CAREER PATHWAYS' IMPACT ON STATE ASSESSMENT, GRADUATION RATES, AND SCHOOL LEADERSHIP

A Doctoral Thesis Presented to the
Faculty of the College of Education
University of Houston

In Partial Fulfillment
of the Requirements for the Degree

Doctor of Education
in Professional Leadership

by

Chad Dwight Barrett

May 2013

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Dedication

For Jana,

Words can't express how much your love and support during this journey has meant to me. I could not have done it without you, my number one cheerleader. You told me I could do it when I doubted, you massaged knots out of my neck and shoulders late into the night, you provided for me and the boys when time didn't permit me to help and you kept us all sane during an insane time in our lives. You and the boys mean more to me than anything in the world and I appreciate the opportunity allotted me to complete this goal. I love you!

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Abstract

A myriad of studies have associated effective, high-quality Career Technical Education (CTE) programs with college and career readiness, needs of the workplace, and the demands of the labor industry (Brown, 2005; DeWitt, 2008; Horne, 2010; Texas Workforce Commission, 2012). Career pathways are a part of CTE and describe a focus that students undertake by choosing multiple courses in a similar vocational subject. This study extensively evaluated the CTE program in a large Gulf Coast suburban school district, the statistical differences of students on the Texas Assessment of Knowledge and Skills (TAKS) state assessment, and analyzed completion and dropout rates between CTE students in a career pathway and their non-CTE peers. A significant difference was found in English Language Arts (ELA), math and science TAKS scores, as well as in both completion and dropout rates. The role of CTE in public education and implication on school leadership are also discussed.

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CHAPTER ONE

INTRODUCTION

Brief Review

In November, 2011, the patrons of a major suburban district on the Gulf Coast passed a $270 million bond election. Part of the bond calls for the creation of a 1400 student Career and Technical Education (CTE) high school scheduled to open in the fall of 2014. The participating students, faculty, and staff draws primarily from the existing five high schools within the district. An enormous amount of time, effort, and funding has been invested in this inaugural project for the district.

Initially, this study analyzed the CTE data as it related to student achievement. Subsequently, this particular information enabled school leaders to make data-based decisions and supported the district's efforts in creating a CTE high school. Moreover, it provided data that can be used to address educators' academic and philosophical approaches as coursework and programs are planned. The results from this study assisted the district in making this school and program have as smooth and successful beginning as possible. Interestingly, as this study (and research therein) has expanded, it became quite evident that subsequent results could also assist the district in assessing its CTE program and evaluating its effectiveness with regards to TAKS scores, and ultimately, other state assessment programs as they are implemented throughout the high school.

Practitioners in the 21st century are continually looking for ways to improve campus performance on state assessment. In Texas, the primary measurement tool of a

campus's success is in their state assessment – also known as the "Texas Assessment of Knowledge and Skills", or "TAKS" test. Within this system, each school district in Texas is given a rating based on its students' academic performance. More specifically, the ratings can range from "Academically Unacceptable" to "Exemplary". The district utilized in this study recently regained the status as "Recognized" after several years of having been rated only as "Acceptable". The district's goal is to maintain "Recognized" status as they look for ways to improve and eventually become an "Exemplary" district.

Finally, this study offers valuable data related to the analysis of current CTE programs' effectiveness in increasing the high school completion rate, as well as decreasing the dropout rate of its students. A primary goal of school districts is to increase their graduation rates. This is due in part from the No Child Left Behind (NCLB) federal legislation which mandated graduation for all United States students (US Dept. of Education, 2001). The local goals, visions and mission statements of the district emphasize the importance of becoming "accomplished, self-directed, and collaborative citizen-scholars" (Pasadena, 2012). This system of standards has been a point of emphasis for at least the last decade for the districts' CTE teachers and administrators. Extensive efforts have been undertaken as a means to reduce the dropout rate in the district. With these efforts in mind, this particular study is anticipated to be of extreme significance to the district and the CTE program.

The concept of a new CTE high school in the district is exhilarating. Current trends in industry and workforce demand, coupled with the expectations of the community, encourage and support the efforts and the overall aim of the leaders within the district. Furthermore, the new school will graduate students that have either obtained

an employable skill and/or certification or are ready to transfer to a post-secondary institution for completion of a degree. In short, due to the district emphasis, graduating students will be ready to fill immediate gaps within the workforce. This study gives the district an analysis of data concerning its career pathways, as well as to identify avenues of opportunity for future studies and research.

Beyond the scope of the campus and the school district is the larger issue of CTE's role in the state and nation's educational system. For several decades, the legislators and decision makers in government have collected data, reviewed reports, and have enacted policies to address educational issues. And, as early as 1983, the National Commission on Excellence in Education presented a report entitled *A Nation at Risk*. This report revealed the number of functionally illiterate individuals in the United States, as well as the enormous plight within the American education system (A Nation at Risk, 1983). Later, in 2002, the Federal legislative actions of *No Child Left Behind* changed the perception of CTE (Chadd & Drage, 2006). Stone and Alfred (2004) noted that "CTE serves to engage students and keep them in school where learning can continue and be improved." This study offers a substantial quantitative analysis of a major suburban school system's CTE program.

Career Technical Education (CTE) – formerly known as Vocational Education – has been a part of American education since the turn of the 20th century. It has come to be regarded as a "responsive and flexible education system that directly addresses globalization and current business and industry need" (DeWitt, 2008). In the past 100 years, students have utilized vocational/CTE courses to learn and develop skills about various vocational topics, to choose a career field, or to receive training and certification

in an industry. Countless students have benefited from CTE. In fact, February is celebrated as CTE month and is celebrated throughout the nation (Kidwai, 2010).

As the 21st century unfolds, CTE has found itself in a new role as teachers find Millennial students filling their classrooms. Millennial students are students currently occupying middle and high school classrooms and are characterized by their techno-savvy knowledge, short attention span, and little interest in antiquated teaching practices. Technology is the point of emphasis and rigor and relevance is its core (Horne, 2010). According to Bill Daggett, founder and president of the International Center for Leadership in Education, "CTE must be seen as a primary deliverer of strong academic preparation," restructured from programs where the core material is taught separately to an "applied academics program where vocational skills become the platform in which the academic skills are delivered" (Horne, 2010, p. 11).

Additionally, many states have adopted a state assessment program. As a result of this adoption, schools are now labeled as Academically Unacceptable, Acceptable, Recognized, or Exemplary (TEA, 2012). Each student is tested yearly in some (if not all) of the four core subjects (i.e., English, Math, Science, and Social Studies). Then, during the 11th grade year, students take an exit-level test in all four core content areas. Each student must pass all four of these areas to be eligible for graduation (TEA, 2012). This study examined the affect career pathways have on state assessment scores of the students that are identified as being in a career pathway.

The topic of career pathways is discussed in CTE literature and research quite frequently. Brenda Sanders (2012), an eHow.com contributor, defines it as follows:

> A career pathway is simply education, training and support services being used to help people get high demand jobs or get promoted in a high-demand field. The focus of the program is to make things easier by helping students and potential students build or make changes to their careers. These include students who transfer from high school to community college, non-credit courses to credit classes and community college to university/employment. (p. 1)

Thus, career pathways enable its participants to hone in on skills, knowledge, and techniques that the general education students do not. The training received in the pathways prepares the students for their post-secondary goals and aspirations.

As more school districts turn to CTE courses and career pathways the number of students identified in a career pathway is expected to increase. Principals, counselors, and key campus and district personnel will be called upon to become more involved with the CTE programs, the placement of students in career pathways, and provide facilities and support for the programs. Further, as these pathways grow and flourish, those in positions of leadership will have to make key decisions regarding programs, facilities, personnel, and student selection. The research documented in Chapter Two clearly shows that CTE is growing and is becoming a valuable part of a school's curriculum. Career pathways are requiring more time and resources of district administrators and its leadership. This study examined the impact of career pathways on district and campus leadership as well as on problems/issues and solutions.

The district wherein the study is conducted is a major suburban district on the Gulf Coast. There are 52,000+ students in the district with five high schools from which

the data of this study came. In addition, the student demographic representation within the district is as follows: 82% of the student population is Hispanic, 8% Caucasian, 6% African-American, and 3% Asian, respectively. 82% of the students are also economically disadvantaged (PISD, 2012). A large number of the students in the high school take at least one CTE class during their four years of high school. Many students also choose to take several courses in a certain subject area (i.e., pathway) and graduate with certifications from those programs or are eligible to continue in a post-secondary setting. It is these students that are the subject of this study.

Statement of the Problem

In the state of Texas, public educators have used the Texas Assessment of Knowledge and Skills (TAKS) since 2003 (TEA, 2010). For almost a decade this criterion-referenced test has been used to assess Texas public school students. Statewide assessment has been a part of Texas education for many years and has been planned by the legislature to continue for years to come. Public school administrators and teachers are constantly searching for methods, techniques, and procedures that can improve test scores. Additionally, students and parents are continually seeking programs and tutoring sessions to assist in the mastery of the competencies. To this end, administrators are encouraging all stakeholders to become involved and improve campus ratings. Much pressure is placed on the schools, teachers, and students to perform. A large portion of this study focused on the effect of CTE on these state assessments, particularly during the exit-level 11th grade year. It also identifies students who enrolled in CTE career pathways while in their high school year and determines if that had an impact on their TAKS scores in Science, Social Studies, Math and English.

Another area of concern identified by administrators, teachers, and other stakeholders is the subject of high school completion rates. Stone's 2004 report showed that dropouts entered high school unprepared; that they tend not to live with two biological parents; and, they are no longer affected by their parent's education level (Stone, 2004). Symonds calls this the "forgotten half challenge" – the challenge to prepare the millions of young adults to be successful in 21st century America (Symonds, 2009). Saddler et al. (2011) states, "Clearly, these young people need additional skills and supports if they are to become productive citizens, wage earners, consumers, and life-long learners with family skills" (p.38). Alarmingly, one-in-three students who start high school in the 9th grade fails to complete the 12th grade within four years (ACTE, 2007).

CTE is essential in the preparation of students in the 21st century. The Texas Department of Labor and Tracking reports that the gap between employer demand and workforce supply is growing (Texas Dept. of Labor, 2012). The Texas Workforce Commission has identified fifty-seven projected jobs needed in the future, most of which are CTE related (Texas Workforce Commission, 2012). Moreover, categories such as Advanced Technology, Computer and Information Technology and Energy are rich in CTE related skills (Texas Workforce Commission, 2012).

CTE gives students the opportunity to gain skills, experience, and exposure to 21st century careers. In 2003, the Center on Education and Training for Employment reported on the benefits of CTE based on a myriad of studies and reports (Brown, 2003). CTE provides direct benefits, such as wage/earning advantages and indirect benefits like lifelong learning opportunities (Brown, 2003). Additionally, employers are now turning to CTE programs more than ever for new employees as companies and industry expands.

CTE students in turn get chances to interact with prospective employers of their career/vocational interest (Brown, 2003).

The topic of and concerns related to dropout is a major point of emphasis in this study. More specifically, the effect of CTE on dropout rates is examined. It has been a long-standing belief and observation of mine that CTE keeps students in school and reduces the dropout rate. Students in CTE build a relationship and a bond of trust with their instructors. They also tend to choose a career pathway of interest that they want to pursue or explore as a possible career.

Purpose of the Study

This study examined the relationship between Career Technical Education career pathways and statewide assessment among the 11th grade students within the district in 2010, the graduation rates of the class of 2011, and the school leadership in a major Gulf Coast suburban school district. Career pathways are a part of the Career and Technical Education (CTE) department in a school district and refer to when a student chooses multiple courses in a similar CTE subject. This quantitative non-experimental correlational study identified those students who are in career pathways out of a class cohort of 2992 students in a major suburban Gulf Coast school district and analyzed their state assessment scores and high school completion rates as compared to their non-CTE peers using an analysis of variance. Additionally, the role of leadership in CTE and its students is examined and discussed.

Research Questions

The following research questions will guide the overall study:

1. Does the enrollment in various CTE pathways have a significant difference on the 11th grade ELA TAKS results?
2. Does the enrollment in various CTE pathways have a significant difference on the 11th grade Math TAKS results?
3. Does the enrollment in various CTE pathways have a significant difference on the 11th grade Science TAKS results?
4. Does the enrollment in various CTE pathways have a significant difference on the 11th grade Social Studies TAKS results?
5. Does the enrollment in various CTE pathways have a significant difference on completion rates?
6. Does the enrollment in various CTE pathways have a significant difference on dropout rates?

Definition of Terms

At-Risk: A student is identified as at-risk of dropping out of school based on state-defined criteria (§TEC 29.081.). At-risk status is obtained from the PEIMS 110 records. The statutory criteria for at-risk status include each student who is under 21 years of age and who:

- was not advanced from one grade level to the next for one or more school years;
- did not perform satisfactorily on an assessment instrument administered to the student under TEC Subchapter B, Chapter 39, and who has not in the previous or current school year subsequently performed on that instrument or another

appropriate instrument at a level equal to at least 110 percent of the level of satisfactory performance on that instrument;

- is in prekindergarten, kindergarten or grades 1, 2, or 3 and did not perform satisfactorily on a readiness test or assessment instrument administered during the current school year;
- is pregnant or is a parent;
- has been placed in an alternative education program in accordance with §TEC 37.006 during the preceding or current school year;
- has been expelled in accordance with §TEC 37.007 during the preceding or current school year;
- is currently on parole, probation, deferred prosecution, or other conditional release;
- was previously reported through the PEIMS to have dropped out of school;
- is a student of limited English proficiency, as defined by §TEC 29.052;
- is in the custody or care of the Department of Protective and Regulatory Services or has, during the current school year, been referred to the department by a school official, officer of the juvenile court, or law enforcement official; and/or
- is homeless, as defined by 42 U.S.C. Section 11302 and its subsequent amendments or resided in the preceding school year or resides in the current school year in a residential placement facility in the district, including a detention facility, substance abuse treatment facility, emergency shelter, psychiatric hospital, halfway house, or foster group home (TEA , 2010).

Career and Technical Education (CTE): Formerly known as "vocational education", CTE is an array of classes and courses offered in a high school curriculum that allow students to learn skills and trades and earn certifications or admission to post-secondary programs.

Career Pathway: A Career Pathway is a coherent, articulated sequence of rigorous academic and career/technical courses, commencing in the ninth grade and leading to an associate degree, baccalaureate degree (and beyond), an industry recognized certificate, and/or licensure. The Career Pathway is developed, implemented, and maintained in partnership among secondary and postsecondary education, business, and employers. Career Pathways are available to all students, including adult learners, and lead to rewarding careers.

Dropout: A dropout is a student who is enrolled in public school in Grades 7-12, does not return to public school the following fall, is not expelled, and does not: graduate, receive a GED, continue school outside the public school system, begin college, or die. Dropout counts are obtained from PEIMS records. Based on the attendance and enrollment records of all districts, the records of Texas graduates for the last several years, and GED certificate records, TEA identifies students for whom districts do not need to submit leaver records. School districts must account for all other students through the submission of leaver reasons. The leaver record provides 14 possible reasons for leaving school in 2009-10, including one which indicates the student is a dropout (reason code 98) (TEA, 2010).

Economically Disadvantaged: This term represents the percent of economically disadvantaged students. This term is also calculated as the sum of the students coded as

eligible for free or reduced-price lunch or eligible for other public assistance, divided by the total number of students (TEA, 2010).

Gifted and Talented Students – This is a term used for students who perform at or shows the potential for performing at a remarkably high level of accomplishment when compared to others of the same age, experience, or environment and who: (1) exhibits high performance capability in an intellectual, relative, or artistic area; (2) possesses an unusual capacity for leadership; or (3) excels in a specific academic field (TEC, 2007).

Millennial: A Millennial is a reference to the Millennium Generation, the students currently occupying middle and high school classrooms and are characterized by their techno-savvy knowledge, short attention span, and little interest in antiquated teaching practices.

16 Career Clusters: Created by the National Career Clusters Framework and adopted by many state government and educational agencies, these 16 groups are the classifications of careers used to develop the career pathways students take for CTE:

- **Agriculture, Food & Natural Resources** -The production, processing, marketing, distribution, financing, and development of agricultural commodities and resources including food, fiber, wood products, natural resources, horticulture, and other plant and animal products/resources.
- **Architecture & Construction** - Careers in designing, planning, managing, building and maintaining the built environment.
- **Arts, Audio/Video Technology & Communications** - Designing, producing, exhibiting, performing, writing, and publishing multimedia content including visual and performing arts and design, journalism, and entertainment services.

•**Business Management & Administration** - Careers in planning, organizing, directing and evaluating business functions essential to efficient and productive business operations.

•**Education & Training** - Planning, managing and providing education and training services, and related learning support services, such as administration, teaching/training, administrative support, and professional support services.

•**Finance** - Planning and related services for financial and investment planning, banking, insurance, and business financial management.

•**Government & Public Administration** - Planning and executing government functions at the local, state and federal levels, including governance, national security, foreign service, planning, revenue and taxation, and regulations.

•**Health Science** - Planning, managing, and providing therapeutic services, diagnostic services, health informatics, support services, and biotechnology research and development.

•**Hospitality & Tourism** - Preparing individuals for employment in career pathways that relate to families and human needs, such as restaurant and food/beverage services, lodging, travel and tourism, recreation, amusement and attractions.

•**Human Services** - Preparing individuals for employment in career pathways that relate to families and human needs such as counseling and mental health services, family and community services, personal care, and consumer services.

•**Information Technology** - Building linkages in IT occupations for entry level, technical, and professional careers related to the design, development, support and management of hardware, software, multimedia and systems integration services.

•**Law, Public Safety, Corrections & Security** - Planning, managing, and providing legal, public safety, protective services and homeland security, including professional and technical support services.

•**Manufacturing** - Planning, managing and performing the processing of materials into intermediate or final products and related professional and technical support activities, such as production planning and control, maintenance and manufacturing/process engineering.

•**Marketing** - Planning, managing, and performing marketing activities to reach organizational objectives such as brand management, professional sales, merchandising, marketing communications and market research.

•**Science, Technology, Engineering & Mathematics** - Planning, managing, and providing scientific research and professional and technical services (e.g., physical science, social science, engineering) including laboratory and testing services, and research and development services.

•**Transportation, Distribution & Logistics** - The planning, management, and movement of people, materials, and goods by road, pipeline, air, rail and water and related professional and technical support services such as transportation infrastructure planning and management, logistics services, mobile equipment and facility maintenance (National, 2012).

State Board of Education (SBOE): The SBOE is an elected 15 member board who along with the Commissioner of Education oversee the public education system of Texas in accordance with the Texas Education Code (Texas Education Agency, 2012).

Texas Assessment of Knowledge and Skills (TAKS): This term represents the state assessment used in Texas beginning in the 2003 school year and has begun to be faded out by the new End of Course (EOC) and STARR exam, which was introduced in 2010 and began implementation in 2011 (Texas Education Agency, 2012).

