

THE PERCEPTIONS OF CAREER AND TECHNICAL EDUCATION (CTE) TEACHERS ON
THE INFLUENCE OF CTE ON STUDENT ENGAGEMENT

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Abstract

Learning in school requires active engagement. Student engagement is an important aspect for all students, whether urban, suburban, or rural, and regardless of socioeconomic background. Students enter Career and Technical Education (CTE) programs for a multitude of reasons and CTE programs offer unique support for student success by increasing student engagement. This study will focus on CTE teachers' perceptions of the influence that CTE programs and industry credentialing have on student engagement.

Utilizing information on student engagement will help educators develop strategies to promote student motivation and student engagement, thus leading to student academic success. This study is a quantitative, descriptive statistical study in which the researcher examined studies that focused on student engagement and student engagement predictors. The research identified six qualities of student engagement: positive conduct and absence of disruptive conduct, school attendance, academic progress, social membership, high expectations in students' ability to achieve, and emotional support. The researcher developed a survey to examine teachers' perceptions of CTE influence on student engagement by including the six qualities of student engagement as guidelines for questionnaire development.

Results of the survey indicate that CTE teachers identify all six domains of student engagement as represented within their course structure. Responses of all groups were similar, while their levels of industry involvement different. Additional results of all teacher responses are provided in the paper

Dedication

This paper is dedicated to my parents John G. Allen and Barbara Brown Allen. You have guided me through life while always showing and giving unconditional love. Without your love and support, I could not have achieved this accomplishment.

Lovingly, Kim

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Chapter 1

Introduction of Study

Learning and succeeding in school requires active engagement and student engagement is an important aspect for all students, whether urban, suburban, or rural, and regardless of socioeconomic background. Student engagement is significant in relation to the academic success of students (McMahon & Portelli, 2004). This paper reflects upon the review of the literature and the investigation of Career and Technical Education (CTE) teachers' perceptions of the influence of CTE and industry certification on student engagement.

Setting the Context for Inquiry

Recent reports tell us that no more than 75% of students leave high school with a diploma. In nearly 2,000 of the nation's high schools, graduation is not the norm. Only 69.2% of the students graduate after four years (Barton, 2007; Center for Social Organization of Schools, 2008; edweek.org, 2009). Many students currently enrolled in schools are not fully engaged in the educational process due to lack of a clear connection between high school work and personal goals (Bottoms & Young, 2008). The Partnership for 21st Century Skills revealed in its 2007 survey that 80 percent of voters say that the skills students need to learn in preparation for 21st Century careers are different from what they needed 20 years ago (Partnership for 21st Century Skills and Vockley-Lang, 2007). Community and industry stakeholders also believe that schools need to do a better job of keeping up with changing educational needs (Barton, 2007, Partnership for 21st Century Skills and Vockley-Lang, 2007, Walker, 2008).

Successful learning to achieve life and career success requires active engagement. Engagement is defined as a school participant's involvement in both learning and overall activities. Since student engagement is often measured by a student's overall achievement and school involvement, a closer look is required. Engagement is important for all students in school, whether urban, suburban, or rural, and regardless of socioeconomic background. A student is considered to be disengaged when the student is not as involved with school as one would expect (English Cobuild Dictionary, 2010). Disengagement is a higher order factor composed of correlating factors occurring over a gradual period (Balfanz, Herzog, & Mac Iver, 2007). Students may experience a loss of academic motivation, which leads to detachment from school and its expectations, while reducing effort, and classroom involvement. Students in prosperous environments, when they become disengaged, may learn less than they could or miss

opportunities; however, they are often provided supplemental chances to meet expectations. The consequences of disengagement vary within different socioeconomic background. The students most affected are from disadvantaged backgrounds, in high poverty, urban high schools. These students are less likely to graduate and have fewer opportunities for second chances and future success (National Academy of Sciences, 2003). According to Reschly and Appleton, “Engagement is the primary theoretical model for understanding the dropout and is, quite frankly, the bottom line in interventions to promote school completion” (Reschly & Appleton, 2008, p. 3).

