difference between the graduation rates of male and female CTE concentrator students for 2012-2013. The P value for the t-test was.68, which is greater than .05 and indicates that at this confidence level the mean difference, is likely due to chance (Table 2).

Table 2

Independent Samples Test, Graduation rates by Gender, 2012-13

Concentrators	N	Mean
Male	16	97.24
Female	16	96.66

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Sources retrieved from the Technical Education Data System and Kentucky Department of Education (KDE). (2013). *Graduation Data.* Retrieved from http://education.ky.gov/AA/Reports/Pages/Graduation-Rate-Data.aspx

The graduation rate of female concentrators in sixteen districts was 96.66 percent, nearly equal to the graduation rates of male concentrators, 97.24%.

PHASE III

Phase III of this study compares the graduation rates of all 53 state operated Area Technology Centers (ATCs) to the average graduation rate of all graduates in the public school system in the state. This comparison also utilized existing data from the Technical Education Data System (TEDS) and the Kentucky Department of Education (KDE) state report card. This analysis utilized a single sample T-test to compare the means of the graduation rates of the (53) state operated Area Technology Centers to the state average graduation rate for the 2012 – 2013 school year. The state's graduation rate as reported on the KDE online report card was 86.1%. This phase answers research question #3 as follows:

3. Is there a difference in the graduation rates between12th-grade CTE concentrators in the 53 state operated ATCs and the mean graduation rate for all Kentucky 12th graders enrolled in public high school systems for the 2012-2013 academic school year?

Ho3: There is no difference in the graduation rates between 12th -grade, CTE concentrators and the state's mean graduation rate for all 12th -grade students in public school systems in Kentucky for the 2012-2013 academic school

Results

The single sample t-test showed that the mean graduation rate for the ATCs was 97.61%. This comparison resulted in a "P" value of .000, which means that the null hypothesis is rejected and the alternative by default is supported. The test indicated that there is a statistically significant difference in the graduation rates of two means with the ATC's mean being 11.51% higher than the public school system's state average mean.

Table 3

One-Sample T Test, Graduation Rate, Population and Sample, 2012-13

	Test Value = 86.1			
	t	*df*	*Sig. (2 tailed)*	*Mean Diff*
	25.99	53	.00	11.51

Sources retrieved from the Technical Education Data System and Kentucky Department of Education (KDE). (2013). *Graduation Data.* Retrieved from http://education.ky.gov/AA/Reports/Pages/Graduation-Rate-Data.aspx

Summary

The results of this study were determined by the research which dealt exclusively with answering the three before stated research questions in three respective phases as described in this chapter. The main objective of this study is to examine the graduation rate data for two distinct groups of high school seniors (CTE concentrators & non-CTE concentrators) during the 2012 – 2013 school year and determine if there was a significant statistical difference between the groups. The study involved data collection, comparison, and a statistical analysis for the two groups. Group (1) consisted of Area Technology Center (ATC) senior students from 16 randomly chosen ATCs, who had reached "CTE concentrator" status and group (2) senior students from 16 corresponding high schools that were not classified as "CTE concentrator students." The data comparison and statistical analysis as performed utilizing the independent samples t-test from the "SPSS" software indicated that there was a significant statistical difference between the two groups with the CTE concentrator group scoring 11.69% higher graduation rates than the non-CTE concentrator students from the corresponding high schools.

The researcher also examined the graduation rate data for the ATC students according to gender to determine if a significant difference existed. This comparison, also utilizing "SPSS" and the independent samples t-test, indicated no significant difference between the two groups.

The final phase in this study concludes with an effort to look at two larger groups of students, CTE concentrators and all regular senior students in the KY public school system for the 2012-2013 school year. This phase compared the graduation rates of all

CTE concentrator students from the 53 state operated ATCs to the rates of all graduates from the Kentucky public school system. This comparison utilized a single sample t-test to compare and analyze the means of the two groups. The findings concluded that there was a significant difference between the two groups with the CTE concentrator graduation mean at 97.61 and the regular public school's mean at 86.1%.

CHAPTER V

CONCLUSIONS

Purpose of the Study

The main focus of this study was to collect, examine, and compare the graduation rates of two different groups of high-school students in the state of Kentucky. The first group consisted of CTE concentrator students from (16) randomly chosen Area Technology Centers (ATCs) and the second group consisted of non-CTE concentrator students from 16 corresponding high schools within the public school system. The two groups were randomly chosen to represent all four geographical quadrants in the state of Kentucky for the 2012-2013 school year. The primary objective of the study was to determine if a statistically significant difference existed between the two groups' graduation rates.