Texas Education Agency (TEA): The TEA is a branch of the Texas government and is responsible for overseeing over 1000 public school districts statewide. Founded in 1949, the TEA is responsible for school laws, regulations, and state assessment (Texas Education Agency, 2012).

Limitations

Due to the complexity and variety of CTE programs and career pathways, and the use of only one school district and one cohort in the study, this research study may not be used as a generalization of the trends and best practices for all CTE programs and school districts. Additionally, only one assessment data point was used for the state assessment part of the study – namely, the exit level TAKS given in the 2009 – 2010 school year – which does not take into account trends or changes in the test and testing procedure. This study also includes an additional limitation with regard to the data quality. As with each and every PEIMS indicator, the quality of the CTE data relies heavily on the data entry process that may contain some error. Other mitigating factors, such as race, socioeconomic backgrounds, LEP, ESL, SPED, and GT status are also not being considered within the framework of this study.

Additionally, the study does not account for the school or teacher factors. Future studies should examine the impact various school programs and teachers had on the outcome variables of interest.

The current study did not incorporate any student, teacher, or parent perceptions in the form of surveys or interviews.

CHAPTER TWO

LITERATURE REVIEW

The History of Career and Technical Education

The term Career and Technical Education (CTE) is a term that was born out of the Vocational Education movement during the 20th century. The tenets of vocational education can be traced back to colonial America. An inspection of early American writings reveals that the subject of vocational and agricultural thought is the center of Jeffersonian ideology. Thomas Jefferson was adamantly opposed to urbanization and city life. In fact, it is reported that when he left Washington in 1809 he "never again left the foothills of the Blue Ridge Mountains" (McDonald, 1976). He devoted himself to his agricultural businesses, woodworking, architectural design, and inventing for the remainder of his life. He made his income from his crops of cotton, tobacco and rice as he managed his plantation (McDonald, 1976). Countless volumes of agricultural and meteorological records, scientific observations, schematics of agricultural and mechanical inventions/ideas, and observational journals were penned by Jefferson and passed down for generations to glean knowledge from. He was an advocate for CTE before the term was even conceived.

Initially, vocational education existed separately from formal public education. Barlow noted that few people, such as Ben Franklin, "intended that students be taught everything useful and everything ornamental related to the professions for which they were training" (p. 27). Young adults, immigrants, and families were left to learn about vocational professions and share them with others on their own accord. Public education for many was restricted to learning the 3 R's – that is, reading, writing, and arithmetic.

Many families initially were immersed in day-to-day activities of survival and maintaining their agriculturally based lifestyle. All members of the family learned the vocation of colonial life. With time different trades emerged and "hands-on" training was introduced to would-be learners. The mode of learning was apprenticeship where a skilled craftsman would oversee a handful of students. Legislation supporting apprenticeships sprang up throughout the colonies and the concept seemed to flourish and benefit all aspects of the American society.

As the Industrial Revolution began in America, educational and vocational needs shifted to the growing demands of industry. As ideas and inventions were conceived and companies formed, the need for a trained workforce became apparent. On the job training became the mode of education initially as skilled laborers were in high demand. Manual labor academies sprang up in towns. Students worked in the shop or factory and learned the trade. In turn, the business paid the school for the students' service. As public schools began emerging with the population/immigration growth across the nation, some organized attempts at vocational education began to take root in some form. Trade schools were initiated and rural and urban students alike began enrolling (Barlow, 1976).

Modern day CTE evolved out of the vocational education movement, which began at the turn of the 20th century. Considered the founder of vocational psychology, Frank Parsons has written many books and given lectures encouraging institutions to develop vocational programs (O'Brien, 2001). According to DeWitt (2008), it is "a system that engages and motivates students to stay in school by integrating the foundation of academic learning with practical skills training" (p. 17). Vocational education as we know today had its beginning (Barlow, 1976).

According to Barlow, the period of 1926-1976 has been touted as the "Coming of Age" for vocational education (p. 63). This time was marked by great growth and development. He estimated that, at its peak, more than twice as many people were enrolled in vocational education programs than in all of the four-year colleges and universities (Barlow, 1976). In the introduction to his paper he writes:

> In its 'coming of age,' vocational education reaches out to many more people, the handicapped, the disadvantaged, to the particular needs of ethnic groups, and to the vocational training needs of women. On the occupational side, the expansion is directed to embrace more and more occupations, with attention to a variety of clusters of occupations. (Barlow, 1976)

To support this movement several organizations were formed and legislative acts were passed. For example, The Commission on National Aid to Vocational Education was formed in 1914 by Congress to report on the issue of vocational education. The commission released its report later that same year and called for vocational education nationwide and for providing funding – primarily through grants. The report also recommended future legislative needs. The Smith-Hughes Act of 1917 was a direct result of this effort. The act created the Federal Board for Vocational Education to oversee implementation and distribute funding (Barlow, 1976).

The suffrage movement and the public education of all students became interested in the plight of women and vocational education as well. While the manual training movement had been predominantly male, the home economics movement brought awareness to the forefront that women at home and at work had educational and

occupational needs (Barlow, 1976). Home economic courses were developed and students enrolled. A typical home economics curriculum allowed students to learn such things as how to cook, make clothes, serving etiquette, grocery shopping/meal planning, and childcare.

One of the most notable actions taken during the 20th century was a presidential declaration made to the United States Office of Education in 1939 by Franklin D. Roosevelt concerning utilizing vocational training facilities immediately in the face of World War II. Emphasis here was placed on the aviation and defensive needs of the nation (Barlow, 1976). As war efforts ramped up as the United States became involved in the European front funding, involvement and training reached a fervent peak. Thus, the entire nation worked together to support the war effort.

Later, after WWII, the social revolution impacted the nation. Consequently, schools and educational programs had to adjust to societal demands. President John F. Kennedy appointed a panel to review the Vocational Education Act of 1917. After extensive review, the panel shared its recommendations with the nation. In short, this act brought sweeping reforms to a 50-year-old system. The result was the Vocational Act of 1963. Amendments were made in 1968 to address current needs and funding issues (Barlow, 1976).

In recent years, a trend is seen across the country where states are incorporating CTE programs in public schools. For example, California is completely rebuilding its CTE system, and Arizona has made "academic content explicit in CTE courses" (DeWitt, 2008, p. 18). DeWitt further reports that other states are using portions of their Perkins funds to provide staff development for math and CTE teachers to help them identify

embedded content and develop lesson plans to teach academic content in CTE courses (DeWitt, 2008).

In regard to CTE in Texas, the State Board of Education (SBOE) serves as the State Board for CTE. The board oversees CTE programs and sets standards for funding. Federal funds stem from the Carl D. Perkins Career and Technology Improvement Act of 2006 (Texas Dept. of Labor and Tracking, 2012). The Perkins Act required the SBOE to create a CTE State Plan to specify how CTE programs in Texas would function and establish their objectives. Furthermore, the funding is funneled through two channels. 70% goes thru the Texas Education Agency (TEA) for secondary programs and 30% through the Texas Higher Education Coordinating Board (THECB) for postsecondary programs (Texas Dept. of Labor and Tracking, 2012). According to the Texas Dept. of Labor, TEA has developed a five year state plan for CTE for 2008-2013 and works with THECB to "ensure the quality of state CTE programs" (Texas Dept. of Labor and Tracking, 2012).

Lately, one program that has generated a great deal of success is Achieve Texas. This particular program stems from Texas' career pathway system and is funded and supported by the Texas Education Agency. Its primary aim is for "students to begin taking courses in high school that will serve as the foundation for postsecondary education and the work force" (Texas Dept. of Labor and Tracking, 2012, p. 2). Students enroll in these courses during their initial years of high school and continue to build upon the content learned initially. Fruition is seen at the end of the pathway when the student receives their certification or successfully transitions into a post-secondary setting.

During each and every February, schools, communities, and governments celebrate CTE month. In short, CTE awareness is the point of emphasis during the entire month. Programs are highlighted, proclamations are made, and media attention is emphasized. The promotion has shown to be effective in drumming up community support and enrollment in CTE programs continues to increase (Kidwai, 2010).

As evidenced by the documentation of the chronological history of vocational education and CTE, it is apparent that the United States has had and continues to maintain a deep commitment to the program and its students. As a result, there are 15.6 million secondary and postsecondary career and technical education students in the United States according to the Association for Career and Technical Education (ACTE) (Facts, 2012). This rich history of CTE helped formulate the research questions of this study.

One concern expressed by many involved in CTE is the issue of perception. Due to CTE's vocational background and history, it appears that students collectively hold a common thread of belief about this approach. A study conducted by Bae, Gray, and Yeager (2007) stated, "There seems to be a common belief among policy makers and the public that CTE students in general do not perform as well as the general non-CTE students in academic courses such as math and reading" (p. 10). Plank also (2007) noted that "some have portrayed CTE as a dumping ground in which unmotivated youths encounter low expectations and outdated training." And, in his article about CTE and sustainability, Bernadino (2011) wrote that "CTE carries a long-held image misconception – an outdated observation harbored by students, parents, and the general public that CTE lacks academic rigor and only leads students to low-skill jobs" (p. 44).

Bae et al. (2007) write that:

> Despite the compelling evidence that CTE programs help student' high school completion and postsecondary success in the labor market, more often than not, CTE students are viewed as the ones left behind, CTE schools are blamed for the allegedly lower academic performance of their students, and ultimately the viability of CTE as a differentiated school curriculum is questioned. (p. 10).

The study cites the 2004 Nave report and a *Jobs for the Future* policy paper (written in 2005 by a Boston consulting firm) in its literature review as the root of the issue discussed (Bae et al., 2007). The same study also concluded that CTE participation was found not to be associated with math test scores when math course-taking was controlled (Bae et al., 2007).

The Bernadino article also cites numerous examples of how the "new" CTE (as he calls it) is adapting to the needs of the 21st century and has incorporated practices and trends that have embraced new technologies, industrial practices (as evidenced in the green movement), and paradigm shifts in the workforce (Bernadino, 2011). The key, of course, is proper implementation. As cited within this literature review, a variety of studies demonstrate that CTE programs across the nation are reporting significant gains and success with their CTE students. The district in which this study takes place has also been a strong advocate for CTE as evidenced by the district's efforts toward its CTE program. Again, proper implementation is the key.

Career Pathways

Whitaker (2008) states that "career pathways provides the scaffolding upon which young people can navigate a series of career development activities and courses which make high school relevant and make the workplace a reality" (p. 22). This is a true statement for many students who find themselves in need of guidance and direction. Moreover, during the time of transition from adolescence to adulthood, students are bombarded with decisions and choices. The choice of a career or profession is one of those important decisions that a teenager begins to seriously consider and choose. Career pathways provide a vehicle for those choices to come to fruition by allowing students a realistic experience regarding particular careers. Students "begin to see a connection between their education and their future as competent and capable workers" (p. 23). They "validate the entire educational enterprise" to the point that "learning becomes relevant and their classes become related" (Whitaker, 2008, p. 23).

Over the years, work has been done to identify these different pathways. Recently, the National Association of State Directors of Career Technical Education Consortium (2012) developed a framework of 16 career clusters that is used nationally. The following statement provides a more detailed explanation of this framework:

> The National Career Clusters Framework is comprised of 16 Career Clusters and related Career Pathways to help students of all ages explore different career options and better prepare for college and career. Each Career Cluster represents a distinct grouping of occupations and industries based on the knowledge and skills they require. The 16 Career Clusters and related Career Pathways provide an important organizing tool for

schools to develop more effective programs of study (POS) and curriculum. (p. 1)

The 16 career clusters are:

•Agriculture, Food & Natural Resources;

•Architecture & Construction;

•Arts, Audio/Video Technology & Communications;

•Business Management & Administration;

•Education & Training;

•Finance;

•Government & Public Administration;

•Health Science;

•Hospitality & Tourism;

•Human Services;

•Information Technology;

•Law, Public Safety, Corrections & Security;

•Manufacturing;

•Marketing;

•Science, Technology, Engineering & Mathematics; and

•Transportation, Distribution & Logistics.

The impact of career pathway models has been examined at both high school and post-secondary educational facilities. As reported by Sass (2007), one very successful model was studied in the Palm Beach, CA area. This model was created for a community college system that was encountering problems with its associate degree programs. They created a career pathway model to connect a "seamless flow" between the curriculum of the college to the K-12 and university system. A thorough study of the college's data on

its programs was conducted. Detailed and extensive changes were made to the curriculum to allow programs to be transferrable and allow students to be employable (Sass, 2007).

During its implementation, Sass notes that continual improvements were made to basically overhaul the system and modernize it. Nevertheless, the dividends have now paid off. The college completion rates have soared from a dismal 423 graduates in 2001 to 1800 in 2005 – a mere four years, with even more growth expected as students enrolled in the program (Sass, 2007).

Another Compton study examined the impact of gender, race, ethnicity, program of study, and degrees completed on the earnings of Iowa community college students in career pathways. This study was significant because it is estimated that 60% of all post-secondary students are enrolled in a community college and that 30% of those are enrolled in occupational programs (Compton, 2010). This particular finding is significant in that it demonstrates the role of the community college in CTE and the workforce, as well as the fact that the Carl D. Perkins Act of 2006 requires documentation of these students' success rates in order to continue to receive federal funding (Compton, 2010).

In this study, human capital theory was researched and considered in light of CTE. According to Compton (2010), this theory holds to the premise that there is a social and economic benefit for the whole by helping the life of the individual. Compton's study looked at how that theory is used in career pathways, especially on the earnings of the students.

The results of the study showed several things. Firstly, as for the most "glaring result", according to Compton (2010), is that program completion rates were "very low",

especially among male students and non-White students (p. 108). This finding is notably different from the study by Sass wherein completion rates were higher. It was recommended that further study was needed on this finding. Of the factors studied, Compton found that gender had the strongest influence on earnings with males edging out their female counterparts (Compton, 2010). The other factors were not found to have a significant effect on earnings.

Both the Sass and Compton studies deal with the effects of career pathways in the community college setting and the impact on students. The Sass study shows a very successful model of utilizing career pathways while the Compton study identifies factors that play a dynamic role in CTE programs. Both are indicators of the necessity of having career pathways solidly established in the high school to better serve students. Both also emphasize the need for further studies of career pathways and the students, teachers, and programs that are involved with them.

A five year study was conducted in Oklahoma looking at the extent of HST students continuing to postsecondary education and their employment after their programs (McCharen, 2008). McCharen examined archival data of students who had completed a Health Science Technology/Health Careers Certification in high school and examined enrollment trends to determine if those same students transitioned into healthcare postsecondary programs (McCharen, 2008). Additionally, the study investigated to what extent those students were employed after completing the program.

The study found that students were not successfully transitioning to postsecondary education (19%), nor were they placed in related employment occupation (33%)

(McCharen, 2008). The significance of this finding is noteworthy in that federal funds utilized to provide for the programs were not getting the results desired.

In Texas, a CTE State Plan has been created by the State Board of Education (SBOE) to approve and oversee CTE programs in the state. The SBOE further specifies that federal funds are to be divided between the Texas Education Agency (TEA) and the Texas Higher Education Coordinating Board (THECB) and to be "split 70% for secondary programs and 30% for postsecondary; at least 85% of those funds must be passed to local education agencies and community colleges" (Texas Dept. of Labor and Tracking, 2012). These checks and balances help assure quality CTE programs and a system for student instruction in schools, colleges, or technical institutions.

Another system Texas government has put in place to oversee Texas career pathways and CTE programs is the P-16 Council. The Texas Dept. of Labor and Tracking (2012) reported that the P-16 Council was created in 2003 by the Texas Legislature, the P-16 Council advises THECB and SBOE on the "coordination of postsecondary career and technology education and related teacher education programs in Texas colleges and universities" (p. 5). The P-16 council also works with countless government and institutional entities on issues related to the "Advanced Placement/International Baccalaureate (AP/IB) Incentive Program, college readiness projects, the role of community colleges, teacher recruitment and retention, dual/concurrent enrollment and minority enrollment and assessment" (p. 5).

A noteworthy finding in the research is that parents and employers are very supportive of career pathways once they gain understanding of how it works and the benefits offered to students. They are eager to assist and promote CTE programs to their

neighborhood and community. Whitaker (2008) states, "When parents understand the infrastructure of career pathways they see the benefits to their students and embrace it enthusiastically" (p. 23). The key, therefore, is helping them to understand. Many districts have dedicated significant time and resources toward CTE awareness, not only during CTE month, but throughout the year. For example, the district of this study holds open house and has developed numerous videos, pamphlet/brochures to showcase the CTE program and career pathways.

Employers have become involved in career pathways through a program called the Career Pathway Initiative, which gives the area businesses an opportunity to become involved directly with the schools and their business (Whitaker, 2008). Employers have input on curriculum, programs, certification completion and selection. In a successful program, all stakeholders work together and produce a positive result in the life of a student.

Career Pathways and Graduation Rates

It is reported that the United States graduation rate peaked in 1969 at 77% and has been falling ever since (Khadaroo, 2010). A more recent statistic shows that 69.2% of all high school seniors graduated in 2006, while only 68.8% graduated in 2007. The disparity in these numbers accounts for approximately 11,000 fewer graduates (Khadaroo, 2010). It is projected that, from 2000-2020, the share of the United States population with less than a high school degree is expected to increase from 16.1% to 18.5% (Levin, 2005). Additionally, there are numerous sources on the problem of decreasing graduation rates and on the financial cost to the nation (Saddler et al., 2011).

Regarding the class of 2010 in Texas, the TEA reports that students who completed their diplomas in four years were at 84.3% (ranking 10th among 34 states reporting to the National Governors Association [NGA]) (TEA, 2012). In the report, with regard to the progress, the Texas Commissioner of Education was quoted as saying, "We still have work to do to move the numbers even higher" (p. 1). Furthermore, in June of 2010, the National Governors Association and the Council of Chief State School Officers developed the Common Core Standards that provided "clear and consistent goals for learning that would prepare America's children for success in college and work" (Reese, 2011, p. 16).

A significant amount of research has been done in recent years concerning the impact of career pathways and CTE on improving graduation rates. A very large and thorough study funded by a federal grant came out of John Hopkins University and was published by the National Research Center for Career and Technical Education in October 2005. Over 1600 students born in 1980 were identified from the National Longitudinal Survey of Youth 1997. From that sample, a subsample of 846 students were followed and analyzed until the end of their high school careers (Plank, DeLuca, & Estacion, 2005).

Several important factors also came out of that study. First, researchers concluded that: "For students who are of a normal age, or even younger than normal, at the time of high school entry, it appears that some CTE combined with core academic course taking is good medicine, but only up to a point" (Plank et al., 2005, p. 25). That correlates to a 1:2 ratio of CTE to academic courses, which was contrary to a previous study in 2001 conducted where Plank reported the ratio to be 3:4. Researchers concluded

that this 1:2 ratio minimized the risk of students 15 years of age or younger from dropping out.