Career and Technical Education (CTE) programs should engage students by providing opportunities for them to learn skills that lead to industry credentials or certification (Office of Vocational and Adult Education, 2008). The purpose of this study is to determine the perceptions of CTE teachers regarding their programs’ influence on the active engagement of their students and whether or not industry credentialing of the students or teachers adds to that influence. The information from this investigation will convey teachers’ perceptions of what engages students and will indicate high school CTE teachers’ perceptions of their programs’ influence on students’ school engagement and successful program completion.

Background of the Study

Career and Technical Education in the 21st Century is charged with the requirement to prepare students for the world of work and for postsecondary education. Lynch (2000), identified four forces as underscoring reform of high school CTE in the United States: the new economy, public expectation for schools, new research on student learning and motivation, and high school reform. CTE is integral to whole school, comprehensive reform and is not separate. Collective conversations from his qualitative study found six components integral to high school and CTE reform for the 21st Century: high school majors, contextual teaching and learning, work-based learning, authentic assessment, career academies, and Tech Prep.

The current global economy requires students to have specific skills to enter and succeed in the workplace. It requires that students have higher levels of education that usually result in increased wages. Students will need some form of postsecondary education even if it is nondegree extensive company training programs (Barton, 2007, Lynch, 2000). In today’s economy, investments are being made in the community college system to meet the additional educational needs of students. Under President Barack Obama’s administration, economic

reform efforts include continued high school career and technical training and post secondary job skills training. “Robert Shireman, Deputy Under Secretary of Education, said the initiative is designed to produce an additional five million community college graduates by 2020” (Kellogg, & Tomsho, 2009 p. 2). Students enrolled in CTE programs and various CTE reform programs are provided opportunities to matriculate into postsecondary education especially through the community college system. The conflict in CTE is that the community and employers want CTE and work skills included in high schools, while parents expect their children to learn these work skills while following a curriculum path leading to college. Although about 65% of students enter college the fall after graduation (Barton, 2007), many do not complete a baccalaureate degree (Barton, 2007, Lynch, 2000).

Based on empirical and commentary literature there are four purposes for high school CTE within the first five to ten years of the 21st Century:

1. Providing career exploration and planning
2. Enhancing academic achievement and motivation to learn more
3. Acquiring generic work competencies and skills useful for employment
4. Establishing pathways for continuing education and lifelong learning

(Lynch, 2000 p. 9).

Students enter CTE programs for a multitude of reasons. Some are self-directed placements and others are guidance-directed placements. Students come from diverse socioeconomic and academic backgrounds, and often exhibit signs of low school engagement. Career programs in schools are viewed as a gateway to the world of work. Students’ diverse backgrounds have an effect on their ability to learn. Learning is often associated with positive student involvement or engagement. The hands-on learning environment follows distinctive format. The nature of instruction encourages students to develop self-directed skills in learning, and the teachers promote competency-based educational strategies allowing students to have exposure and new opportunities. In the ‘structure’ of a work related learning environment, this technique supports the competency-based, industry work-based, individualized instruction.

Career and Technical Education teachers plan instructional activities that encourage independent learning and promote positive group interactions. Independent learning enables students to progress at their own pace, and competency-based education (CBE) is used within the curriculum framework in which diverse learning styles are promoted and nourished. The students

continue to develop interpersonal skills fundamental for continued learning and leadership development. The change in the degree of engagement for students who enter career programs may have an effect on how well they manage in their overall school experiences.

Whether or not the incoming students are engaged in their education and how soon these students become engaged may also affect their performance in other educational experiences/classes. Work-based learning is a dominant portion of the curriculum in CTE programs and student engagement is enhanced by the strong work-based learning students experience in the CTE curricula.

Arrangements that combine school with related work such as internships, apprenticeships, and co-operative education programs and courses in CTE can provide the preparation and work experience that employers want. Such programs also have the potential to reduce high school dropout rates by enabling the 20-30 percent of students who now drop out of high school to see the benefits of staying in school until graduation. (Barton, 2007 p. 27)

The work-based components are vital in two ways. First, the students, especially those who are considered at risk, often become increasingly involved in their learning and thus engage more readily when they are introduced to work-based learning. Secondly, credentialing and work-based learning become a vital link for CTE students to identify and solidify their career objectives and postsecondary goals. Industry certifications may not guarantee entry-level employment but they do serve as predictors of success. Employers find that a student's skills set can be identified and verified through credentialing (VDOE, 2/19/2008).