This study replicates a similar study conducted by a doctoral candidate in the state of Tennessee, which compared the graduation rates of CTE concentrators and non-CTE concentrators in fifteen Northeast Tennessee school systems (Shadden, 2011). One significant difference in the two studies is that the Tennessee study examines two groups of students who are situated within their public school systems, and the Kentucky study examines graduation data from both state operated and funded Area Technology Centers and the Kentucky public school system. However, both studies examine, contrast and compare the graduation rates of CTE concentrator and non-CTE concentrator students in at least one or more phases of research.

The study's primary goal is to determine whether there is a statistically significant difference between the graduation rates of the two previously identified groups. Given the large percentage of secondary students participating in CTE studies, this research examines data that may be used to determine the extent and nature of future secondary programs of study and career pathways leading to higher graduation rates. Previously stated reports show that in the 2010-2011 school year, 7,494,042 secondary students participated in CTE nation-wide (ACTE, 2014). With the national focus of assuring that all high school graduates do so "College and Career Ready" (CCR), CTE has become a viable alternative to the traditional high school "academic-only" route and offers career pathways, which include a rigorous sequence of courses leading to valid industry certifications and dual credit with many post-secondary schools and universities.

The research is also driven by the Kentucky Department of Education's newly designed "Next Generation Learner's" delivery plan. The delivery plan, along with a new assessment and accountability system, are direct results of a No Child Left Behind (NCLB) waiver granted by the federal government (Kentucky Department of Education (KDE), 2013). This waiver allows the recipients to devise a unique educational achievement plan tailored to meet the specific needs of their state's school system. KDE's new plan emphasizes an increased focus on the "Collage and Career Readiness" of graduating students in the Kentucky school systems. The Vision/Challenge section of the delivery plan offers evidence of a dire need to increase high-school graduation rates in Kentucky's public school system. The delivery plan noted that in 2010 the CCR rate was at 34 percent, and the state graduation rate was at 76 percent (KDE, 2013).

This study examined the effects of the programs of study within the realm of Career and Technical Education (CTE) on the graduation rates of high-school students. In this research, the graduation rates of CTE 12th grade concentrators were compared to the mean graduation rates of all 12th-grade students in a corresponding high school for the 2012-2013 school year. This study, furthermore, compared the graduation rates of CTE 12th grade concentrators to the graduation rates of all 12th grade high school graduates in the state for the 2012-2013 school year. The researcher examined the data to determine the effect, if any, that engaging in a prescribed career pathway in CTE (classified as a concentrator) had on the graduation rates of high-school students. The results of this research were obtained primarily as a result of the earnest endeavor to answer the following research questions.

1. Is there a difference in the graduation rates of 12th -grade CTE concentrators in the16 participating Area Technology Centers (ATC) and the mean graduation rates of all 12th -grade students in their (16) corresponding high schools for the 2012-2013 academic school year?
2. For the (16) participating (ATC's), is there a difference in the graduation rates between male and female 12th -grade CTE concentrators for the 2012-2013 academic school year?
3. Is there a difference in the graduation rates between12th-grade CTE concentrators in the (53) state operated ATCs and the mean graduation rate for all Kentucky 12th graders enrolled in public high school systems for the 2012-2013 academic school year?

Interpretation of Results

The results of this study may influence the way tin which the general public views the value of CTE in regard to the scholastic opportunities available to students in the secondary educational setting in Kentucky. The result of this research was divided into three separate phases, which dealt with the three previously described research questions. All data for examination and analysis regarding this study was retrieved from either the KDE online report card of the Technical Education Data System (TEDS). The retrieved data in this study was organized into tables and analyzed with the Statistical Package for Social Sciences (SSPS) version 22. The output date for each research question can be found in the list of figure's section of this work.