Second, the study also showed that too much exposure to CTE implies an increased risk of dropping out. However, students that entered high school older than normal do not seem to have "detectable effects on dropout likelihood" when CTE and academic course taking are combined in combinations (Plank et al., 2005, p. 25). The researchers reason and hypothesize that other factors contribute to their dropout rates.

In 2001, a comparative study by Loveless examined CTE graduation rates in eight districts in upper eastern Tennessee compared to non-CTE graduates with a positive difference noted between the two groups (Loveless, 2011). The research also suggests that "CTE graduation rates can help improve a school district's overall graduation rate" (p. 2).

During the same timeframe as the Loveless study, Webb conducted a study in the Upper Cumberland Region of Tennessee. This particular study also compared the graduation rates of CTE students to non-CTE students in 14 public school systems (Webb, 2012). Interestingly, Webb (2012) states:

> While CTE concentrators did graduate at a higher rate than non-CTE 12th grade students in most of the schools systems that participated in the study, there was not a statistically significant difference to support CTE as the reason for these differences. (p. VI)

Also, a closer look as to the mitigating factor(s) that caused more CTE students to graduate was warranted for further research.

The importance of student organizations' effect on graduation rate was studied in research by Schimpf in the state of Georgia. The emphasis delved into the relationship between CTE and high school graduation rates and influencing factors. The main finding here was that involvement in student organizations and work based learning experiences had the "most significant results for students staying in school and graduating" (Schimpf, 2011, p. i). Students that are involved in their school and their work are more likely to continue through their programs and graduate versus students who just go to school and are not involved.

Conversely, a 2005 study in Texas by Mooneyham found that "the graduation rate analysis showed a higher group mean for CATE students but not statistical significance" (Mooneyham, 2005, p. iii). This study revealed that students from both groups graduated at the same rate. The data used was collected over a three-year period (i.e., 2000-2002) in the state of Texas, and was gathered directly from the Texas Education Agency (TEA). A note of interest here is that this time period was earlier than the aforementioned studies reviewed previously and may have a bearing on the different results. Additionally, the educational climate in Texas was one of change as the state was undergoing replacing its assessment test from the Texas Assessment of Academic Skills (TAAS) to the Texas Assessment of Knowledge and Skills (TAKS).

Career Pathways and Dropout Rates

In a published article in 2010 Anne Lewis, one of the country's most respected writers on education policy reported that the United States did not even reach the Organization for Economic Cooperation and Development's chart of 30 countries under study for either work-based or school-based learning (Lewis, 2010). The logic then

follows that dropouts lower a person's productivity and human capital and, ultimately, have a negative impact on economic growth. Studies have also shown that the trends of our urban cities are indicating a downward spiral with dropout rates climbing, inept skills being taught, and students not completing college (Symonds & Gonzales, 2009).

Considering that there are approximately 23 million dropouts between the ages of 18 – 67, which accounting for an excess of $50 billion in lost federal and state income taxes and $192 billion loss in combined income and tax revenue with each dropout cohort, there is increasing concern regarding the related impact on the economic impact and overall health of our nation (Levin, 2005). It is reported that a high school dropout earns about $260,000 less over a lifetime and pays about $60,000 less in taxes and has a 9.2 year shorter lifespan than a high school graduate (Levin, 2005). In fact, a dropout's annual salary averages $11,989, as compared to a college graduate at $33,701, and healthcare costs compare at $35,000 to $15,000, respectively (Levin, 2005). While these costs are staggering, there is hope. For example, if we could reduce the number of Americans with less than a high school education by 1/3, the savings would range in excess of $3.8 billion (with higher estimates reaching toward $6.7 billion) for temporary assistance for needy families, $3.7 billion for food stamps and $400 million for housing assistance (Levin, 2005). Compare that to the fact that high-risk students are eight-to-ten times less likely to drop out in the 11th and 12th grades if they enroll in a CTE program (ACTE, 2007). One could ascertain that CTE might be a viable and very feasible solution to our nation's dropout problem and the issues it causes.

A 1998 study by Kulik at the University of Michigan also examined dropout rates for at-risk students. This study found that students are 8-10 times less likely to drop out

in their last two years of high school if they are enrolled in a CTE program (Kulik, 1998). Furthermore, the overall dropout rate of a school was found to be reduced by as much as 6% if there was a quality CTE program at that school (Kulik, 1998).

A 2005 study by Mooneyham at the University of North Texas explored CTE's impact on dropout rates over a period of time between 2000-2002. The study found, over time, that "CATE students dropped out less often than non-CATE students at a statistically significant level" (Mooneyham, 2005, p. iii). The discussion presented in that study also suggests that CTE "incorporates the hands-on motivation to make academics important and meaningful" as a reason why CTE students dropped out less (Mooneyham, 2005).

Many states have undertaken initiatives to curtail dropout rates. In Texas, for example, The Texas Education Agency (TEA) reported that there were 55,306 dropouts in 2006-2007, and 45,796 in 2007-2008; hence, there was a decrease of 17.2% (Texas Education Agency, 2009). In another example, a California program has been established called the *Multiple Pathway Movement* – a system that offers options and choices, utilizes the CTE framework especially in new and emerging programs, and is shared by school, businesses, and employers (Symonds & Gonzales, 2009). The National Academy Foundation (NAF) uses the career pathways of finance, hospitality/tourism, information technology and engineering to help students be successful by providing courses and internship and boasting a 90% graduation rate (Symonds, 2009). In this model the community colleges play a critical role of support, counseling, course offering, and career pathways for students to utilize and choose from.

Career Pathways and State Assessment

Stephen Plank conducted a study in 2001 examining the relationship between CTE and academics; specifically, searching for a balance between achievement and persistence. The balance he maintained would impact test scores and likelihood of dropping out. Plank (2001) stated, "Given the importance of a high school diploma in our society a slight reduction in test scores might be found acceptable in exchange for higher graduation rates" (p. 318).

A retrospective cohort study was also conducted between CTE participants and non-CTE participants compared incoming 9th grade math and reading state assessment scores (before CTE) with their state assessment scores in their 11th grade year (Bae et al., 2007). The results of this study illustrated that no significant change in reading was found; yet, it did find significance in 1 of 2 cohorts on math noting that less college-prep math courses were taken by the CTE students. Yet, when that variable was controlled, CTE participation was found not to be associated with math test scores (Bae et al., 2007).

Another study, which took place during the 2009-2010 academic school year, was conducted by Orozco (2010) who researched a school district in Texas. The focus on this study was on how students in career pathways compared with non-CTE students in respect to academic achievement, school engagement, and their technical skills (Orozco, 2010). The school district studied is a large district in El Paso, Texas, which had similar demographics of this study. A particular finding of interest within the study was that the 11th grade students that were in a Program of Study (POS) scored significantly higher than non-POS students in exit level math and ELA on the TAKS test when controlling ethnicity, socio-economic, status, gender, and campus factors (Orozco, 2010). This is a

different finding than that of Bae in 2007 – where CTE participation was found not to be associated with math test scores (Bae et al., 2007).

As noted above, the present study examines CTE's impact on Math, ELA, Social Studies, and Science TAKS scores. Furthermore, 11th graders from the class of 2011 who are identified to be in a CTE career cluster will be compared to their non-CTE classmates. Their TAKS scores in each of the four core classes will be compared to the non-CTE scores, which will be done district wide with all of the students that have been identified.

CTE Related Research

In the last decade attention in educational circles has turned to CTE and various aspects of a CTE educational program. In 2003, Brown reported on the benefits of CTE and cited 18 studies, surveys and data sets (Brown 2003). It was noted in the Brown report that CTE can benefit students by "providing earning advantages before and after graduation" and by "increasing engagement, retention and persistence and by directing them to postsecondary education and pursuit of lifelong learning" (p.3).

A research report published in 2008 cited numerous studies and reports showing that CTE students are taking more rigorous courses, especially in math. CTE students' state test scores increased more than their non-CTE counterparts. Graduates also experienced a higher salary and more employment opportunities (Techniques, 2008). The emphasis trend is to be more academic in nature and less vocational in coursework (Plank, 2001).

Throughout the nation, CTE programs celebrate CTE month each February. During this month of celebration, CTE organizations engage in an awareness activity in

the community or school (Kidwai, 2010). A high school in south Texas each year after the TAKS test takes its 10th graders to the district's CTE career development school building for an expo. Students get a series of six minute presentations over an array of CTE courses and what each offers. Students will then have the opportunity in the following weeks to schedule their 11th grade classes incorporating CTE classes they found of interest (Lewis, B. 2007). It has shown to be a huge success and has raised awareness of the CTE program in the school and community.

CTE has been noted to impact a district and a community in a powerfully positive way as well. Brewer (2004) reports that, at Pekin High School in Illinois, 1000 students of a 2300 student high school are enrolled in CTE courses with funds supplied by the district. Each year the CTE students build a house for the community, which is valued at $200,000. Brewer (2004) also states, "CTE holds the power to encourage their skills and interests, while giving new life and significance to the academies that they need to survive and become productive citizens" (p. 15). The community and area businesses are very supportive of the school and the CTE program. In this particular case, Pekin High School boasts an attendance rate of 96.9%, which is higher than the state average and their graduation rate has increased (Brewer, 2004).

The Mooneyham study found an interesting correlation between CTE students and attendance rates. Namely, when compared to their non-CTE peers, CTE students showed a statistical significance in their attendance records from 2000-2002 (Mooneyham, 2005). This research also concluded that: "The clear implication is that in order for any schooling to be effective students must go to school and stay in school in order to graduate" (Mooneyham, 2005, p. 75).

CTE and School Leadership

The topic of school leadership has been a topic of discussion as of late. Compared to traditional leadership, the approach for CTE-based school leadership is significantly different with respect to budgeting, discipline, personnel issues, as well as the myriad of other day-to-day operational decisions that a CTE school leader would make.

In January, 2012, The U.S. Department of Education Office of Vocational and Adult Education reported on the necessity of CTE administrators to begin aligning the curriculum to make the transition from secondary to post-secondary programs (U.S. Dept. of Education, 2012). One of the significant roles of administrators is summarized in the following statement:

> CTE educators have been developing strategies to better align secondary and postsecondary CTE for more than two decades, although CTE is by no means alone in such efforts. While many of the CTE initiatives are targeted only at CTE students – and the greatest successes may be achieved when alignment does not occur in silos – the experiences of the CTE community can provide valuable insights into larger efforts to align secondary and postsecondary expectations for all students. (p. 2)

Thus, it behooves administrators to have a working knowledge of CTE curriculum and align it in such a way that seamless transitions occur from completion of high school to post-secondary education. Yet, making this happen requires training and a working knowledge of each of the career pathways. It also requires a good working relationship between the high school and the post-secondary institutions. Leadership will have to

formulate and nurture these relationships outside of the auspices of a traditional high school.

Recruitment is another leadership skill set that has to be developed as a CTE administrator. CTE programs rely heavily on advertisement and recruiting to sustain its membership from year to year. Administrators of CTE programs have to be actively involved in promoting their programs to students, parents, and the community. Lewis reports on a school system that has an annual CTE Expo to promote its program. Each year the school district takes its 10th graders to the CTE campus for the event. Students are exposed to the different opportunities that CTE offers through a series of short presentations and demonstrations. This program has been very successful (Lewis, 2007).

Nikirk reported a similar program in a Maryland school district. And, in addition to bringing the 10th graders in, the administration decided to also set up informational booths at the district's 8th grade campuses and begin recruitment there as well (Nikirk, 2007). This approach was noted to be very successful for the students and the district.

In their 2006 study, Chadd and Drage noted that, due to *No Child Left Behind Act*, the leadership of CTE programs now had a responsibility to show how their programs positively impacted state assessment and contributes to students staying in school and being academically more successful. Thus, school leaders have to do their homework and understand the CTE programs very well. Symonds (2012) also noted that three changes must occur in high schools – namely, high-quality career counseling, changing the culture and career and technical education. He maintains that educational leaders must continue to work to offer opportunities for all students (Symonds, 2012).

When considering the day-to-day operations of an effective CTE program, and especially a CTE high school, a significant difference in the school leadership is observed. One of the important changes is in how the budgeting works. Most of the CTE funding comes from the federal government and is funded through the Perkins Act (Texas Education Agency, 2012). Currently, fiscal concerns from those in Washington are impacting the Fiscal Year 2013 discussions, which could significantly impact CTE funding in a negative way (ACTE, 2012). School leaders, therefore, have to monitor such activity and be strong advocates for their program(s) to their senators and congressman/woman.

On a local level, administrators must work with their district and school board to fund their programs. Portions of the CTE budget are funded by local money and allocated by the school board for use on the various campuses and programs. Personnel must also be well-versed in this and be involved in the overall budget process. Additionally, school administrators must work closely on their campus with the different directors of the campus CTE programs in developing, maintaining, and monitoring of funds through them.

The Carl D. Perkins Career and Technical Improvement Act of 2006 addressed many issues facing leadership, such as rigorous and relevant academics with technical instruction, applied learning, higher expectation, and CTE program accountability (Daggett, 2007). Daggett (2007) maintains that the Perkins law "requires applied learning that contributes not only to higher order thinking and technical skills, but also to problem-solving skills and character development" (p.11). This is achieved through student engagement and includes discipline, dropout and graduation rates and CTE

student organization participation (Daggett, 2007). School leadership must be able to analyze the data to adapt to the CTE needs of the campus and its students. In addition, Daggett (2007) states, "Simply identifying what needs to change is not enough; the process that is necessary to move from a traditional program to one that is highly successful must be determined using proven data-driven strategies"(p. 11).

Traditional high schools in the secondary setting spend a lot of time and manpower dealing with school discipline and office referrals. This, however, is not the case in CTE environments. Daggett (2007) maintains that the data shows that the students' level of engagement and the relationships forged between students and with the students and their instructors are the primary factors for this reduction in discipline issues. This fact allows administrators more time to be instructional leaders and address other campus needs.

With the implementation of the No Child Left Behind (NCLB) legislation, school administrators were faced with the challenge of raising the academic performance of their students. And, in 2002, in conjunction with state and local officials, Bill Daggett and The International Center for Leadership in Education developed a three stage process. The three stages are as follows:

1. Developing a clear shared understanding among teachers, administrators, board members, and the general public as to ***why*** schools need to raise the academic standards of all students.
2. Using data to determine ***what*** should be the instructional priorities.
3. Determining ***how*** to improve students' academic performance through CTE (p. 3).

Daggett (2002) maintains that those programs that understand the "why" are those that are, in fact, successful and have "sustained meaningful improvement" (p.3). In addition, technology is the driving force for CTE and the changes we have seen since NCLB's implementation. School leaders involved in the organization, development and implementation of CTE programs must understand this concept; be able to grasp the importance of future employment opportunities; and, be able to help the CTE programs move toward these goals.

The "what" aspect of the process involves identifying what programs need to be changed. Through examination of the data and the future projections for employment, as well as the job market, can help school leaders make informed, data driven decisions. For example, 13 of the 16 Career Clusters require an increased level of reading ability of entry-level jobs than many high school tests require for graduation (Daggett, 2002). School administrators in conjunction with faculty and directors have to implement programs that can meet this requirement and insure student success.

The debate and ongoing discussion in leadership circles addresses the "how" aspect of the three stages. Many programs, curriculums, and initiatives have been launched since NCLB's implementation over a decade ago. Furthermore, in the CTE realm, leaders must focus on the following two main goals for their programs to be successful:

- Continue to find meaningful ways to equip students with the competencies that employment requires; and

- Develop and reinforce with both rigor and relevance the academic standards that are tested on state assessments by embedding and reinforcing these skills in CTE courses. (Daggett, 2002, p. 7)

Needless to say, a great deal of pressure and accountability has fallen on the shoulders of the school leader, especially with regard to producing the results that have been legislated. It is clear that CTE school leaders must possess a thorough understanding of their CTE programs, curriculum, and student skill sets to make the decisions to obtain the necessary results. As Bill Daggett (2002) noted over a decade ago:

> It is the responsibility of every educator – including CTE educators – to help all students to achieve the proficiency levels required under NCLB. To reach AYP benchmarks, educators must internalize the issues at hand (the *why*), use data-driven decision making to determine new program directions (the *what*), and use models of best practices to implement the required changes (the *how*) (p. 7).

It is important to note the significance that the leadership of a CTE program has to its success. More so than its non-CTE traditional counterpart, a CTE administrator, whether a principal, assistant principal, or a counselor, has to actively be involved in promoting and advocating the students, school and programs. Such promotion is observed in all settings and at all levels from junior high to post-secondary completion and with numerous stakeholders from the district, community and prospective employers.

CHAPTER THREE

METHODOLOGY

The purpose of this study was to investigate the impact that career pathways have on (a) statewide assessment among the 11th graders in 2010, (b) the graduation rates of the class of 2011, and (c) the school leadership within a major Gulf Coast suburban school district. This study also identifies those students who are in career pathways and examines their academic progress and completion of high school, as well as the role school leadership plays in that process.

Description of the Research Design

This quantitative study is a non-experimental designed analysis of archival data collected from a cohort of students identified as the class of 2011 in a major Gulf Coast suburban school district. Archival data was accessed with permission from the district's research and evaluation department. Data received consisted of campuses, grade level, gender, ethnicity, socio-economic, career cluster, leaver codes, and math, science, ELA, and social studies TAKS scores of students in the 11^{th} grade in the 2009-2010 school year. This data set was divided primarily into two groups: (a) those students identified as being in a career cluster and (b) those students that are not. The data sets were used to analyze differences between cluster participants and non-cluster participants. In addition, an Analysis of Variance (ANOVA) was used to address each of the following six research questions:

1. Does the enrollment in various CTE pathways have a significant difference on the 11th grade ELA TAKS results?

2. Does the enrollment in various CTE pathways have a significant difference on the 11th grade Math TAKS results?
3. Does the enrollment in various CTE pathways have a significant difference on the 11th grade Science TAKS results?
4. Does the enrollment in various CTE pathways have a significant difference on the 11th grade Social Studies TAKS results?
5. Does the enrollment in various CTE pathways have a significant difference on completion rates?
6. Does the enrollment in various CTE pathways have a significant difference on dropout rates?

Additionally, permission has been granted by the Director of Research/Evaluation at the school district to conduct this study under the conditions that (1) data is provided to you by a district administrator and (2) data is masked so that individually identifiable information is not included. The IRB application with the University of Houston was also submitted and approved (see Appendix A).

Research Questions

This study focused on the following six research questions:

1. Does the enrollment in various CTE pathways have a significant difference on the 11th grade ELA TAKS results?
2. Does the enrollment in various CTE pathways have a significant difference on the 11th grade Math TAKS results?
3. Does the enrollment in various CTE pathways have a significant difference on the 11th grade Science TAKS results?