Statement of the Problem

The problem that this study will seek to examine is whether or not Career and Technical Education programs and industry credentialing influence CTE student engagement. The purpose of this study is to determine the perceptions of CTE teachers regarding their programs' influence on the level of engagement of their students and whether or not industry credentialing of the students or teachers adds to that influence. This study will focus on CTE teachers' perceptions of the influence that CTE programs and industry credentialing have on student engagement. The study will view the perceived changes in student engagement and performance once a student is involved in a CTE program of study. A teacher survey will be utilized to collect data on teachers' perceptions of the influence of CTE programs and industry credentialing on student engagement

and what changes CTE teachers' believe occur in students' academic and social engagement when the students are enrolled in CTE courses.

The Professional Significance of the Study

This study has meaning for teachers if CTE teachers perceive that students involved in their CTE program experience a change in their school engagement. This is particularly relevant for those demonstrating the characteristics of low engagement. The study investigates through teachers' perceptions if student participation in a CTE program helps to actively engage students in their overall educational learning experiences and whether or not obtaining industry credentials prepares students in a career and technical education field. Teachers also offer their perceptions on the benefits to CTE students who are provided the opportunity to complete a career and technical education program sequence and obtain an industry credential or occupational competency assessment that confers certification; earn an occupational competency credential from a recognized industry, trade, or professional organization; or acquire a professional license in a career and technical education field from the Commonwealth of Virginia (VDOE, 2009).

This study provides additional understanding for school divisions and school administrators who may be battling issues related to student engagement.

In addition, to knowing if students are taking the right courses in high school and performing at acceptable levels on college entrance exams, we also need to know whether they engage in the kinds of educationally purposeful activities that will help them develop the competencies they need to succeed in college and beyond. (McCarthy, & Kuh, 2005, p.1)

Meaningful results gathered from this study, will be of value to practitioners who are dealing with ever-increasing demands of standards-based assessments and the need to increase graduation rates. CTE teachers' perceptions of CTE programs were studied to examine possible differences that affect student engagement. The information from this investigation conveys what might cause students to change their school engagement and what school divisions might do to enhance their curriculum offerings through CTE course offerings, industry credentialing, and reform strategies to activity engage detached students back into the educational process.

Various studies addressed the need to find ways to keep students actively engaged in school. These studies varied from why students drop out with the information coming directly

from former students who dropped out, to the reviews of CTE programs focusing on the transition from school to work, to the characteristics of school divisions and CTE programs. Each study placed value on data collected from students and the experiences of those students to make suggestions on how to improve curriculum and program planning. The researchers did not all go into their studies expecting to find value added from CTE programs. Researchers were open to learning from their participants while completing their individual studies and pushed the reader to reflect on current practices where they are. While reviewing the literature provided by these studies, it became clear that studies on CTE and student engagement are varied and can be designed many ways.

Research Questions

The purpose of this study is to determine the perceptions of CTE teachers regarding their programs' influence on the active engagement of their students and whether or not industry credentialing of the students or teachers adds to that influence.

The researcher sought to answer the following research questions:

1. What are CTE teachers' perceptions regarding CTE course influence on the domains of student engagement?
2. What are CTE teachers' perceptions on whether or not industry certification adds to student engagement?
3. What are the differences between the perceptions of industry certified and non-industry certified CTE teachers regarding their programs as a means to increase student engagement?
4. What do CTE teachers say about changes that occur in students' academic and social engagement when the students are enrolled in CTE courses?

Theoretical Framework

The theoretical framework of this study is shown in Figure 1. The attitudes and perceptions of CTE teachers are examined to determine how industry certified and non-industry certified CTE teachers engage their students and how their engagement of students model the six domains of student engagement determined from the research. The model uses knowledge regarding teacher attitudes and how their perceptions between industry certified and non-industry certified teachers on engaged students differ. Figure 1 represents the theoretical framework

designed for this study. This study used six domains of student engagement identified in the literature

1. Positive Conduct and Absence of Disruptive Conduct,
2. Attendance/ School Attendance and Class Attendance,
3. Academic Progress/Academic Achievement/Grades/Graduation,
4. Social/Feels like a member of the school community,
5. High Expectations in students' ability to achieve,
6. Emotional

(Daggett, 2008, Harrison, 2004; National Academy of Sciences, 2003; National Center of School Engagement; 2006; Reschly, & Appleton, 2008; Yazzie-Mintz, 2007) These six domains helped to determine the perceptions of CTE teachers regarding their programs influence on the level of engagement and whether or not industry credentialing of the students or teacher adds to that influence. The model focuses on CTE teachers and how students are engaged while enrolled in CTE courses.