Phase one utilized an Independent Samples T-Test to determine if there was a statistically significant difference in the graduation rates of the CTE concentrator students and the general students in the corresponding high schools. Using a two-tailed.05 criterion, we reject the null hypothesis. The CTE concentrator group ($M = 97.20$, $SD = 2.69$) scored significantly higher graduation rates than the general 12^{th} grade non-CTE students ($M = 85.51$, $SD = 5.10$), (see table A1). Levene's Test for Equality of Variances shows a significant value of .282 (which is less than .05) meaning that the variability of the two conditions is not significantly different. SPSS output data obtained from the "t-test for Equality of Means" indicate the sig. (also known as the P value) is .000 which is less than .05, indicative that there is a statistical difference between the two groups. The mean difference between the groups indicates that the CTE group's graduation rates were 11.69% higher than the non-CTE group. The statistical analysis, therefore, rejected the null hypothesis, Ho:$\mu_{\circ} = \mu_{\varphi}$ which stated that there was no

significant difference in the graduation rates of the two groups and consequently, supports the alternative hypothesis which indicated that the graduation rates of the CTE concentrator students were significantly higher than the graduation rates of the non-CTE concentrator students for the 2012 -2013 school year.

Phase II of the study also utilized an Independent Samples T-Test to compare the data for the male and female CTE concentrator students from the 16 Area Technology Centers (ATCs) to see if there was a significant difference in the graduation rates for the two groups. Using a two-tailed .05 criterion, we failed to reject the null hypothesis showing no significant statistical difference between the graduation rates of male and female CTE concentrator students for the 2012-2013 school year. The P value for the t-test was .632 which is greater than .05 and indicates that at this confidence level the mean difference is likely due to chance.

Phase III of the study compared the graduation rates between12th-grade CTE concentrators in the 53 state operated ATCs and the mean graduation rate for all Kentucky 12^{th} graders enrolled in public high school systems for the 2012-2013 academic school year. This comparison also utilized existing data from the Technical Education Data System (TEDS) and the Kentucky Department of Education (KDE) state report card. This analysis utilized a single sample T-test to compare the means of the graduation rates of the 53 state operated Area Technology Centers to the state average graduation rate for the 2012 – 2013 school year. The single sample t-test showed that the mean graduation rate for the ATCs was 97.61%. This comparison resulted in a "P" value of .000 which means that the null hypothesis was rejected and the alternative by default was supported. The test indicates that there was a statistically significant difference in the

graduation rates of two means with the ATC's mean being 11.51% higher than the public school system's state average mean.

The results presented in Chapter IV were not complicated by the use of covariates. The graduation rates of ACTs can be influenced by factors than the presence or absence of career pathways and related variables. For instances, concentrator students could be more proficient irrespective of the career and technical curricula provided at the ACTs. In other words, ACT students might represent a different sub-population of high school students from the start. Perhaps they would outperform their high school counterparts not owing to the career and technical curriculum provided by the ACTs.

Limitations

Limitations of this study follow:

- This study encompassed Career and Technical Education (CTE) students from the state operated "Kentucky Tech." system consisting of fifty three Area Technology Centers (ATCs) strategically located across the state in such a way as serve students on a state-wide basis.
- This study utilized data from the KDE online report card which incorporates data sets prepared by KDE exclusively.
- This study utilized data from the state's Technical Education Data System (TEDS) which is prepared for the state operated ATCs exclusively.

- This research does not consider or compare CTE concentrator students from locally operated Career Technology Centers who are managed and funded through many local boards of education located in Kentucky.

Implications for Future Research

Research for this study examined the graduation rates of two particular groups of high-school students in Kentucky for the 2012-2013 school. These two groups were formed from selecting CTE concentrator students from the fifty three state operated Kentucky Tech school system and the selection of students from corresponding high schools in the Kentucky public school system. The design and nature of this study revealed the important role that CTE can and should have as our state focuses on increasing the graduation rates of our secondary students. While the results of this study indicate the benefits of students reaching a CTE concentrator status in regard to graduation rates, no current studies exist that examine the correlation of CTE concentrator students and students meeting the state's College and Career Readiness (CCR) benchmarks. Further research within the realms of CTE regarding the significance of their programs of studies as they related to meeting these CCR guidelines could provide much-needed data in Kentucky's quest to prepare all graduating students for college or entry-level jobs that could lead to meaningful and lasting careers.

Further research in this area should also branch out to include CTE students from locally operated Career Technology Centers who are funded and managed by the local boards of education. The graduation rates and percentages of met CCR benchmarks could subsequently be compared with the CTE students in this study and the CTE students from

the locally operated CTE centers. These results could influence best-practice procedures that could afterwards benefit all CTE students across the state with regard to the increasing of graduation rates and the meeting of CCR benchmarks. Both categories, graduation rates and CCR benchmarks, are primary objectives within the state's newly developed delivery plan.