4. Does the enrollment in various CTE pathways have a significant difference on the 11th grade Social Studies TAKS results?
5. Does the enrollment in various CTE pathways have a significant difference on completion rates?
6. Does the enrollment in various CTE pathways have a significant difference on dropout rates?

Setting

The setting for this is a major suburban school district in the Gulf Coast. This particular district is the 16th largest in a state of over 1,000 separate districts, which maintains a current enrollment of nearly 53,000 students. Furthermore, five high schools, ten intermediate schools, eight middle schools, thirty-five elementary and four alternative schools comprise the district's 62 campuses. With regard to student demographics, the district is comprised of 82% Hispanic, 8% Caucasian, 6% African-American, 3% Asian, .08% Pacific Islander, and .02% American Indian. In addition, 82% of the total students are considered to be economically disadvantaged, and the graduation rate is currently at 77%. Lastly, the following are other district-wide demographics: 11,729 are Bilingual/ESL, 2,743 are Gifted and Talented, and 4,064 students in Special Education.

Subjects

Through the use of the district's data records, this study utilized individual records of students who are identified as being in the 2011 class cohort and participated in the exit level state assessment (TAKS) test in Math, Science, Social Studies, and ELA during the 2009-2010 academic year. It was determined that there were 2957 students from the nine reporting schools that met these criteria. Students who lacked exit level

TAKS scores were excluded. The profiles of the students have been collected by the research and evaluation department of the district and are currently stored in the district database. This data was expunged of all identifiable characteristics prior to its release for the study.

Table 3.1 below summarizes the number of selected students enrolled in the district according to the categories of Gender, Ethnicity, Economically Disadvantaged, Limited English Proficiency (LEP), English Second Language (ESL), Special Education (SPED), Gifted and Talented (GT), and At-Risk status.

Table 3.1

Number of Students Enrolled in Cohort

Category		Frequency	Percent
Gender	Female	1486	50.3
	Male	1471	49.7
	TOTAL	2957	100
Ethnicity	Asian	83	2.8
	Black	188	6.4
	Hispanic	2274	76.9
	Indian	7	0.2
	P. Island	5	0.2
	Two	41	1.4
	White	358	12.1
	TOTAL	2957	100
Economically Disadvantaged	No	1095	37
	Yes	1862	63
	TOTAL	2957	100
Limited English Proficiency	No	2856	96.6
	Yes	101	3.4
	TOTAL	2957	100
English Second Language	No	2883	97.5
	Yes	74	2.5
	TOTAL	2957	100
Special Education	No	2784	94.1
	Yes	173	5.9
	TOTAL	2957	100
Gifted & Talented	No	2757	93.2
	Yes	200	6.8
	TOTAL	2957	100
	No	1351	45.7
	Yes	1606	54.3
	TOTAL	2957	100

Note. P. Island = Pacific Islander; Two = Two or more ethnic categories.

Table 3.2

Number of Students in Cohort by Location

Category	Frequency	Percent	Valid Percent	Cumulative Percent
Evening School	38	1.3	1.3	1.3
High School #1	727	24.6	24.6	25.9
JJAEP	1	.0	.0	25.9
High School #2	474	16.0	16.0	41.9
High School #3	624	21.1	21.1	63.0
High School #4	545	18.4	18.4	81.5
High School #5	501	16.9	16.9	98.4
DAEP	5	.2	.2	98.6
CTE Center	42	1.4	1.4	100.0
TOTAL	2957	100.0	100.0	

Note: JJAEP = Juvenile Justice Alternative Education Placement; DAEP = District Alternative Education Placement; CTE Center = Career Technical Education Center

Table 3.3

Number of Students by Grade Level

	Frequency	Percent	Valid Percent	Cumulative Percent
11th	133	4.5	4.5	4.5
12th	2824	95.5	95.5	100.0
Total	2957	100.0	100.0	

Procedures

Application for this research study was made with the school district in the spring of 2012. Permission for this study was granted on May 4, 2012 by the Director of Research and Evaluation under the conditions that (1) data is provided to you by a district administrator and (2) data is masked so that individually identifiable information is not included (See Appendix B).

A proposal for this research study was submitted to the Institutional Review Board for the University of Houston on June 29, 2012. All necessary signatures and approvals have been collected and submitted. Requested documents were submitted and uploaded. Permission from IRB was initially granted on October 22, 2012 contingent upon some application corrections and submission of the district approval letter. Resubmission was made and final approval was granted on November 12, 2012 (see Appendix A).

In addition, data was provided by the district in an Excel document. Information requested in columnar form include: school name, gender, ethnicity, economically disadvantaged, at-risk, CTE code, TAKS math scores, TAKS science scores, TAKS social studies scores, TAKS ELA scores, and Leaver code.

The column titled *School Name* lists the school the student attended. The column titled *Gender* indicates whether the student is male or female. The column titled *Ethnicity* lists the reported ethnicity of the student. The columns entitled *economically disadvantaged* and *at-risk* is simply labeled a "Y" for yes and an "N" for no. All of this information gives the demographic information of the cohort.

The column entitled CTE code is used to divide the CTE students from non-CTE students. A code of 2 or 3 in this column indicates the student is in a designated career pathway. A career pathway is a coherent, articulated sequence of rigorous academic and career/technical courses, commencing in the ninth grade and leading to an associate degree, baccalaureate degree and beyond, an industry recognized certificate, and/or licensure. The career pathway is developed, implemented and maintained in partnership among secondary and postsecondary education, business, and employers. Over the years, work has been done to identify these different pathways. And, more recently, the National Association of State Directors of Career Technical Education Consortium developed a framework of 16 Career Clusters that are used nationally.

The following statement encapsulates the 16 career clusters:

The National Career Clusters Framework is comprised of 16 Career Clusters and related career pathways to help students of all ages explore different career options and better prepare for college and career. Each career cluster represents a distinct grouping of occupations and industries based on the knowledge and skills they require. The 16 Career Clusters and related career pathways provide an important organizing tool for schools to develop more effective programs of study (POS) and curriculum (National, 2012).

More specifically, the 16 career clusters are:

- •Agriculture, Food & Natural Resources;
- •Architecture & Construction;
- •Arts, Audio/Video Technology & Communications;
- •Business Management & Administration;
- •Education & Training;
- •Finance;
- •Government & Public Administration;
- •Health Science;
- •Hospitality & Tourism;
- •Human Services;
- •Information Technology;
- •Law, Public Safety, Corrections & Security;
- •Manufacturing;
- •Marketing;
- •Science, Technology, Engineering & Mathematics; and
- •Transportation, Distribution & Logistics.

A coding of "2" indicates that that student is in a coherent sequence. An individual has taken a minimum of 3 semesters of a CTE course that are in the same category (i.e., medical science) as identified by the student's counselor and receives that particular coding.

Students in this cohort participated in a Kuder test in the 8th grade, which identified CTE pathway interest. Students and their counselors use this information when building the student's high school schedule. Furthermore, many of the pathways have an

application/interview process the students go through after the initial introductory course. This process is due in part because space is limited in the program. For example, the Cosmetology pathway is limited to 40 students per cohort.

A coding of "3" indicates that the student is in a technical preparation program (tech prep) and that there is an articulation agreement that exists between the student, the school, and a particular employer/industry.

The standardized state assessment in the state of Texas is called "TAKS", which stands for Texas Assessment of Knowledge and Skills, and has been used since 2003 in grades 3-12 (up until 2012). Each year from grades 3-9 students take the reading and math TAKS with writing assessed in grades 4 and 7, science in grades 5 and 8, and social studies in grade 8. In 10^{th} and 11^{th} grade students take all four core subjects – that is, English Language Arts (ELA), Math, Science, and Social Studies. During their 11^{th} grade year the TAKS test is referred to as the "Exit Level TAKS". This assessment has a standard set for graduation requirements (minimum score of 2100). These are the scores requested for this study. Each of these four core subjects will have a respective column. The numerical score given to the student will be indicated in each of the respective columns.

The last column of information requested will be titled *Leaver Code*. The leaver code is a combination letter and number or just a number that indicates what became of that particular student. Leaver codes will be used to classify the student for completion or dropout rates.

Leaver codes have been required since the 1997-98 school year in Texas and are part of the Public Education Information Management System (PEIMS). Public school

districts are required to report the reasons students in grades 7-12 leave school (TEA, 2012).

Once the data was received, the data was sorted and the students were divided into CTE and non-CTE groups. Each group was then analyzed to determine the demographic breakdown of each group.

Analysis

The data will be analyzed using an Analysis of Variance (ANOVA) in order to determine whether there was a significant difference between the performance of students in ELA, Math, Science, and Social Studies by career pathway. In ELA, for example, the analysis will investigate the extent to which various career pathways (listed below) will yield a significant difference or better results on the statewide assessment result.

The data set received from the district contained 2992 students. After a closer review, it was discovered that not all of these students met the criteria of being those who were in the 11th grade in the 2010-11 school year. 35 students were removed from the initial data set. 2957 students were used for the purpose of this study.
The students were divided into two groups – those in a CTE career pathway called CTE 2 and those not in a CTE career pathway called CTE 1. CTE 1 and CTE 2 are used in the analysis and tables seen in this chapter. Students coded as a 0 or a 1 in the district data had been determined to have not been in a career pathway. Those students had never taken any courses that were a coherent sequence – successive courses in the same genre of classes. This group is called CTE1. Students coded as a 2 or a 3 in the district data had taken several CTE courses in a coherent sequence (common courses for a pathway) and are considered to be in a career pathway. This group is called CTE 2.

Table 3.4

Career Tech Table

	Frequency	Percent	Valid Percent	Cumulative Percent
0	236	8	8	8
1	275	9.3	9.3	17.3
2	1753	59.3	59.3	76.6
3	693	23.4	23.4	100
Total	2957	100	100	

A breakdown of the CTE students based on the district career categories revealed the following:

Table 3.5

Career Pathway

Pathway	Frequency	Percent	Valid Percent	Cumulative Percent
	47	1.6	1.6	1.6
Agriculture, Food & Natural Resources	68	2.3	2.3	3.9
Architecture & Construction	217	7.3	7.3	11.2
Arts, A/V Technology & Communications	325	11.0	11.0	22.2
Business, Management & Administration	341	11.5	11.5	33.8
Education & Training	166	5.6	5.6	39.4
Health Science	573	19.4	19.4	58.7
Hospitality & Tourism	101	3.4	3.4	62.2
Human Services	174	5.9	5.9	68.0
Information Technology	126	4.3	4.3	72.3
Law, Public Safety, Corrections & Security	316	10.7	10.7	83.0
Manufacturing	75	2.5	2.5	85.5
Marketing, Sales & Service	66	2.2	2.2	87.8
N/A	9	.3	.3	88.1
Science, Technology, Engineering & Math	203	6.9	6.9	94.9
Transportation, Distribution & Logistics	150	5.1	5.1	100.0
Total	2957	100.0	100.0	

The analyses of the state assessment scores were utilized to determine mean score differences by career cluster. This provided data to analyze the research questions regarding state assessment and determined the significance of the data's findings.

Another point of study was analyzing the data for the research questions concerning dropout and completion rates. To do this, the leaver codes had to be categorized to determine how many students completed high school and how many

dropped out and did not complete high school. Once those students were determined an ANOVA was conducted on these two sets of data in order to determine the significance of the data's findings.

This study concluded with a discussion and analysis of the findings. Further, each of the six research questions was discussed at length. Finally, conclusions were drawn and further studies or areas of research were suggested for future exploration.

Instruments

The procedures described and the data for each of the 2992 students in a major suburban Gulf Coast school district were presented in a Microsoft Office Excel document format. All students were masked as to not be identifiable. This data set is the source used for the study and contains gender, demographics, TAKS scores, leaver codes, and career pathway. The TAKS scores and leaver codes are supplied by the TEA. The career pathway is chosen in conjunction with the Kuder test administered in the 8th grade to identify CTE courses/pathways a student is interested in and input from the student's counselor, the student, and his or her parents.

The standardized state assessment in the state of Texas is called the Texas Assessment of Knowledge and Skills (or TAKS) and has been used since 2003 in grades 3-12 up until 2012. Each year students from grades 3-9 take the reading and math TAKS with writing assessed in grades 4 and 7, science in grades 5 and 8, and social studies in grade 8. During their 10th and 11th grade, students take all four core subjects – namely, English Language Arts (ELA), Math, Science, and Social Studies. During their 11th grade year the TAKS test is referred to as the "Exit Level TAKS". This assessment has a standard set for graduation requirements (minimum score of 2100). This is the score

requested for this study. Each of these four core subjects will have a respective column. The numerical score given to the student will be indicated in each of the respective columns.

The last column of information requested will be titled *Leaver Code*. The leaver code is a combination letter and number or just a number that indicates what became of that particular student. Leaver codes will be used to classify the student for completion or dropout rates.

A career pathway is a coherent, articulated sequence of rigorous academic and career/technical courses, commencing in the ninth grade and leading to an associate degree, baccalaureate degree and beyond, an industry recognized certificate, and/or licensure. The career pathway is developed, implemented, and maintained in partnership among secondary and postsecondary education, business, and employers.

Leaver codes have been required since the 1997-98 school year in Texas and are part of the Public Education Information Management System (PEIMS). Public school districts are required to report the reasons students in grades 7-12 leave school (TEA, 2012).

CHAPTER FOUR

RESULTS

The purpose of this study was to examine the impact of the career pathways of Career and Technical Education (CTE) on state assessment, completion rates and school leadership. Chapter Four presents the data and findings of the study. The chapter is arranged in order of the six research questions that guided the study:

Research Question One: Does the enrollment in various CTE pathways have a significant difference on the 11th grade ELA TAKS results?

Research Question Two: Does the enrollment in various CTE pathways have a significant difference on the 11th grade Math TAKS results?

Research Question Three: Does the enrollment in various CTE pathways have a significant difference on the 11th grade Science TAKS results?

Research Question Four: Does the enrollment in various CTE pathways have a significant difference on the 11th grade Social Studies TAKS results?

Research Question Five: Does the enrollment in various CTE pathways have a significant difference on completion rates?

Research Question Six: Does the enrollment in various CTE pathways have a significant difference on dropout rates?

Data Collection and Coding

The data set received from the district contained 2992 students. After closer examination it was discovered that not all of these students met the criteria of being those who were in the 11^{th} grade in the 2010-11 school year. Therefore, 35 students were

removed from the initial data set. In total, 2957 students were used for the purpose of this study.

In the district data students were coded as a 0, 1, 2, or 3 in the district data with regard to their CTE status. Upon further investigation, it was discovered that those students who were coded as a 0 or a 1 had been determined were not in a career pathway. Those students had never taken any courses that were a coherent sequence – that is, successive courses in the same genre of classes. Students coded as a 2 or a 3 in the district data were determined to have had taken several CTE courses in a coherent sequence (i.e., common courses for a pathway). These students are considered to be in a career pathway.

In the data set, a CTE code of 0 had a frequency of 236. This accounted for 8% of the data. 0 represents students who had not been in a CTE class and were identified as not being in a coherent sequence. This means that 236 of the 2957 students (or 8%) were coded a 0 with respect to their CTE affiliation and had not participated in a coherent sequence during their high school career.

The data further revealed that there was a frequency of 275 entries with a code of 1 entered for CTE status. This accounts for 9.3% of the data set. A code of 1, like the code of 0, meant for the purpose of this study that students with this code, with respect to their CTE affiliation, had not participated in a coherent sequence during their high school career. This means that 275 of the 2957 students (or 9.3%) were coded as a 1 with respect to their CTE affiliation and also had not participated in a coherent sequence during their high school career.

In the data set there was a frequency of 1753 entries with a code of 2 entered for CTE status. This accounts for 59.3% of the data set. A code of 2 meant for the purpose of the study that those students were identified as a student in a coherent sequence and was considered to be in a career pathway. This means that 1753 of the 2957 students (or 59.3%) were coded as a 2 with respect to their CTE affiliation and had participated in a coherent sequence during their high school career and were identified as being in a career pathway.

In the data set there was a frequency of 693 entries with a code of 3 entered for CTE status. This accounts for 23.4% of the data set. A code of 3 meant for the purpose of the study that those students were identified as a student in a coherent sequence and was considered to be in a career pathway. This means that 693 of the 2957 students (or 23.4%) were coded as a 3 with respect to their CTE affiliation and had participated in a coherent sequence during their high school career and were identified as being in a career pathway. Table 4.1 below depicts the breakdown.

Table 4.1

CTE Table A

Code	Frequency	Percent	Valid Percent	Cumulative Percent
0	236	8	8	8
1	275	9.3	9.3	17.3
2	1753	59.3	59.3	76.6
3	693	23.4	23.4	100
Total	2957	100	100	

The four groups in Table 4.1 were divided into two groups, CTE 1 and CTE 2. CTE 1 and CTE 2 were the two groups used in the analysis for this study. CTE 1 is composed of the first two rows in Table 4.1 and is identified as the Non-CTE career pathway students. These are the students coded as a 0 or a 1 in the data set. CTE 2 is composed of the last two rows and is identified as the CTE career pathway students. These students are coded as a 2 or 3 in the data set.

Once this was done the data became divided into two groups. A frequency of 511 entries existed in the CTE 1 category. This accounted for 17.3% of the data. A frequency of 2446 entries existed for CTE 2. This accounted for 82.7% of the data. Therefore, the data set was divided into 2 groups of students: CTE 1 which represent 511 or 17.3 % of the students and CTE 2 which represent 2446 or 82.7% of the students. Table 4.2 depicts this division of students. The groups CTE 1 and CTE 2 are used in the analysis and tables seen in this chapter.

Table 4.2

CTE Table B

	Frequency	Percent	Valid Percent	Cumulative Percent
CTE 1	511	17.3	17.3	17.3
CTE 2	2446	82.7	82.7	100
Total	2957	100	100	

A breakdown of CTE 1 and CTE 2 by grade level reveals that there were 133 (or 4.5%) within the data set in the 11^{th} grade and 2824 (or 95.5%) within the data set in the

12th grade. In CTE 1 (i.e., non-career pathway), there were 64 (or 12.5%) of the 511 CTE 1 students who were in the 11th grade. Conversely, there were 69 (or 2.8%) of the 2446 CTE 2 (i.e., career pathway) students in the 11th grade. In the 12th grade there were 447 students (or 87.5%) within the CTE 1 group, as compared to 2377 (or 97.2%) of the CTE 2 group. Table 4.3 shows this information.

Table 4.3

CTE 1 & 2 Divided by Grade Level

			CTE 1	CTE 2	Total
Grade Level	11	Count	64	69	133
		% Within CTE	12.50%	2.80%	4.50%
	12	Count	447	2377	2824
		% Within CTE	87.50%	97.20%	95.50%
Total		Count	511	2446	2957
		% Within CTE	100%	100%	100%

A breakdown of the data set by gender reveals that there were 1486 (or 50.3%) of the students were females and 1471 (or 49.7%) were males. When looking exclusively at the CTE 1 group of 511 students 236 (or 46.2%) were females and 275 (or 53.8%) were males. The comparison of the 2446 CTE 2 students reveals that 1250 (or 51.1%) were females versus 1196 (or 48.9%) who were males. Table 4.4 depicts this data.