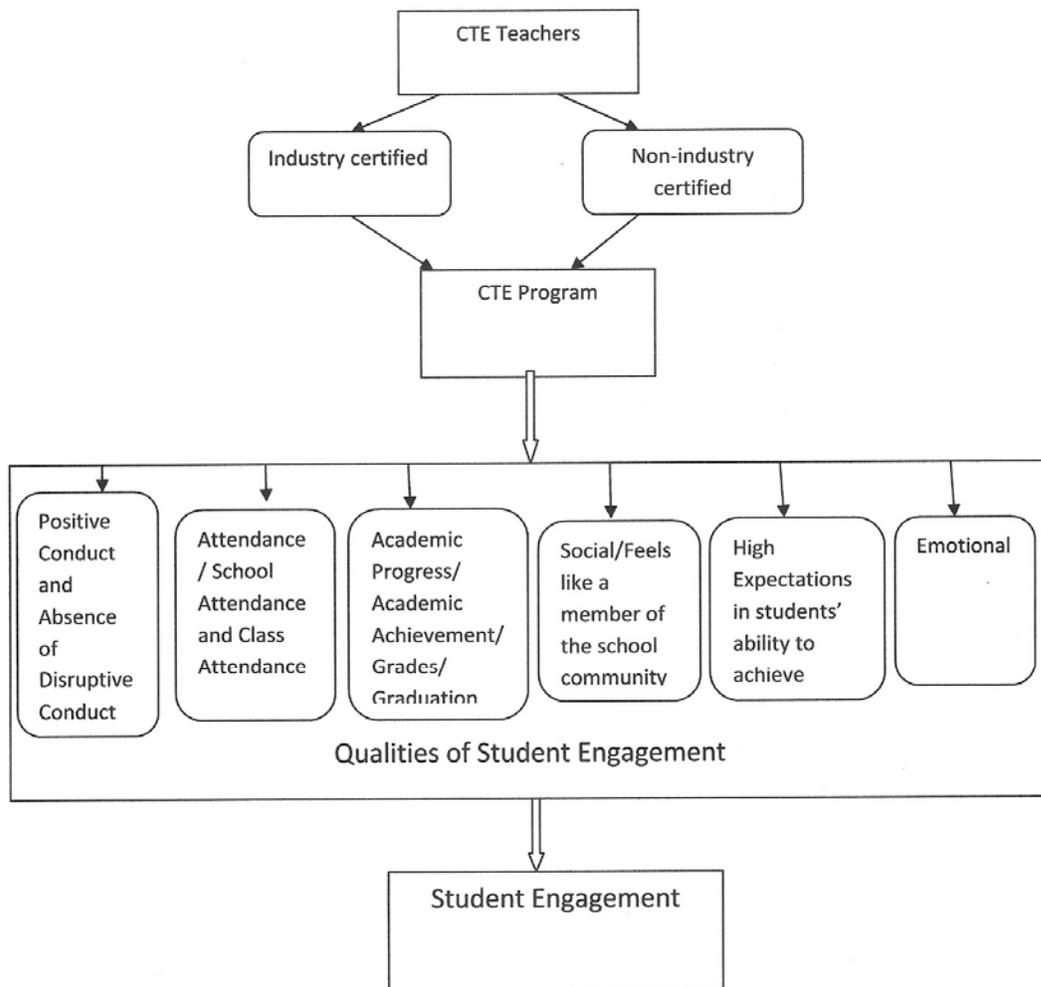


Figure 1. Theoretical framework.

Structure of the Study

This study is a quantitative, survey study. The survey design delineates the perceptions of CTE teachers and their influence on the level of engagement of these students and whether or not industry credentialing adds to that influence. The survey methodology was used to assess teachers' perceptions of how CTE influence changes in the students' engagement in class. The premise that CTE curricula offer unique learning environments is evident in the literature. Competency-based and individualized instructions are primary methods of pedagogy in CTE programs and such strategies recognize that students who enter CTE programs of study have unique and diverse capacities for learning. The students' experiences and engagement in CTE

programs may have an effect on their academic achievement and ultimately their ‘career objectives’. The level of the students’ engagement may be a critical factor to their success in the career technical school and their other school experiences.