Conclusion

As the United States strives to remain competitive in the national labor market, it has become evident that the education and graduation of our high-school students will play a vital role in how we measure up to our global neighbors. The researcher's intentions in this study are manifold as the work not only seeks to determine the effect of becoming a CTE concentrator student on overall graduation rates in Kentucky, but also seeks to find a correlation in CTE studies and the college and career readiness of our high school graduates. According to the review of literature in this work and a common concern shared by all involved in Kentucky's endeavor to improve public education, it is not enough to simply increase the number of students who receive a high school diploma. The need to prepare our youth for an ever evolving society and work environment demands much more from our education systems. Our education systems must now examine and evaluate every current program to determine if it is meeting the needs of the society and the labor market.

As previously stated, Kentucky scholastic administrators are on a new mission to devise a statewide educational delivery plan within the realms of secondary education that will prepare students for seamless transitions into higher education or entry-level

jobs that lead to lasting and rewarding careers. The results of this study show the evident relationship existing between CTE, graduation rates and to some degree the career readiness of secondary graduates. It is now the responsibility of educational professionals and consequently, our public school systems, to create programs of study and career pathways that correspond with and adhere to the goals and objectives of the state's College and Career Readiness (CCR) delivery plan. Reports documented within this study indicate that secondary students are already on board with the opportunities and benefits embedded in CTE. Reports show that for the 2010-2011 school year, 7,494,042 secondary students participated in CTE nation-wide (ACTE, 2014). According to ACTE, (2014) today's CTE programs provide students the relevant and rigorous education required for the high wage, high skill, and high- demand careers in the labor market. While most people would readily agree that a high school diploma plays a prominent role in the preparedness of our youth for life beyond secondary education, many do not fully recognize the many educational opportunities available on the secondary level.

According to KDE reports, 80 percent of all jobs in our state will require some form of training beyond high school and 63 percent of these jobs will require a post-secondary degree (Kentucky Department of Education, 2013). Given that a post- secondary education is important to a successful career, it is logical to offer programs of studies that make direct and seamless transitions into higher-education programs of study. The articulation agreements and dual credit opportunities that are currently in place among Kentucky Tech Area Technology Center (ATCs) ensure these post-secondary opportunities for CTE concentrator students. This study seeks to show the positive correlation between CTE education, and the endeavor that our school systems graduate

students ready and able to assume productive and rewarding positions in the workplace and become major contributors to the economic health and success of our society in general.

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APPENDIX A:

CTE concentrator and non CTE concentrator data tables

Table A1

List of High schools and Corresponding ATCs

Name	High School	ATC
Barren Co	86	100
Boone Co.	86	97.7
Breckinridge Co.	85.5	100
Caldwell Co.	85	94.3
Carrol Co.	84.7	94.9
Floyd Co.	91.3	100
Harrison Co.	88.9	95.5
Knox Co.	87.6	100
Lake Cum/Russell Co.	84.7	94.5
Letcher Co.	88.3	96.1
Martin Co./Sheldon Oak	87.6	98.2
Morgan Co	78.8	100
Pulaski Co.	91.7	93.8
Shelby Co.	81.8	95
Warren Co.	89.1	100
Wayne Co.	70.8	92.1
Mean (SD)	85.61 (5.10)	97.01 (2.69)

Sources retrieved from the Technical Education Data System and Kentucky Department of Education (KDE). (2013). *Graduation Data.* Retrieved from http://education.ky.gov/AA/Reports/Pages/Graduation-Rate-Data.aspx

VITA

Steve L. Bennett was born in Columbia Kentucky on February 28, 1956. He attended elementary school in the Russell county school system and graduated from Russell County High School in 1974. After completing an apprenticeship, he was awarded the Journeyman status as “Tool Maker” in 1979. He earned a Bachelor of Technical Education degree from Western Kentucky University in 2005. In 2007, he received a MAED, Instructional Leadership degree from Eastern Kentucky University.

He worked as a Machinist until 1994 after which he became a Technical Industrial Machinery Maintenance instructor at the Lake Cumberland Area Technology Center in Russell Springs, Kentucky. In 2006, he obtained a position with the Office of Career and Technical Education (OCTE), central office, in Frankfort, Kentucky as an Academic Consultant. In 2008, he was promoted to a Supervisory position within the OCTE where he worked until retiring in September of 2014.