Table 4.4

CTE 1 & 2 Divided by Gender

			CTE 1	CTE 2	Total
Gender	F	Count	236	1250	1486
		% Within CTE	46.20%	51.10%	50.30%
	M	Count	275	1196	1471
		% Within CTE	53.80%	48.90%	49.70%
Total		Count	511	2446	2957
		% Within CTE	100.00%	100.00%	100.00%

An ethnic breakdown of the data reveals that the student data is divided up into the following seven categories: Asian, Black, Hispanic, Indian, Pacific Islander, Two or more ethnic groups, and White. There were 84 Asian students, which accounted for 2.8% of the population. There were 188 Black students, which accounted for 6.4% of the population. 2274 students (or 76.9% of the population) were listed as Hispanic. 7 students (or 0.2%) were classified as Indian and only 5 students (or .2%) were Pacific Islanders. 41 students (or 1.4%) were classified as two or more ethnic groups. 358 White students (or 12.1%) completed the 2957 students used in this study.

A breakdown of the ethnicity of the students between the CTE 1 and CTE 2 groups shows that, although there were more students in CTE 2, the overall percentage in each group was similar per category. There were 16 Asian students (or 3.1%) of the CTE 1 population, as compared to 68 students (or 2.8%) of the CTE 2 population. There were 32 Black Students (or 6.3%) of the CTE 1 population, as compared to 156 (or 6.4%) of the CTE 2 population. Spanish students were divided into 365 students (or 71.4%) of the CTE 1 population compared to 1909 (or 78%) of the CTE 2 population. This was the

biggest percentage difference seen between the two groups.

There was only 1 Indian student in the CTE 1 group, which accounted for 0.2% of the population. Similarly, there were only 6 Indian students in the CTE 2 group, also accounting for 0.2% of the population. 2 Pacific Islander students composed the CTE 1 group and accounted for 0.4% of its population. 3 Pacific Islanders were in the CTE 2 group. This was a mere 0.1% of its population.

In the two or more ethnic groups category, only 3 students were in CTE 1, composing 0.6% of its group compared to 38 students in CTE 2 in the same category, accounting for 1.6% of its group. Finally, in the White ethnic group, there were 92 students in CTE 1 and 266 in CTE 2, which correlated to 18% and 10.9% of their individual groups, respectively. Table 4.5 shows the ethnic data breakdown.

Table 4.5

CTE 1 & 2 Breakdown by Ethnicity

			CTE 1	CTE 2	Total
Ethnicity	Asian	Count	16	68	84
		% Within CTE	3.10%	2.80%	2.80%
	Black	Count	32	156	188
		% Within CTE	6.30%	6.40%	6.40%
	Hispanic	Count	365	1909	2274
		% Within CTE	71.40%	78.00%	76.90%
	Indian	Count	1	6	7
		% Within CTE	0.20%	0.20%	0.20%
	Pacific Islander	Count	2	3	5
		% Within CTE	0.40%	0.10%	0.20%
	Two or more ethnic	Count	3	38	41
		% Within CTE	0.60%	1.60%	1.40%
	White	Count	92	266	358
		% Within CTE	18.00%	10.90%	12.10%
Total		Count	511	2446	2957
		% Within CTE	100.00%	100.00%	100.00%

In looking at the cohort (dataset), in regards to the classification of economically disadvantaged, there were 1862 students (or 63%) of the 2957 total students that were economically disadvantaged. This term is calculated as the sum of the students coded as eligible for free or reduced-price lunch or eligible for other public assistance, divided by the total number of students (TEA, 2010). 1095 students (or 37%) were not economically disadvantaged.

The percentage points change, however, when comparing CTE 1 to CTE 2. In CTE 1 group 58.1% (or 297 students) were economically disadvantaged compared to 64 % (or 1565 students) in CTE 2. The 1095 students who were not economically disadvantaged were composed of 214 (41.9%) students in CTE 1 and 881 (36%) students in CTE 2. Table 4.6 shows this breakdown in table form.

Table 4.6

CTE 1 & 2 Breakdown by Economically Disadvantage Status

			CTE 1	CTE 2	Total
Economically Disadvantaged	N	Count	214	881	1095
		% Within CTE	41.90%	36.00%	37.00%
	Y	Count	297	1565	1862
		% Within CTE	58.10%	64.00%	63.00%
Total		Count	511	2446	2957
		% Within CTE	100.00%	100.00%	100.00%

In the student data used in this study only 101 of the 2957 (3.4%) students were classified as Limited English Proficient (LEP). 32 of them were in CTE 1, which accounted for 6.3% of the CTE 1 population. The other 69 students were in CTE 2 and composed 2.8% of that subgroup's population. The remaining 2856 students (96.6%) were not classified as LEP students and were divided up as 479 students (93.7%) in CTE 1 and 2377 students (97.2%) in CTE 2. Table 4.7 depicts this breakdown.

Table 4.7

CTE 1 & 2 Breakdown by Limited English Proficient Status

			CTE 1	CTE 2	Total
Limited English Proficient	N	Count	479	2377	2856
		% Within CTE	93.70%	97.20%	96.60%
	Y	Count	32	69	101
		% Within CTE	6.30%	2.80%	3.40%
Total		Count	511	2446	2957
		% Within CTE	100.00%	100.00%	100.00%

Similar to LEP status is the English Second Language (ESL) status. As shown in Table 4.8, a mere 2.5% of students (74 students) fell into this category. The other 2883 students (or 97.5% of the 2957) were not considered to be an ESL student.

Of the 74 ESL students, 49 were in career pathways (CTE 2) and 25 were not (CTE 1). The 49 students reflect a mere 2% of CTE 2 population and the 25 students represent 4.9% of the CTE 1 population. This means that 98% (or 2397 of the 2446 students) in CTE 2 were non-ESL learners and that 95.1% (or 486 of the 511 CTE 1 students) were also non-ESL learners (see Table 4.8 below).

Table 4.8

CTE 1 & 2 Breakdown by English Second Language Status

			CTE 1	CTE 2	Total
English Second Language	N	Count	486	2397	2883
		% Within CTE	95.10%	98.00%	97.50%
	Y	Count	25	49	74
		% Within CTE	4.90%	2.00%	2.50%
Total		Count	511	2446	2957
		% Within CTE	100.00%	100.00%	100.00%

Special education students also composed a small percentage of the cohort (data set). There were 173 students (5.9%) of the 2957 who were classified as a student with a specific disability leaving 2784 students (94.1%) that were non-special education students. This ratio was fairly consistent across the CTE 1 & 2 subgroups. 134 special students were found to be in a career pathway and were listed in the CTE 2 group data. This accounts for 5.5% of the CTE 2 total population. The other 39 special education students were not in a career pathway and were placed in CTE 1. 7.6% of the CTE 1 population was listed as special education.

It should be noted that 94.5% of CTE 2 and 92.4% of CTE 1 were made up of non-special education students (2312 and 472 students, respectively). Table 4.9 depicts the breakdown by special education status.

Table 4.9

CTE 1 & 2 Breakdown by Special Education Status

			CTE 1	CTE 2	Total
Special Education	N	Count	472	2312	2784
		% Within CTE	92.40%	94.50%	94.10%
	Y	Count	39	134	173
		% Within CTE	7.60%	5.50%	5.90%
Total		Count	511	2446	2957
		% Within CTE	100.00%	100.00%	100.00%

Another small subgroup found in the data set was the students identified as Gifted and Talented. According to the Texas Education Code 29.121, these are students who perform at or show the potential for performing at a remarkably high level of accomplishment when compared to others of the same age, experience, or environment and who: (1) exhibits high performance capability in an intellectual, relative, or artistic area; (2) possesses an unusual capacity for leadership; or, (3) excels in a specific academic field (TEC, 2007).

In this study there were 200 Gifted and Talented (G/T) students identified. This accounts for 6.8% of the total student population of this study. That leaves 2757 (or 93.2%) of the students who were not G/T. 54 of these students did not enroll in a career pathway, while 146 did enroll. The 54 students compose 10.6% of the CTE 1 group; while the 146 students comprise 6% of the CTE 2 group (see Table 4.10).

Table 4.10

CTE 1 & 2 Breakdown By Gifted/Talented Status

			CTE 1	CTE 2	Total
Gifted/Talented	N	Count	457	2300	2757
		% Within CTE	89.40%	94.00%	93.20%
	Y	Count	54	146	200
		% Within CTE	10.60%	6.00%	6.80%
Total		Count	511	2446	2957
		% Within CTE	100.00%	100.00%	100.00%

The final subgroup identified in this study's data set is a group called At-Risk. A student is identified as at-risk of dropping out of school based on state-defined criteria (§TEC 29.081.). At-risk status is obtained from the PEIMS 110 records. The statutory criteria for at-risk status include each student who is under 21 years of age and who:

- was not advanced from one grade level to the next for one or more school years;
- did not perform satisfactorily on an assessment instrument administered to the student under TEC Subchapter B, Chapter 39, and who has not in the previous or current school year subsequently performed on that instrument or another appropriate instrument at a level equal to at least 110 percent of the level of satisfactory performance on that instrument;
- is in prekindergarten, kindergarten or grades 1, 2, or 3 and did not perform satisfactorily on a readiness test or assessment instrument administered during the current school year;
- is pregnant or is a parent;

- has been placed in an alternative education program in accordance with §TEC 37.006 during the preceding or current school year;
- has been expelled in accordance with §TEC 37.007 during the preceding or current school year;
- is currently on parole, probation, deferred prosecution, or other conditional release;
- was previously reported through the PEIMS to have dropped out of school;
- is a student of limited English proficiency, as defined by §TEC 29.052;
- is in the custody or care of the Department of Protective and Regulatory Services or has, during the current school year, been referred to the department by a school official, officer of the juvenile court, or law enforcement official; and/or
- is homeless, as defined by 42 U.S.C. Section 11302 and its subsequent amendments or resided in the preceding school year or resides in the current school year in a residential placement facility in the district, including a detention facility, substance abuse treatment facility, emergency shelter, psychiatric hospital, halfway house, or foster group home (TEA , 2010).

There are 1606 of the 2957 students who are considered at-risk. That is, 54.3% of the total population of the study. 1351 students (45.7%) were not considered at-risk. This percentage rate held consistent when looking at composition of the CTE 1 and CTE 2 groups in regards to at-risk composition. In CTE 1, there were 281 (55%) at-risk students versus 230 (45%) not at-risk students in the subgroup. In CTE 2, there were 1325 (54.2%) at-risk students versus 1121 (45.8%) non at-risk students in the subgroup. This

subgroup had the most consistency in ratio of any of the subgroups in regards to the status breakdown as compared to the whole group. Table 4.11 shows this relationship.

Table 4.11

CTE 1 & 2 Breakdown by At-Risk Status

			CTE 1	CTE 2	Total
At-Risk	N	Count	230	1121	1351
		% Within CTE	45.00%	45.80%	45.70%
	Y	Count	281	1325	1606
		% Within CTE	55.00%	54.20%	54.30%
Total		Count	511	2446	2957
		% Within CTE	100.00%	100.00%	100.00%

Although not considered for significance or addressed in the research questions in this study, the breakdowns of the student makeup in CTE 1 and CTE 2 are worthy of discussion in Chapter Five and possible future research areas.

In the 8th grade, the students of the cohort in this study were given an aptitude test that determined what career cluster (i.e., pathway) they would fall into if they were categorized in 1 of the 14 different categories the school district offered. The selection is based off of feedback from the student's like, dislikes, strengths, and areas of interest. Kuder test scores and interviews with the student and parents helped determine placement as well. All students are assigned a cluster, however, not all students follow that pathway or enroll in a coherent sequence in that particular subject. The CTE 1 students chose not to follow the pathway identified in this process. The CTE 2 students continued to follow in that pathway and took sequential courses in that area.

The district wherein that this study was conducted utilizes or offers programs in

14 of the 16 career pathways. Only Finance and Government and Administration pathways are not offered. The other 14 programs are listed in the data set and are divided accordingly.

Of the 2957 students in this study, all but 56 had a career pathway attached to their record. There was no explanation given as to why those students did not have a career pathway identified; however, the indicators show that 25 were in a career pathway (CTE 1). This was 3.4% of all the students in CTE 2. 31 of these students are in CTE 1, which represents 6.1% of its population.

Of the 2957 total students, 68 (or 2.3%) initially enrolled in the career pathway called Agriculture, Food & Natural Resources. It is the production, processing, marketing, distribution, financing, and development of agricultural commodities and resources including food, fiber, wood products, natural resources, horticulture, and other plant and animal products/resources (National, 2012). It was discovered that17 students did not take a coherent sequence and were placed in the CTE 1 group accounting for 3.3% of that subgroup. However, 51 students did enter into the career pathway and were placed in CTE 2 group. Those 51 students make up 2.1% of the 2446 students in career pathways (CTE 2).

The data showed 217 (or 7.3%) of the students had Architecture & Construction listed as their career pathway. Architecture and construction are careers in designing, planning, managing, building and maintaining the built environment (National, 2012). It was found that 30 of those 217 students were placed in CTE 1 because they did not follow a coherent sequence. These 30 represent 5.9% of the CTE 1 group. However, 187

students did follow the coherent sequence and were in a career pathway. These students were placed in CTE 2 group and compose 7.6% of its total population.

The data revealed that 325 or 11% of the students listed Arts, Audio/Video Technology & Communications as their career cluster. This cluster involves the designing, producing, exhibiting, performing, writing, and publishing multimedia content including visual and performing arts and design, journalism, and entertainment services (National, 2012). Of these students, 84 were placed in CTE 1 because they did not take a coherent sequence of courses in this cluster. This group constitutes 16.4% of CTE 1. The remaining 241 students did follow the sequence and were listed as being in a career pathway (CTE 2) and compose 9.9% of that group's data set.

Of the total students, 341 (or 11.5%) of the students chose Business Management & Administration as their career cluster. This cluster includes careers in planning, organizing, directing and evaluating business functions essential to efficient and productive business operations (National, 2012). Of these, 40 students were placed in CTE 1 group for failing to establish a coherent sequence and a career pathway. These students compose 7.8% of CTE 1. The remaining 301 students were involved in the business management and administration career pathway. They were placed in CTE 2 and compose 12.3% of that subgroup.

In the career pathway known as Education &Training, 166 (or 5.6%) of the students chose it. This pathway involves the planning, managing and providing education and training services, and related learning support services, such as administration, teaching/training, administrative support, and professional support services (National, 2012). In this group, 28 of these students were placed in CTE 1 for

failure to enroll in a career pathway. These 28 constitute 5.5% of the CTE 1 group. 138 students did enroll in a career pathway. They were placed in CTE 2 and compose 5.6% of this group.

Out of the data set, 573 (or 19.4%) students picked Health Science as their career cluster. This was the largest cluster of the 14 offered by the district. Health science includes the planning, managing, and providing therapeutic services, diagnostic services, health informatics, support services, and biotechnology research and development (National, 2012). Upon inspection, 76 of these students were determined to not be in a career pathway and were placed in CTE 1 with the other students who did not take a coherent sequence. These 76 students made up 14.9% of CTE 1 group. The remaining 497 students were placed in the CTE 2 group because they were in a career pathway and had taken the minimum required courses to establish them in a coherent sequence. These students made up 20.3% of the CTE 2 group.

The Hospitality & Tourism career cluster was chosen by 101 (or 3.4%) of the students. This pathway includes the preparing of individuals for employment in career pathways that relate to family and human needs, such as restaurant and food/beverage services, lodging, travel and tourism, recreation, amusement and attractions (National, 2012). However, 19 of the 101 students did not pursue these courses and consequently were placed in the CTE 1 group. These 19 students compose 3.7% of the CTE 1 group. The remaining 82 students chose to continue taking courses in this pathway and established a coherent sequence, placing them in the CTE 2 group. They compose 3.4% of the total number of students in CTE 2.

Another 174 (or 5.9%) of the students from the data set selected Human Services as their career cluster. This pathway involves preparing individuals for employment in career pathways that relate to families and human needs such as counseling and mental health services, family and community services, personal care, and consumer services (National, 2012). The study shows that 28 of these students did not pursue this cluster as a career pathway so they were placed in CTE 1. They compose 5.5% of the CTE 1 group. The remainder of the students pursued a career pathway in Human Services. They were placed in CTE 2 – that is, the career pathway group. There were 146 students, and they composed 6% of the CTE 2 group.

In Information Technology, 126 (or 4.3%) of the students were in this cluster. This pathway involves building linkages in Information Technology occupations for entry level, technical, and professional careers related to the design, development, support and management of hardware, software, multimedia and systems integration services (National, 2012). There were 21students who were removed and placed in CTE 1for failure to be in a coherent sequence. These students compose 4.1% of the CTE 1 group. The remaining 105 students were identified as being in a career pathway and were placed in CTE 2. 4.3% of CTE 2 students were in this pathway.

The students who listed the career pathway titled Law, Public Safety, and Corrections & Security numbered 316 (or 10.7%). This pathway involves the planning, managing, and providing legal, public safety, protective services and homeland security, including professional and technical support services (National, 2012). There were 59 students chose not to pursue a coherent sequence in this cluster so they were placed in CTE 1. They compose 11.5% of the CTE 1 group. The remaining 257 students were

placed in CTE 2 because they were identified as being in a career pathway. These students made up 10.5% of the CTE 2 population.

It was found that 75 (or 2.5%) of the students listed the career pathway Manufacturing as their career cluster. Manufacturing includes the planning, managing and performing the processing of materials into intermediate or final products and related professional and technical support activities, such as production planning and control, maintenance and manufacturing/process engineering (National, 2012). Of the original 75 students, 13did not take coherent sequences or courses in manufacturing and were placed in the CTE 1 subgroup. These particular students compose 2.5% of the CTE 1 group. The remaining 62 students enrolled in multiple courses in manufacturing, establishing a coherent sequence, and were assigned to the CTE 2 group. They compose 2.5% of the CTE 2 population.

The Marketing career cluster was selected by 66 (or 2.2%) of the students. This pathway is involved in the planning, managing, and performing marketing activities to reach organizational objectives such as brand management, professional sales, merchandising, marketing communications and market research (National, 2012). Six of the students were placed in CTE 1 upon review because they did not take a coherent sequence in this pathway. 1.2% of these students made up the CTE 1 group. The remaining 60 students remained in the cluster and were placed in CTE 2. These 60 students compose 2.5% of CTE 2.