The researcher conducted a quantitative study to examine CTE teachers’ perceptions of the impact of CTE and industry credentialing on student engagement. The complete discussion of methodology and procedures is addressed in Chapter 3.

Limitations and Delimitations

Limitations. This study relies on the expressed perceptions of the CTE teachers who took the survey. There was no control to determine if those expressed perceptions reflect the honest opinions of the participants. Further, the researcher is a former CTE teacher who believes in the value of CTE coursework as it relates to student engagement. Every effort has been made to control for this personal bias. Finally, the surveys were administered during the final month of the school year, and the expressed perceptions may be limited by the timing of the administration of the survey.

Delimitations. A delimitation of this study is that it focuses on one urban, two suburban, and two rural school divisions. The participants were a part of a self-selected volunteer sample that elected to teach CTE courses and are industry certified or elected not to be industry certified in their content area. The researcher acknowledges that there are internal and external factors that could not be controlled because the reasons why participants decided to teach CTE courses are varied and diverse. Perceptions of teachers will also be reviewed as to why they may or may not have expanded their credentials to become industry certified or offer their students an opportunity to gain private industry external credentials.

Definitions

In order to have a better understanding of this research study, common definitions need to be provided. For purposes of this study, the following terms were identified and defined to connote the constructs and practices to be investigated in this study:

Career and Technical Education (CTE). Formerly known as Vocational Education, the programs help students, workers, and lifelong learners of all ages fulfill their working potential. It provides students with academic subject matter taught with relevance to the real world,

employability skills, and education pathways that help students explore careers and interests while moving through school (Association for Career and Technical Education (ACTE, 2008).

Career and Technical Education (CTE) Completer. Students who complete a career and technical education program sequence (VDOE, 2010).

Career Goal. The career goal students identify prior to their entrance into the CTE center or CTE program (VDOE, 2010).

Competency-based education (CBE), Known as the cornerstone of CTE, students are provided with the necessary skills and information to learn at their own pace. The students are assessed based on their attainment of predetermined levels of achievement (Lynch, 2000).

Credentials in Career and Technical Education. A complete industry certification program (e.g., Certified Nursing Assistant, CNA), a state issued professional license (e.g., Cosmetology), an occupational competency assessment (e.g., "Job Ready" assessments from the National Occupational Competency Institute, NOCTI), or a pathway examination that leads to a completed industry certification (e.g., automotive technician examinations from ASE) (VDOE, 2/29/2008).

Cooperative Education. A method of instruction that combines career and technical classroom instruction with paid employment directly related to the classroom instruction. Both student instruction and employment are planned and supervised by the school and the employer so that each contributes to the student's career objectives and employability. Students enhance their knowledge, skills, and attitudes by participating in supervised experiences that are not easily replicated in an educational setting (VDOE, 2010).

Disengagement. A higher order factor composed of correlating factors coupled with a gradual loss of academic motivation, leading to detachment from school, disconnecting from its norms and expectations, while reducing effort, classroom involvement, and a commitment to school completion (Balfanz, Herzog, & Mac Iver, 2007).

Engagement. "A school participant's involvement in learning and school activities, motivation and commitment to learning, sense of belonging and accomplishment, and have relationships with adults, peers, and parents who support learning" (Daggett, 2008, p. 49).

High school completer. "Students who completed the course of public elementary and secondary education offered by the school district and who received a high school diploma, or

who met other requirements of completion as defined by state law or policy” (Garofano, Sable, & Hoffman, 2008, p. C-2).

Individualized instruction. Instruction that is developed for the individual needs of each student. Assessments of the students are also adapted for the individual.

No Child Left Behind Act (NCLB). Federal educational act, that promotes accountability for schools and school districts through identification of the students’ progress. Student progress is measured by state implemented achievement measures such as standardized achievement tests given at benchmarks (ED.gov, 2009).

On-the-job training (OJT). Training for students at the worksite. This training is most used in CTE cooperative education programs or externships and internships.