A group of 20 (or 6.9%) of the students listed Science, Technology, Engineering & Mathematics as their career cluster. This pathway involves planning, managing, and providing scientific research and professional and technical services (e.g., physical

science, social science, engineering) including laboratory and testing services, and research and development services (National, 2012). However, 33 students' records did not meet the definition of a career pathway and were placed in the CTE 1 group and compose 6.5% of its makeup. The remaining 170 students were verified to be in a career pathway and were placed in CTE 2. These students make up 7% of the CTE 2 group.

The 14th and final cluster listed in the data set is Transportation, Distribution & Logistics. There were 150 (or 5.1%) of the 2957 students chose as their career cluster. This pathway involves the planning, management, and movement of people, materials, and goods by road, pipeline, air, rail and water and related professional and technical support services, such as transportation infrastructure planning and management, logistics services, mobile equipment and facility maintenance (National, 2012). It was found that 26 students did not meet the criteria/definition of career pathway and were placed in CTE 1. They, in turn, compose 5.1% of this group. The remaining 124 students were determined to be in a career pathway and were placed in the CTE 2 group. They make up 5.1% of the CTE 2 group. Table 4.12 breaks down CTE 1 & 2 by Career Cluster.

Table 4.12

Breakdown of CTE 1 & 2 by Career Cluster

		CTE 1	CTE 2	Total
Career Cluster	Count	31	25	56
	% within CTE	6.10%	3.40%	1.90%
Agriculture, Food & Natural Resources	Count	17	51	68
	% within CTE	3.30%	2.10%	2.30%
Architecture & Construction	Count	30	187	217
	% within CTE	5.90%	7.60%	7.30%
Arts, A/V Technology & Communications	Count	84	241	325
	% within CTE	16.40%	9.90%	11.00%
Business, Management & Administration	Count	40	301	341
	% within CTE	7.80%	12.30%	11.50%
Education & Training	Count	28	138	166
	% within CTE	5.50%	5.60%	5.60%
Health Science	Count	76	497	573
	% within CTE	14.90%	20.30%	19.40%
Hospitality & Tourism	Count	19	82	101
	% within CTE	3.70%	3.40%	3.40%
Human Services	Count	28	146	174
	% within CTE	5.50%	6.00%	5.90%
Information Technology	Count	21	105	126
	% within CTE	4.10%	4.30%	4.30%
Law, Public Safety, Corrections & Security	Count	59	257	316
	% within CTE	11.50%	10.50%	10.70%
Manufacturing	Count	13	62	75
	% within CTE	2.50%	2.50%	2.50%
Marketing, Sales & Service	Count	6	60	66
	% within CTE	1.20%	2.50%	2.20%
Science, Technology, Engineering & Math	Count	33	170	203
	% within CTE	6.50%	7.00%	6.90%
Transportation, Distribution & Logistics	Count	26	124	150
	% within CTE	5.10%	5.10%	5.10%
Total	Count	511	2446	2957
	% Within CTE	100.00%	100.00%	100.00%

Results of Each Set of Statistics

After reviewing and dividing the data into CTE 1 and CTE 2 (non-CTE and CTE pathways, respectfully) statistical analysis was run on each data set that correlated to the six research questions posed in this study. A detailed breakdown and analysis is discussed in this section.

Research Question One

The first four research questions discuss the significance that CTE pathways have on the Texas Assessment of Knowledge and Skills (TAKS), the state assessment for Texas public school students. The TAKS test covers 4 domains: English, Math, Science, and Social Studies. The data set includes the TAKS scores of the students during their 11^{th} grade year and whether the student passed the test or not. Research Question One states: Does the enrollment in various CTE pathways have a significant difference on the 11th grade ELA TAKS results?

To answer this question the data set was disaggregated with respect to ELA TAKS results and whether or not the student passed the test. Of the 2957 students, 2810 (or 95%) took the ELA TAKS test. 2766 (or 93.5%) passed it and 44 (or 1.5%) did not pass the test. No ELA TAKS data was received for 147 (or 5%) of the students. Table 4.13 illustrates the breakdown of these statistics.

Table 4.13

ELA TAKS Results

		Frequency	Percent	Valid Percent	Cumulative Percent
	.00	44	1.5	1.6	1.6
	1.00	2766	93.5	98.4	100
	Total	2810	95	100	
Missing	System	147	5.0		
Total		2957	100		

Note. 00 =Failed test; 1.00 = Passed test.

Table 4.14 depicts the number of students in CTE 1 and CTE 2 passing the ELA TAKS. When divided by category of CTE 1 (non-CTE career pathway students) and CTE 2 (CTE pathway students) 15 (or 3.3%) of CTE 1 failed the ELA TAKS test, while 445 (or 96.7%) passed. In the CTE 2 group 29 (or 1.2%) failed and 2321 (or 98.8%) passed the ELA TAKS.

Table 4.14

ELA: CTE Cross tabulation

			CTE 1	CTE 2	Total
ELA	.00	Count	15	29	44
		% Within CTE	3.30%	1.20%	1.60%
	1.00	Count	445	2321	2766
		% Within CTE	96.70%	98.80%	98.40%
Total		Count	460	2350	2810
		% Within CTE	100.00%	100.00%	100.00%

To answer Research Question One – Does the enrollment in various CTE pathways have a significant difference on the 11th grade ELA TAKS results? – The next step is to determine if there was a statistical significance among the two groups (CTE 1 and CTE 2). The mean of CTE 1 was .9876 with a standard deviation of .11097. The mean of CTE 2 was .9910 with a standard deviation of .09457. Table 4.15 illustrates the breakdown of these statistics.

Table 4.15

ELA TAKS Statistics

		Statistic
CTE 1	Mean	.9876
	Std. Deviation	.11097
CTE 2	Mean	.9910
	Std. Deviation	.09457

An ANOVA was run on the two groups of data. With 1 degree of freedom and an F value of 10.283 the test reveals a significance of .001. The difference between CTE 1 and CTE 2 was deemed significant at the .05 level. This statistically determines that the enrollment in various CTE pathways does have a significant difference on the 11th grade ELA TAKS results. Table 4.16 illustrates the findings of this statistical analysis.

Table 4.16

ELA TAKS ANOVA

ELA		Sum of Squares	df	Mean Square	F	Sig.
	Between Groups	.158	1	0.158	10.283	.001
	Within Groups	43.153	2808	.015		
	Total	43.311	2809			

Research Question Two

The second domain or core subject tested on exit level TAKS state assessment is Mathematics. The students were administered this test when they were in the 11th grade. The data set contains their scores and a column designating whether or not the student passed the test. It was this information upon which the data was pulled and analyzed in order to answer Research Question Two – Does the enrollment in various CTE pathways have a significant difference on the 11th grade Math TAKS results?

Of the 2947 students, 2783 took the Math TAKS test. 2636 students (or 94.7%) passed it and 147 students (or 5.3%) did not pass the test. No Math TAKS data was received for 174 students. Table 4.17 illustrates the breakdown of these statistics.

Table 4.17

Math TAKS Results

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	147	5	5.3	5.3
	1.00	2636	89.1	94.7	100
	Total	2783	94.1	100	
Missing	System	174	5.9		
Total		2957	100		

Note: .00=Failed test; 1.00=Passed test.

Table 4.18 depicts the students in Table 4.17 when divided by category of CTE 1 (non-CTE students) and CTE 2 (CTE students). The analysis revealed that 40 (or 8.8%) of CTE 1 failed the Math TAKS test, while 416 (or 91.2%) passed. In the CTE 2 group 107 (or 4.6%) failed and 2220 (or 95.4%) passed the Math TAKS.

Table 4.18

Math: CTE Crosstabulation

			CTE 1	CTE 2	Total
Math	.00	Count	40	107	147
		% Within CTE	8.80%	4.60%	5.30%
	1.00	Count	416	2220	2636
		% Within CTE	91.20%	95.40%	94.70%
Total		Count	456	2327	2783
		% Within CTE	100.00%	100.00%	100.00%

Note. .00=Failed test; 1.00= Passed test.

To answer the research question "Does the enrollment in various CTE pathways have a significant difference on the 11th grade ELA Math results?" the next step is to determine if there was a statistical significance among the two groups (CTE 1 and CTE 2). The mean of CTE 1 was .9627 with a standard deviation of .18976. The mean of CTE 2 was .9666 with a standard deviation of .17966. Table 4.19 illustrates the breakdown of these statistics.

Table 4.19

Math TAKS Statistics

		Statistic
CTE 1	Mean	.9627
	Std. Deviation	.18976
CTE 2	Mean	.9666
	Std. Deviation	.17966

An analysis of variance (ANOVA) was conducted to determine if there was a statistical significance among the two groups (CTE 1 and CTE 2). The sum of squares between groups was .664 using a df of 1. This yielded an F value of 13.330 and a significance of .000. Thus the difference between CTE 1 and CTE 2 was deemed significant at the .05 level. This statistically determines that enrollment in various CTE pathways does have a significant difference on the 11th grade TAKS Math results. This statistical analysis is illustrated in Table 4.20.

Table 4.20

Math TAKS ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Math	Between Groups	.664	1	0.664	13.330	.000
	Within Groups	138.571	2781	.050		
	Total	139.235	2782			

Research Question Three

The third domain or core subject tested on exit level TAKS state assessment is Science. The students were administered this test when they were in the 11th grade. The data set contains their scores and a column designating whether or not the student passed the test. It was this information upon which the data was pulled and analyzed to answer Research Question Three – Does the enrollment in various CTE pathways have a significant difference on the 11th grade Science TAKS results?

Of the 2957 students, 2794 took the Science TAKS test. 2701 (or 96.7%) passed the test and 93 (or 3.3%) did not pass the test. No Science TAKS data was received for 163 students. Table 4.21 illustrates the numerical division of these groups.

Table 4.21

Science TAKS Results

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	93	3.1	3.3	3.3
	1.00	2701	91.3	96.7	100.0
	Total	2794	94.5	100.0	
Missing	System	163	5.5		
Total		2957	100		

Note: .00=Failed test; 1.00=Passed test.

When divided by category of CTE 1 (non CTE students) and CTE 2 (CTE students) 25 (or 5.5%) of CTE 1 failed the Science TAKS test, while 431 (or 94.5%) passed. In the CTE 2 group 68 (or 2.9%) failed and 2270 (or 97.1%) passed the Science TAKS. Table 4.22 illustrates these statistical findings.

Table 4.22

Science: CTE Crosstabulation

			CTE 1	CTE 2	Total
Science	.00	Count	25	68	93
		% Within CTE	5.5%	2.9%	3.3%
	1.00	Count	431	2270	2701
		% Within CTE	94.5%	97.1%	96.7%
Total		Count	456	2338	2794
		% Within CTE	100.0%	100.0%	100.0%

Note: .00 = Failed test; 1.00= Passed test.

To answer the research question "Does the enrollment in various CTE pathways have a significant difference on the 11th grade Science TAKS results?" the next step is to determine if there was a statistical significance among the two groups (CTE 1 and CTE 2). The mean of CTE 1 was .9726 with a standard deviation of .16334. The mean of CTE 2 was .9802 with a standard deviation of .13950. Table 4.23 illustrates this statistical finding.

Table 4.23

Science TAKS Statistics

		Statistic
CTE 1	Mean	.9726
	Std. Deviation	.16334
CTE 2	Mean	.9802
	Std. Deviation	.13950

An analysis of variance (ANOVA) was conducted on the data to determine if there was a statistical significance among the two groups (CTE 1 and CTE 2). The sum of squares between groups was .253 using a DF of 1. This yielded an F value of 7.873 and a significance of .005. Thus, the difference between CTE 1 and CTE 2 was deemed significant at the .05 level. This statistically determines that enrollment in various CTE pathways does have a significant difference on the 11th grade TAKS Science results. This statistical analysis is illustrated in Table 4.24.

Table 4.24

Science TAKS ANOVA

Science		Sum of Squares	df	Mean Square	F	Sig.
	Between Groups	0.253	1	0.253	7.873	0.005
	Within Groups	89.652	2792	0.032		
	Total	89.904	2793			

Research Question Four

The fourth domain or core subject tested on exit level TAKS state assessment is Social Studies. The students were administered this test when they were in the 11th grade. The data set contains their scores and a column designating whether or not the student passed the test. It was this information upon which the data was pulled and analyzed to answer Research Question Four – Does the enrollment in various CTE pathways have a significant difference on the 11th grade Social Studies TAKS results?

Of the 2957 students, 2823 took the Social Studies TAKS test. 2814 (or 99.7%) passed it and 9 (or .3%) did not pass the test. No Social Studies TAKS data was received for 134 students. Table 4.25 illustrates this statistical analysis.

Table 4.25

Social Studies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	9	.3	.3	0.3
	1.00	2814	95.2	99.7	100.0
	Total	2823	95.5	100.0	
Missing	System	134	4.5		
Total		2957	100		

Note: .00=Failed test; 1.00=Passed test.

When divided by category of CTE 1 (non CTE students) and CTE 2 (CTE students) 3 or (0.7%) of CTE 1 failed the Social Studies TAKS test, while 454 (or 99.3%) passed. In the CTE 2 group 6 (or 0.3%) failed and 2360 (or 99.7%) passed the Social Studies TAKS. Table 4.26 illustrates this categorization.

Table 4.26

Social Studies: CTE Crosstabulation

			CTE		
			CTE 1	CTE 2	Total
Social Studies	.00	Count	3	6	9
		% Within CTE	0.7%	0.3%	0.3%
	1.00	Count	454	2360	2814
		% Within CTE	99.3%	99.7%	99.7%
Total		Count	457	2366	2823
		% Within CTE	100.0%	100.0%	100.0%

Note: .00=Failed test; 1.00=Passed test.

To answer the research question "Does the enrollment in various CTE pathways have a significant difference on the 11th grade Social Studies TAKS results?" the next step is to determine if there was a statistical significance among the two groups (CTE 1 and CTE 2). The mean of CTE 1 was .9975 with a standard deviation of .49888. The mean of CTE 2 was .9995 with a standard deviation of .02124. Table 4.27 illustrates this statistical analysis.

Table 4.27

Social Studies TAKS Statistics

		Statistic
CTE 1	Mean	.9975
	Std. Deviation	.49888
CTE 2	Mean	.9995
	Std. Deviation	.2124

An analysis of variance (ANOVA) was conducted on the data to determine if there was a statistical significance among the two groups (CTE 1 and CTE 2). The sum of squares between groups was .006 using a df of 1. This yielded an F value of 1.956 and a significance of .162. Thus the difference between CTE 1 and CTE 2 was deemed not significant at the .05 level. This statistically determines that enrollment in various CTE pathways does not have a significant difference on the 11th grade TAKS Social Studies results. This statistical analysis is illustrated in Table 4.28.

Table 4.28

Social Studies TAKS ANOVA

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	0.006	1	0.006	1.956	0.162
Within Groups	8.965	2821	0.003		
Total	8.971	2822			

Research Question Five and Six

The data set received from the school district contained information indicating whether or not students completed high school and also whether the students dropped out of school. The same students who were analyzed in the 11th grade for their state assessment outcomes were used to analyze completion and dropout rates the following year. The data set contained leaver codes indicating the status of individual students. It was from this data that completion and dropout status was established and the statistical analysis run to answer the final two research questions – Does the enrollment in various CTE pathways have a significant difference on completion rates? And, does the enrollment in various CTE pathways have a significant difference on dropout rates?

At the time the data was pulled in the fall of 2012 there were 2536 students who had completed high school and 215 students who had been classified as drop outs. Of the 428 students identified as non-CTE pathway students (CTE 1) in the data who had either completed high school or dropped out, there were 381 (or 89%) who had completed high school and 47(or 11%) who had dropped out. Of the 2323 students who were identified as CTE pathway students and categorized as CTE 2 in the data and had either completed

high school or had dropped out, there were 2155 (or 92.8%) who completed high school and 168 (or 7.2%) who dropped out. There were 206 students who left the district sometime between entering their 11th grade year and the fall of 2012 when the data was extracted from district records or were still enrolled in the district. Table 4.29 illustrates the categories of this data with the 206 students removed.

Table 4.29

Leavercode: CTE Crosstabulation

			CTE1	CTE2	Total
Leavercode	0	Count	47	168	215
		% Within CTE	11.0%	7.20%	7.80%
	1	Count	381	2155	2536
		% Within CTE	89.0%	92.8%	92.2%
Total		Count	428	2323	2751
		% Within CTE	100.0%	100.0%	100.0%

When the data is compared between the 428 non-CTE students (CTE 1) and the 2323 CTE students (CTE 2) it reveals a mean of .89 and .93, respectively. The standard deviation of CTE 1 is .313 and .259 for CTE 2. Even though there are nearly six times as many CTE students, there data is more clustered than that of their non CTE peers. Table 4.30 depicts the analysis of this description.

Table 4.30

CTE Descriptives

					95% Confidence Interval for Mean			
	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Min.	Max.
CTE 1	428	0.89	0.313	0.015	0.86	0.92	0	1
CTE 2	2323	0.93	0.259	0.005	0.92	0.94	0	1
Total	2751	0.92	0.268	0.005	0.91	0.93	0	1

When the same data is taken and an ANOVA is run with a 1 degree of freedom an F value of 7.065. The results reveal a .008 significance level which is <.05 level for significance. Therefore the effect of Career Pathways is significant on completion rates and reducing dropout rates. Thus, the difference between CTE 1 and CTE 2 was deemed significant at the .05 level. This statistically determines that enrollment in various CTE pathways does have a significant difference on the completion and dropout rates on the students in this study. This statistical analysis is illustrated in Table 4.31.

Table 4.31

Leaver Code ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	0.508	1	0.508	7.065	0.008
Within Groups	197.689	2749	0.072		
Total	198.197	2750			

Description of Results in Terms of the Population Sample

The impact of CTE on state assessment was compared between the CTE 1 and CTE 2 groups. Four areas of assessment were reviewed: TAKS ELA, TAKS Math, TAKS Science, and TAKS Social Studies. An ANOVA was conducted on each of the four areas to determine significance.

The findings are as follows: In the area of TAKS ELA, 2766 of the 2810 students who took the TAKS ELA test (98.4%) passed, and 44 students (or 1.6%) failed. When comparing the two groups, 3.3% (or 15 students) of the CTE 1 group failed the test, as compared to 1.2% of CTE 2. This correlates with 96.7% (or 460 students) of the CTE 1 group passing, as compared with 98.8% (or 2350 students) of the CTE 2 group. Percentage-wise, more CTE students passed than the non-CTE students. The ANOVA test revealed that this difference was significant in the two groups.

In the area of TAKS Math, 2636 of the 2783 students who took the Math TAKS (94.7%) passed the test, and 147 (5.3%) failed. When comparing the two groups, 8.8% (or 40 students) of the CTE 1 group failed the test, as compared to 4.6% (or 107 students) of the CTE 2 group. This means that 91.2 % (or 456 students) of the CTE 1 group passed

their TAKS Math, and 95.4% (or 2327 students) of the CTE 2 group. As with the TAKS ELA group, CTE 2 performed better on their math TAKS test. The ANOVA test revealed that this also was significant.

In the area of TAKS Science, of the 2794 students who took the test, the students had a 3.3 % failure rate overall and a 96.7% passing rate. However, when divided into the two groups, CTE 1 had a failure rate of 5.5 %, as compared to 2.9% for CTE 2. The passing rate was similar as well. 94.5% of the CTE 1 (456 students) passed and 97.1% of CTE 2 passed (2338 students) their Science TAKS test. Again, CTE 2 outperformed their CTE 1 peers. The ANOVA test indicated that this difference was significant statistically as well.

The 2823 students who tested in TAKS Social Studies did very well overall. A mere 0.3% failed the exam, and an impressive 99.7% passed the state exam. Dividing the data into the two groups revealed a slightly larger difference. 0.7% of CTE 1 failed, and 0.3% of CTE 2 failed. This compared with 99.3% of CTE 1 students passing with CTE 2 having 99.7%. The ANOVA indicated that this small difference was not statistically significant.

It should be noted that not all of the 2957 students' scores were reported in the data for the 2010-11 school year. The data reveals the following missing data sets: English – 128, Math – 155, Science – 144, and Social Studies – 117. There are many plausible explanations for this although the data does not reveal why. Absences, by far, are the main reason there is no data for tests. Other reasons may be, invalid tests, testing irregularities, voided tests, and clerical scoring errors. The statistical differences noted in

this study excluded those missing data sets when comparing the two groups or in the ANOVAs.

This study also addressed the issue of completion and dropout rates and the impact CTE has on students completing their high school degree plan. Overall, 92.2% of the students did complete their high school requirements and 7.8% did not. However, when the students are divided again by CTE 1 & 2 there is a notable difference. CTE 1 has an 89.0% / 11.0% completion/non-completion rate, while CTE 2 has a 92.8% / 7.2% completion/non-completion rate. This difference was determined to be significant when an ANOVA test was performed.

Conclusion

The results of this study revealed that the majority of students that enrolled in career pathways (as defined by CTE 2) did significantly better in passing their state assessments on ELA, math, and science, in completing their high school program, and not dropping out of school. The results of the data analysis reveal that Career and Technical Education have significant value and place in a high school's educational program. Chapter Five will provide discussions, implications, and conclusions derived from the study.

CHAPTER FIVE

CONCLUSIONS

Introduction

This chapter contains a discussion of the results, implications and conclusions of the study. This chapter also includes the recommendations for others who may use the results of this study when considering a school district's career and technical education (CTE) program and for further research.

This study examined the relationship between Career Technical Education career pathways and statewide assessment among the 11th graders in 2010 and the graduation and dropout rates of the class of 2011. This quantitative, non-experimental correlational study identified those students who are in career pathways out of a class cohort of 2947 students in a major suburban Gulf Coast school district and analyzed their state assessment scores and high school completion rates as compared to their non-CTE peers using an analysis of variance. The role of leadership in CTE and its students was also examined and discussed.

The initial purpose of this study was to gather data for the new 1400 student Career and Technical Education (CTE) high school that is scheduled to open in the fall of 2014. This study analyzes the CTE data as it relates to student achievement. The information enables school leaders to make data-based decisions, supports the district's efforts in creating a CTE high school, and provides data to address the academic and philosophical approach as coursework and programs are planned. The results will assist the district in making the establishment of this school and program as smooth and

successful as possible. As the study and research expanded it became quite evident that this study could also assist the district in assessing its CTE program and evaluating its effectiveness in regards to TAKS scores and, ultimately, other state assessment programs as they are implemented throughout the high school. This study also provides valuable data in analyzing current CTE programs' effectiveness in increasing the high school completion rates as well as decreasing the dropout rate of its students. This study is anticipated to be of extreme significance to the district and the CTE program. It is also anticipated to give the district an analysis of data concerning its career pathways as well as identify avenues of opportunity for future studies and research.

This quantitative study is a non-experimental research design of archival data collected from a cohort of students identified as the class of 2011 in a major Gulf Coast suburban school district. Archival data was accessed with permission from the district's research and evaluation department. Data consisted of campuses, grade level, gender, ethnicity, socio-economic, career cluster, leaver codes, and math, science, ELA, and social studies TAKS scores of students in the 11^{th} grade in the 2009-2010 school year. This data set was divided primarily into two groups: (a) those students identified as being in a career cluster and (b) those students that are not. The data sets were used to analyze differences between cluster participants and non-cluster participants. An Analysis of Variance (ANOVA) was used to address each of the six research questions:

1. Does the enrollment in various CTE pathways have a significant difference on the 11th grade ELA TAKS results?
2. Does the enrollment in various CTE pathways have a significant difference on the 11th grade Math TAKS results?

3. Does the enrollment in various CTE pathways have a significant difference on the 11th grade Science TAKS results?
4. Does the enrollment in various CTE pathways have a significant difference on the 11th grade Social Studies TAKS results?
5. Does the enrollment in various CTE pathways have a significant difference on completion rates?
6. Does the enrollment in various CTE pathways have a significant difference on dropout rates?

In the area of state assessment, the results of the study revealed that 11th grade students identified as being in a CTE pathway performed better in all areas of TAKS than their non-CTE peers. Furthermore, this analysis reveals that students enrolled in various CTE pathways show a significant difference on the 11th grade ELA, Math, and Science TAKS test.

In the area of completion and dropout rates, the students identified as being in a CTE pathway had higher completion rates and lower dropout rates than did their non-CTE peers percentage-wise. The enrollment in various CTE pathways did, in fact, have a significant difference on completion and dropout rates.

Discussion of Results

The findings for this study were reported in Chapter Four; the six research questions that guided the study and their conclusions and discussion will be the topic of this section.

Research Question One

Does the enrollment in various CTE pathways have a significant difference on the 11th grade ELA TAKS results?

When divided by category of CTE 1 (non CTE career pathway students) and CTE 2 (CTE pathway students), 15 (or 3.3%) of CTE 1 failed the ELA TAKS test, while 445 (or 96.7%) passed. In the CTE 2 group, 29 (or 1.2%) failed and 2321 (or 98.8%) passed the ELA TAKS.

The analysis was completed using a cross tabulated table and an ANOVA test to evaluate whether or not there was a significant difference in the 11th grade students ELA TAKS scores who were enrolled in a CTE pathway and the 11th grade students ELA TAKS scores of those who were not enrolled in a CTE pathway. The ANOVA was used to analyze this and was shown to be significant (p=.001). CTE pathways had a significant difference on the 11th grade ELA TAKS results.

As noted in Chapter Two, there are studies that support and refute the findings of this study. The study conducted by Bae, Gray, and Yeager (2007) concluded that CTE participation had no significant change in reading ability. Orozco (2010) also found that 11th grade CTE students in programs of study scored significantly higher than non-CTE students.

It is clear in this study that the students in CTE career pathways performed better on their state assessment (TAKS) test for ELA than the students who were not in a CTE career pathway both in percentage and in statistics.

Research Question Two

Does the enrollment in various CTE pathways have a significant difference on the 11th grade Math TAKS results?

When divided by category of CTE 1 (non CTE students) and CTE 2 (CTE students), 40 (or 8.8%) of CTE 1 failed the Math TAKS test, while 416 (or 91.2%) passed. In the CTE 2 group 107 (or 4.6%) failed and 2220 (or 95.4%) passed the Math TAKS.

The analysis was completed using a cross tabulated table and an ANOVA test to evaluate whether or not there was a significant difference in the 11th grade students Math TAKS scores who were enrolled in a CTE pathway and the 11th grade Math TAKS scores of those who were not enrolled in a CTE pathway. The ANOVA was used to analyze this and was shown to be significant (p=.000). The enrollment in a CTE pathway did have a significant difference on the 11th grade Math TAKS results.

The findings in the literature support and also question the results of this study. As with the TAKS ELA results, Bae, Gray, and Yeager (2007) found that CTE participation was not associated with math test scores once certain variables were controlled. Orozco (2010), on the other hand, as in the ELA results, found that math scores also were significantly higher in the CTE students.

In this study the percentage points of failure of the CTE pathway students is almost half that of the non-CTE pathway students 8.8% vs. 4.6%, and the passing rate was 4.2% higher. Along with being significant statistically, this difference is considerable when considering overall achievement of different groups of students within the district.

Research Question Three

Does the enrollment in various CTE pathways have a significant difference on the 11th grade Science TAKS results?

When divided by category of CTE 1 (non CTE students) and CTE 2 (CTE students), 25 (or 5.5%) of CTE 1 failed the Science TAKS test, while 431 (or 94.5%) passed. In the CTE 2 group, 68 (or 2.9%) failed and 2270 (or 97.1%) passed the Science TAKS (see Table 4.13).

The analysis was completed using a cross tabulated table and an ANOVA test to evaluate whether or not there was a significant difference in the 11th grade students Science TAKS scores who were enrolled in a CTE pathway and the 11th grade Science TAKS scores of those who were not enrolled in a CTE pathway. The ANOVA was used to analyze this and was shown to be significant (p=.007). The enrollment in a CTE pathway did have a significant difference on the 11th grade Science TAKS results.

Research Question Four

Does the enrollment in various CTE pathways have a significant difference on the 11th grade Social Studies TAKS results?

When divided by category of CTE 1 (non CTE students) and CTE 2 (CTE students), 3 (or .7%) of CTE 1 failed the Social Studies TAKS test, while 454 (or 99.3%) passed. In the CTE 2 group, 6 (or .3%) failed and 2360 or 99.7% passed the Social Studies TAKS (see Table 4.12)

The analysis was completed using a cross tabulated table and an ANOVA test to evaluate whether or not there was a significant difference in the 11th grade students Social Studies TAKS scores who were enrolled in a CTE pathway and the 11th grade Social

Studies TAKS scores of those who were not enrolled in a CTE pathway. The ANOVA was used to analyze this and was shown to be significant (p=.151). The enrollment in a CTE pathway did not have a significant difference on the 11th grade Social Studies TAKS results.

As with the other 3 core subjects the students in CTE pathways performed better than the non-CTE students in percentage points. However, this was not enough to be significant statistically.

This study also suggests as do other studies that the importance of CTE programs is multifaceted and is very valuable to high school students in regards to employment, college readiness, quality of life, direction, and adaptation to a changing society (Plank, 2008; Bernadino, 2011, Bae et. al, 2007; Whitaker, 2008; Sass, 2007; Compton, 2010; McCharen, 2008). State assessment is very important in the by-laws of the Texas Education Agency and in legislative circles (TEA, 2012). CTE pathways have a positive impact on those assessments.

Research Question Five

Does the enrollment in various CTE pathways have a significant difference on completion rates?

Looking at the data of the 2957 students there were 206 students who left the district sometime between entering their 11th grade year and or who were still enrolled in the school district at the time the data was pulled from the database. Of the 2751 students left in the analysis, 428 students were identified as non-CTE pathway students and categorized as CTE 1. There were 381 (or 89.0%) who completed high out of CTE

1. 2323 students were identified as CTE pathway students and categorized as CTE 2 in the data. There were 2156 (or 92.8%) who completed high school.

The analysis was completed using a cross tabulated table and an ANOVA test to evaluate whether or not there was a significant difference in the 11th grade student completion rate for those who were enrolled in a CTE pathway and the 11th grade completion rate of those who were not enrolled in a CTE pathway. The ANOVA was used to analyze this and was shown to be significant (p=.000 for completion rates and p=.008 for dropout rates). The enrollment in a CTE pathway did have a significant difference on the 11th grade completion rate.

Research Question Six

Does the enrollment in various CTE pathways have a significant difference on dropout rates?

Looking at the data of the 2957 students, there were 206 students who left the district sometime between entering their 11th grade year and/or who were still enrolled in the school district at the time the data was pulled from the database. Of the 2751 students left in the analysis, 428 students were identified as non-CTE pathway students and categorized as CTE 1. There were 47 (or 11.0%) who dropped out of CTE 1. 2323 students were identified as CTE pathway students and categorized as CTE 2 in the data. There were 168 (or 7.2%) who dropped out.

The analysis was completed using a cross tabulated table and an ANOVA test to evaluate whether or not there was a significant difference in the 11th grade students dropout rate who were enrolled in a CTE pathway and the 11th grade dropout rate of those who were not enrolled in a CTE pathway. The ANOVA was used to analyze this

and was shown to be significant (p=.008 for dropout rates). The enrollment in a CTE pathway did have a significant difference on the 11th grade dropout rate.

Significant amounts of research, time, and energy have been devoted to studying and addressing completion and dropout rates, especially during the last few years. With the state graduate average at 84.3% in 2010, and ranking 10th among 34 states in a TEA report to the National Governors Association, Texas is striving to find programs and methods to improve this statistic (TEA, 2012). The debate continues as to what methods and combinations will best achieve this result (Plank et al., 2005). Some studies suggest, as this study does, that CTE involvement improves graduation rates (Loveless, 2011), while others do not find significance (Webb, 2012; Mooneyham, 2005). Mitigating factors such as involvement in student organizations have also been studied (Schimpf, 2011). This study did not address extracurricular involvement of its students; rather, it focused on academic course choices (i.e., career pathways).

Reduction of dropouts has been a goal of the United States and Texas for many years now. Extensive studies preceded this study regarding the costs, implications and factors affecting dropout (Lewis, 2010; Levin, 2005; ACTE, 2007; Kulik, 1998, Mooneyham, 2005; Texas Education Agency, 2009). Legislation such as the federal No Child Left behind Act of 2001 challenged states to eliminate dropouts and enacted programs to reduce dropouts. Most of the studies reviewed in Chapter Two note that dropout rates are reduced when academics are combined with CTE involvement (Kulik, 1998; Mooneyham, 2005). The noteworthy exception was the balance of CTE classes to academic classes (1:2) to prevent dropout increases (Plank, 2005).

The findings of this study suggest that there are singular and/or multiple factors that result in a higher completion and lower dropout rate district wide. Speculation as to exact causes of this significance is debated on a regular basis among CTE researchers. Many hope that these positive results can be replicated and applied to other groups of students with significant dropout rates.

Implications for School Leaders

In 2002, Bill Daggett published a report entitled *The Future of Career and Technical Education*. As detailed in Chapter Two, this report lays out a detailed plan for administrators to follow in CTE programs of the 21st century. In subsequent years other reports, studies, and discussions have occurred that support Daggett's report. This study and its findings align with them as well.

The study of the pathways of CTE students in this study reveal that 84.4% of the students who graduated in this cohort took at least 2 CTE classes in the same coherent sequence (pathway). That fact alone is significant when, as an administrator, that impact on a campus is considered. The fact that CTE programs impact virtually every student on the campus is noteworthy. This study suggests that the leadership of the school and district review and study the following topics and issues.

First, this study suggests that a common pathway is followed as CTE students progress through their high school curriculum. The pathway on the campus ends at graduation, but often continues for the student into post-secondary training and careers. A school leadership team should ensure that the curriculum is aligned for that successful transition to occur (US Dept. of Education, 2012). Transition that is seamless and data driven produces more successful students, programs, campuses and districts. To do this,

administrators have to have a working knowledge of CTE curriculum and aligning it with the core classes and electives required for graduation.

Second, this study encourages the need for administration to become knowledgeable and involved in the selection process, or recruitment of the students to the different CTE programs and pathways. Many of the students who were in this study but did not choose a pathway to follow took at least 1 CTE class during their high school experience. Although not addressed in this study, it raises the question as to why nothing further was pursued in that particular pathway and what could have been done to better align that student with a possible career interest that he/she could pursue or explore during the high school years.

The administration should be astutely aware of the programs the campus and district offers its students. Promotion of such programs to the parents and community is extremely important. This study suggests that the level of involvement of students in CTE requires tremendous support and resources. The literature supports the endeavors of school districts promoting their programs. Examples of this notion include holding expositions (Lewis, 2007), and having CTE booths at 8th grade campuses (Nikirk, 2007). The significance that CTE seems to have on dropout rates in this study strongly encourages the leadership to promote the programs even more. CTE serves as a motivation for students to stay in school (Chadd & Drage, 2006).

A third implication for leadership is to become very familiar with budgets and funding of the CTE programs. While most of the funds are provided through the Carl D. Perkins Career and Technical Improvement Act of 2006, local funds are used to supplement the programs and meet student needs (Texas Education Agency, 2012).

Monitoring budgetary changes made at the national and state level due to legislative action is also critical. Fiscal Year 2013 discussions occurring now could significantly impact CTE funding as they consider cutbacks (ACTE, 2012).

The sheer number of students in this study that participate in CTE brings focus on the need for continual financial support to promote success. Expendable materials, classroom/lab space, and teaching units to meet demands must be addressed. Many programs turn away interested and qualified students due to the fact that there is not enough room or teachers to expand the programs to include them. School leaders must work on a campus and district level with program and district directors in developing, maintaining, and monitoring of funds in the programs on a regular basis.

The fourth and biggest implication on leadership this study has suggested is the need for a change of philosophy toward CTE. The days of CTE being a solution for only the non-college bound students and an inferior program as compared to the core departments is seemingly over. Daggett (2002) proposed a three stage process over 10 years ago holds truer today than ever. The three stages are:

1. Developing a clear shared understanding among teachers, administrators, board members, and the general public as to ***why*** schools need to raise the academic standards of all students;
2. Using data to determine ***what*** should be the instructional priorities; and
3. Determining ***how*** to improve students' academic performance through CTE (p. 3).

This model implies that now CTE is beginning to be the forefront concern and consideration when considering district programs and campus schedules. In the past, the core classes and other campus departments drove these decisions. This study suggests

that the opposite should and needs to occur in order to achieve the mission and goals of the campus, the district, and ultimately, do what is best for the students. This study yields strong data as to ***what*** should be a priority – CTE pathways and the students in them.

Implications for Further Research

The results of this study and the research done suggest that the pathways taken in career and technical education programs have a statistically significant effect on student scores on their English Language Arts (ELA), math and science state assessment, and a positive impact on social studies state assessment. This research also shows a significant difference in completion and dropout rates for the same students. Legislative mandates are driving school districts toward higher and higher academic rigor and a 100% graduation rate by the year 2014 (United States Department of Education, 2001). The purpose of this study was to examine the impacts that CTE programs of study (also called career pathways) have on achieving 100% completion rates and enhancing state assessment scores. The literature review shows the importance of shifting the educational philosophy and focus from merely academic preparation to preparation for post-secondary goals and readiness. This study lends data to support school districts' goal to do just that. The results of this study suggest that the programs offered by career and technical education maintain a positive relationship with students' state assessment scores and completion rates.

As noted in Chapter Two, prior research, studies and reports in the literature have shown that participation in CTE classes and programs has a positive impact on students, campuses, districts, and communities (Barlow, 1976; O'Brien, 2001; DeWitt, 2008; Texas Department of Labor and Tracking, 2012; Kidwai, 2010; Bae, Gray, & Yeager,

2007; Bernadino, 2011; Plank, 2008; Whitaker, 2008; Sass, 2007; Compton, 2010; Plank, DeLuca, & Estacion, 2005; Loveless, 2011; Mooneyham, 2005; Kulik, 1998; Techniques, 2008; Lewis, BJ, 2007; Brewer, 2004; Chadd & Drage, 2006; Daggett, 2007). Collectively, CTE students benefit from their career pathways and their CTE experience. Administrators at campus and district level, school boards and community/business leaders should take note of the data available regarding CTE.

Hopefully, after reviewing this and other similar studies, school districts will begin to consider the importance of the CTE programs on their campus and will make considerable effort to strengthen, support, and enhance them. Specifically, the following implementation action steps should occur:

1. *Begin with the end in mind*. The focus as a CTE program is developed, created, maintained and nurtured should be consistent with the campus goals of having students complete the program as either college or career ready.
2. *Begin in middle school*. Waiting until the high school years to consider CTE is too late. Since districts already administer tests to determine a student's interest in a CTE area, the information should be provided to the parents and students as soon as possible. Parents need to be aware of programs available to their children so informed decisions about coursework can be made.
3. *Train administration about CTE*. Administrators and counselors at the middle school need to understand the different programs and recruit and counsel students that best meet the student's needs and interest. At the high school, the counseling department will need a working knowledge of CTE programs, classes and career pathways. The administrator assigned to the CTE

department must know as many intricate details as possible and be hands-on in the day-to-day operations of the department and programs. Administrative support at campus and district level must provide consistency across the district and funding for programs.

4. *Develop and support as many pathways as possible*. A full CTE program has 16 different pathways. Budget constraints, personnel availability, and student numbers will determine how many programs a district can offer. Realistic goals and program development will have to be used to assess needs and to do what is best for students.
5. *Community and business partnerships have to be developed and nurtured*. CTE programs must network with the communities and businesses to be successful. School personnel must devote time and energy to do this on a regular basis. Systems must be in place to address needs and implement changes as warranted.
6. *As programs develop academic programs and curriculum reviews must occur*. Data driven decisions must be made and changes to student graduation plans may have to happen. Needs and best practices should be addressed and followed.
7. *Counsel the non-CTE*. Many districts require their students to take at least one CTE program of interest for possible pathway development. Efforts by school personnel to find and address transition goals beyond high school with these students are imperative to reduce dropout rates.

School districts that incorporate and follow these steps will support student success in high school and completion of graduation requirements. The compilation of these steps creates a positive school environment and makes it more likely for student success.

Limitations

Due to the complexity and variety of CTE programs and career pathways, and the use of only one school district and one cohort in the study, this research study may not be used as a generalization of the trends and best practices for all CTE programs and school districts. The sample was from one major suburban Gulf Coast school district in Texas. Additionally, only one assessment data point is used for the state assessment part of the study, the exit level TAKS given in the 2009–2010 school year. This does not take into account trends or changes in the test and testing procedure.

A limitation also exists in the division of the CTE 1 and CTE 2 groups. The coding system used to separate them may or may not be used in other CTE programs. Additionally, the large number of students in CTE 2 (82.7% of the entire study) may be considered a limitation as well.

An additional limitation relates to the data quality. Like every PEIMS indicator, the quality of the CTE data relies heavily on the data entry process, which may inevitably contain some human error. This study is dependent on the reliability and consistency of accurate data keeping and reporting by the district.

Other mitigating factors, such as gender, race, socioeconomic backgrounds, limited English Proficiency (LEP), English as a Second Language (ESL), Special Education (SPED), and Gifted-Talented (GT) status are also not being considered at this time. Researcher bias should also be considered.

Further Research Suggestions

Concern over student performance and completing high school without dropping out has become a topic of concern in our society, legislature, school boards, and campuses. This study focused on one cohort, in one district, in one geographic area, during one specific period of time. The significance of the study and the findings of the research suggest that the following areas of study be explored as well:

1. Expand the data set to include multiple years or cohorts. Multiple years of data could allow comparisons to be made from one class of students to the next. Accuracy and consistency of this study could be verified as well.
2. Conduct the same study with another district with similar demographics to validate findings of this study.
3. Conduct the same study with another district with different demographical makeup to discover the impact of CTE pathways in different settings.
4. Compare this study to state-wide data and trends to discover what is similar and different in the data sets.
5. Follow a class of students from the 8th grade through high school completion. This tracking could lend valuable data on program selection, influences of external factors on success/failure, and trends seen along the way.
6. Re-examine the data set of this study for significance in other factors on state assessment, completion rate, and dropout rate. Various factors, such as high school attended, gender, race, socioeconomic backgrounds, Limited English Proficiency (LEP), English as a Second Language (ESL), Special Education

(SPED), and Gifted-Talented (GT) status were not examined in this study, but the data was included in the data set supplied by the district.

7. A study that compares the success of each of the career pathways can also be examined to see what effects if any being in a certain pathway has on state assessment or completion/dropout rates.

Conclusion

The purpose of this study was to examine the effect that a career pathway in a career and technical education program has on a student's performance on his or her state assessment and on his or her completion and dropout rate. The findings are consistent with a majority of previous studies in that there is a significant difference in both areas (assessment and completion/dropout) between those students in a career pathway than those students that are not with the exception of Social Studies.

Significant findings are that in all areas compared, the students in CTE career pathways had a higher percentage of students who passed the four core areas of state assessment: English language arts, math, science and social studies than their non-CTE career pathway classmates. Similarly, the percent that completed their high school requirements are higher and their dropout rates are lower.

Emphasis and encouragement for school leadership is made throughout this study and thesis. Evidence points strongly for the role of leadership in the CTE programs of school districts. Suggestions for implementation and recommendations for further research are also made.

This thesis would be remiss if reflection is not made on the experience of this study. The entire research process has been an amazing journey of discovery, learning,

processing, and interpreting. Research bias was clearly a factor in how this topic was selected and the research questions addressed throughout the study. As seen in Chapter One, this entire research idea was set in motion by a bond election and personal involvement in a district's career and technical education program. Learning to control bias and preconceived notions as to outcomes and predictions of analysis was an important lesson. Careful attention was given to reporting the literature, as stated and indicated, as it was a very important piece to this thesis. Not all researchers agree with the practices of CTE, and the findings of some studies were contrary to the results of this one.

The data used in this study was entirely archival. The identity of the subjects, therefore, remained anonymous throughout the entire study. No effects of bias were observed on data collection or its management. Only the data reported here was analyzed. The rest of the data was collected and stored for possible future use. The situation of the programs, participants, and assessments has been consistent from the time the data set was collected until now. The current state assessment (i.e., TAKS) concludes with the current 2012-13 school year and the CTE program in the district of this study will begin a new phase starting in the fall of 2014 with the new CTE high school.

One cannot go through the experience of discovery as offered by this study without a change of perspective or enlightenment. Personal perspectives change as the mind is expanded to view other points of view and findings in their research. It teaches a person how to be open-minded, to consider all possibilities, to trust the data, and to make logical conclusions based on fact. This entire process is truly an enlightening experience.

The feelings of inadequacy and incompetence are slowly transformed into that of confidence and assurance in abilities. It is a moment of truth and recognition that is very rewarding.

Career and technical education (CTE) has worn many proverbial "hats" throughout the history of the United States. The present one it is called to wear is one with great importance and responsibility. The CTE of today is facing a 21st century full of challenges and high expectations for its students. The student of CTE must be prepared and trained for the post-secondary world that awaits them. This and other studies documented in this thesis show great promise and opportunity in the days ahead. It is the job of school leadership to review the data and information presented in this study and evaluates their own current CTE programs and makes appropriate changes. At the end of the day the question needs to be asked, "Have I done what is best for our students?" Press on!

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APPENDIX A

UNIVERISTY OF HOUSTON ADMINISTRATIVE REVIEW LETTER

UNIVERSITY of HOUSTON

DIVISION OF RESEARCH

November 15, 2012

Chad Barrett
c/o Ms. Rayyan Amine
Curriculum and Instruction

Dear Chad Barrett,

Based upon your request for exempt status, an administrative review of your research proposal entitled "CAREER PATHWAYS' IMPACT ON STATE ASSESSMENT, GRADUATION RATES, AND SCHOOL LEADERSHIP" was conducted on October 11, 2012.

At that time, your request for exemption under **Category 4** was approved pending modification of your proposed procedures/documents.

The changes you have made adequately respond to the identified contingencies. As long as you continue using procedures described in this project, you do not have to reapply for review. * Any modification of this approved protocol will require review and further approval. Please contact me to ascertain the appropriate mechanism.

If you have any questions, please contact Alicia Vargas at (713) 743-9215.

Sincerely yours,

Kirstin Rochford, MPH, CIP, CPIA
Director, Research Compliance

*Approvals for exempt protocols will be valid for 5 years beyond the approval date. Approval for this project will expire **June 1, 2017.** If the project is completed prior to this date, a final report should be filed to close the protocol. If the project will continue after this date, you will need to reapply for approval if you wish to avoid an interruption of your data collection.

Protocol Number: 13071-EX

APPENDIX B

CONSENT TO PARTICIPATE IN RESEARCH LETTER

Pasadena Independent School District

"Texas Education Agency Recognized District"

May 4, 2012

Mr. Barrett,

This correspondence is to inform you that Pasadena ISD has completed its review of your doctoral thesis studying the impact of CTE participation on state assessment performance. The request has been approved under the conditions that (1) data is provided to you by a district administrator and (2) data is masked so that individually identifiable information is not included. When communicating with others about the study, please specify that you are carrying out this study as a doctoral student at the University of Houston.

When the study is complete, please send a copy to:
Donna Summers
Research and Evaluation
1515 Cherrybrook
Pasadena, TX 77502

Best wishes for a successful study,

Donna Summers

Donna Summers
Director, Research and Evaluation
Pasadena ISD

Donna Summers
Director
Research & Evaluation

1515 Cherrybrook Ln., Rm. F-11 • Pasadena, Texas • 77502
Office: 713-740-0237 • Fax: 713-740-5947 • E-mail: dsummers@pasadenaisd.org

APPENDIX C

COHORT BREAKDOWN BY SUBGROUP

Cohort Breakdown by Subgroups

			CTE		
			1	2	Total
Grade Level	11	Count	64	69	133
		% Within CTE	12.50%	2.80%	4.50%
	12	Count	447	2377	2824
		% Within CTE	87.50%	97.20%	95.50%
Total		Count	511	2446	2957
		% Within CTE	100%	100%	100%
Gender	F	Count	236	1250	1486
		% Within CTE	46.20%	51.10%	50.30%
	M	Count	275	1196	1471
		% Within CTE	53.80%	48.90%	49.70%
Total		Count	511	2446	2957
		% Within CTE	100.00%	100.00%	100.00%
Ethnicity	Asian	Count	16	68	84
		% Within CTE	3.10%	2.80%	2.80%
	Black	Count	32	156	188
		% Within CTE	6.30%	6.40%	6.40%
	Hispanic	Count	365	1909	2274
		% Within CTE	71.40%	78.00%	76.90%
	Indian	Count	1	6	7
		% Within CTE	0.20%	0.20%	0.20%
	Pacific Islander	Count	2	3	5
		% Within CTE	0.40%	0.10%	0.20%

	Two or more ethnic	Count	3	38	41
		% Within CTE	0.60%	1.60%	1.40%
	White	Count	92	266	358
		% Within CTE	18.00%	10.90%	12.10%
Total		Count	511	2446	2957
		% Within CTE	100.00%	100.00%	100.00%
Economically Disadvantaged	N	Count	214	881	1095
		% Within CTE	41.90%	36.00%	37.00%
	Y	Count	297	1565	1862
		% Within CTE	58.10%	64.00%	63.00%
Total		Count	511	2446	2957
		% Within CTE	100.00%	100.00%	100.00%
Limited English Proficient	N	Count	479	2377	2856
		% Within CTE	93.70%	97.20%	96.60%
	Y	Count	32	69	101
		% Within CTE	6.30%	2.80%	3.40%
Total		Count	511	2446	2957
		% Within CTE	100.00%	100.00%	100.00%
English Second Language	N	Count	486	2397	2883
		% Within CTE	95.10%	98.00%	97.50%
	Y	Count	25	49	74
		% Within CTE	4.90%	2.00%	2.50%
Total		Count	511	2446	2957
		% Within CTE	100.00%	100.00%	100.00%
Special Education	N	Count	472	2312	2784
		% Within CTE	92.40%	94.50%	94.10%

	Y	Count	39	134	173
		% Within CTE	7.60%	5.50%	5.90%
Total		Count	511	2446	2957
		% Within CTE	100.00%	100.00%	100.00%
Gifted/Talented	N	Count	457	2300	2757
		% Within CTE	89.40%	94.00%	93.20%
	Y	Count	54	146	200
		% Within CTE	10.60%	6.00%	6.80%
Total		Count	511	2446	2957
		% Within CTE	100.00%	100.00%	100.00%
At-Risk	N	Count	230	1121	1351
		% Within CTE	45.00%	45.80%	45.70%
	Y	Count	281	1325	1606
		% Within CTE	55.00%	54.20%	54.30%
Total		Count	511	2446	2957
		% Within CTE	100.00%	100.00%	100.00%

APPENDIX D

CAREER CLUSTER: CTE CROSSTABULATION

Career Cluster: CTE Crosstabulation

		CTE		
		1	2	Total
Career Cluster	Count	25	22	47
	% within CTE	4.90%	0.90%	1.60%
Agriculture, Food & Natural Resources	Count	17	51	68
	% within CTE	3.30%	2.10%	2.30%
Architecture & Construction	Count	30	187	217
	% within CTE	5.90%	7.60%	7.30%
Arts, A/V Technology & Communications	Count	84	241	325
	% within CTE	16.40%	9.90%	11.00%
Business, Management & Administration	Count	40	301	341
	% within CTE	7.80%	12.30%	11.50%
Education & Training	Count	28	138	166
	% within CTE	5.50%	5.60%	5.60%
Health Science	Count	76	497	573
	% within CTE	14.90%	20.30%	19.40%
Hospitality & Tourism	Count	19	82	101
	% within CTE	3.70%	3.40%	3.40%
Human Services	Count	28	146	174
	% within CTE	5.50%	6.00%	5.90%
Information Technology	Count	21	105	126

	% within CTE	4.10%	4.30%	4.30%
Law, Public Safety, Corrections & Security	Count	59	257	316
	% within CTE	11.50%	10.50%	10.70%
Manufacturing	Count	13	62	75
	% within CTE	2.50%	2.50%	2.50%
Marketing, Sales & Service	Count	6	60	66
	% within CTE	1.20%	2.50%	2.20%
N/A	Count	6	3	9
	% within CTE	1.20%	0.10%	0.30%
Science, Technology, Engineering & Math	Count	33	170	203
	% within CTE	6.50%	7.00%	6.90%
Transportation, Distribution & Logistics	Count	26	124	150
	% within CTE	5.10%	5.10%	5.10%

APPENDIX E

TAKS ANOVA

TAKS ANOVA

	CTE			Statistic	Std. Error
Ela	1	Mean		.9876	.00553
		95% Confidence Interval for Mean	Lower Bound	.9767	
			Upper Bound	.9984	
		5% Trimmed Mean		1.0000	
		Median		1.0000	
		Variance		.012	
		Std. Deviation		.11097	
		Minimum		.00	
		Maximum		1.00	
		Range		1.00	
		Interquartile Range		.00	
		Skewness		-8.831	.122
		Kurtosis		76.374	.243
	2	Mean		.9910	.00201
		95% Confidence Interval for Mean	Lower Bound	.9870	
			Upper Bound	.9949	
		5% Trimmed Mean		1.0000	
		Median		1.0000	
		Variance		.009	
		Std. Deviation		.09457	
		Minimum		.00	
		Maximum		1.00	
		Range		1.00	
		Interquartile Range		.00	
		Skewness		-10.393	.052
		Kurtosis		106.101	.104
Math	1	Mean		.9627	.00946
		95% Confidence Interval for Mean	Lower Bound	.9441	
			Upper Bound	.9813	
		5% Trimmed Mean		1.0000	
		Median		1.0000	
		Variance		.036	
		Std. Deviation		.18976	

Descriptive

	CTE			Statistic	Std. Error
Math	1	Minimum		.00	
		Maximum		1.00	
		Range		1.00	
		Interquartile Range		.00	
		Skewness		-4.901	.122
		Kurtosis		22.128	.243
		Mean		.9666	.00382
		95% Confidence Interval for Mean	Lower Bound	.9591	
			Upper Bound	.9741	
		5% Trimmed Mean		1.0000	
		Median		1.0000	
		Variance		.032	
		Std. Deviation		.17966	
	2	Minimum		.00	
		Maximum		1.00	
		Range		1.00	
		Interquartile Range		.00	
		Skewness		-5.199	.052
		Kurtosis		25.053	.104
		Mean		.9726	.00815
		95% Confidence Interval for Mean	Lower Bound	.9566	
			Upper Bound	.9887	
		5% Trimmed Mean		1.0000	
		Median		1.0000	
		Variance		.027	
Sci	1	Std. Deviation		.16334	
		Minimum		.00	
		Maximum		1.00	
		Range		1.00	
		Interquartile Range		.00	
		Skewness		-5.816	.122
		Kurtosis		31.985	.243
	2	Mean		.9802	.00296

Descriptive

	CTE			Statistic	Std. Error
Sci	2	95% Confidence Interval for Mean	Lower Bound	.9743	
			Upper Bound	.9860	
		5% Trimmed Mean		1.0000	

		Median		1.0000	
		Variance		.019	
		Std. Deviation		.13950	
		Minimum		.00	
		Maximum		1.00	
		Range		1.00	
		Interquartile Range		.00	
		Skewness		-6.890	.052
		Kurtosis		45.512	.104
		Mean		.9975	.00249
		95% Confidence Interval for Mean	Lower Bound	.9926	
			Upper Bound	1.0024	
		5% Trimmed Mean		1.0000	
		Median		1.0000	
		Variance		.002	
	1	Std. Deviation		.04988	
		Minimum		.00	
		Maximum		1.00	
		Range		1.00	
Soc		Interquartile Range		.00	
		Skewness		-20.050	.122
		Kurtosis		402.000	.243
		Mean		.9995	.00045
		95% Confidence Interval for Mean	Lower Bound	.9987	
			Upper Bound	1.0004	
		5% Trimmed Mean		1.0000	
	2	Median		1.0000	
		Variance		.000	
		Std. Deviation		.02124	
		Minimum		.00	

Descriptive

	CTE		Statistic	Std. Error
Soc	2	Maximum	1.00	
		Range	1.00	
		Interquartile Range	.00	
		Skewness	-47.085	.052
		Kurtosis	2217.000	.104