Organization of the Study

The demand for skilled labor in many occupational sectors is strong and growing. Career and Technical Education helps to increase students’ outcomes and achievements (Stone, 2005). Student engagement is significant in relation to the academic success of students (McMahon, & Portelli, 2004). This paper reflects upon the literature and the investigates CTE teachers’ perceptions of the influence of CTE and industry credentialing on student engagement.

Chapter 1 of this study introduces CTE and its suggested relationship with student engagement. It includes the statement of the problem, significance of the study, and research questions that will frame the problem and why the research is conducted. The significance of the research is also included and how it may be used by educational leaders. Chapter 2 presents the literature review, which focuses on the value of CTE, its relationship with student engagement, current expectations regarding industry certification, and possible connections. This base of knowledge sets the stage for investigating the perceptions of CTE teachers regarding their course impact on student engagement. Chapter 3 explains the methodology used in data collection, structure of data analysis, and guidelines for interpretation of the data. Chapter 4 describes the data and presents thematic results within these data. Chapter 5 offers conclusions and suggestions for practice while presenting recommendations for further research.

Chapter 2

Introduction of Literature Review

The literature review for this research study establishes the framework for classifying and computing the data regarding CTE students' (a) industry certification and credentialing, (b) student engagement, (c) perceptions of student academic performance, and (d) perceptions of student social skills. In order to set the parameters of this study, literature was investigated that defined the characteristics of and predictors of student school engagement. Literature also was investigated to determine: the value of CTE, traits of student engagement and identifying levels of student engagement, problems associated with low engagement, how CTE programs of study assist students in engaging in their education and making choices that lead to completion of high school. The historical narrative was developed with literature that provided background information about CTE program perceptions, challenges, and status.

The literature review section is designed to provide theoretical information about educational issues, industry based standards, program completion, and effective strategies to reach and prepare students enrolled in CTE programs. The second section addresses methods of obtaining and interpreting data and explains why the methods were selected. Of particular interest to the researcher is the comparison of CTE low engaged students to non-CTE low engaged students, and their levels of engagement and movement towards graduation. The review covers programs known for effective practices to those not as effective, and the pros and cons of both on program planning and student achievement. The final section of the literature review focuses on CTE programs and how they affect and influence disengaged students and the need to improve, maintain, or not maintain such programs.

Search Procedures

Beginning in May 2008 the literature search was conducted using primarily databases accessible through the Virginia Tech Libraries. Specific search engine databases included:

1. ERIC Education Resources Information
2. Proquest's Dissertations and Theses
3. Education /ejournals
4. Journal, digital libraries and archive university libraries, Virginia Tech

In addition to searches conducted, using Virginia Tech databases, searches were also conducted using the websites housing documents produced by the United States Department of Education and select state government websites. Specific sites used to collect research included:

1. US Department of Education
 - a. ED Pubs
 - b. Ed.gov
2. Carl D. Perkins Career and Technical Education Act of 2006 (US 109th Congress)
3. Virginia Department of Education- www.doe.virginia.gov

Other searches also included educational and corporate organizations including:

1. Googlescholar.com
2. National Association of State Directors of Career Technical Education Consortium
3. Association of Career and Technical Education (ACTE)-acteonline.org
4. Education Week- www.edweek.org
5. Johns Hopkins University- web.jhu.edu
6. NEA- Vocational Education Resources
7. Common Core of DATA (CCD)
8. National Research Center for Career and Technical Education (NRC CTE)
9. National Center for Education Statistics (IES)
10. Southern Regional Education Board (SREB)

Key search terms included: Career and Technical Education/Vocational Education, Disengaged student, student engagement, industry certification.

Exploring the Current Status and the Historical Background

Career and Technical Education (CTE), formerly known as Vocational Education, has a long history of preparing students for the world of work. A focus on CTE developed when the demand was created to educate everyone and to consider establishing separate high school curricula for work-bound students. The discussion among scholars was whether or not to prepare everyone to be college bound or to incorporate courses that prepared students for the world of work. In 1894, a report by the Committee of Ten, headed by Harvard President Charles W. Eliot and made up mainly of university professors, argued unanimously that everyone should take the same rigorous academic curriculum, whether they intended to go to college or not. In the end, the committee's policy did not win out (Stern, 1998).

In 1917, the National Education Association produced another influential report, the *Cardinal Principles of Secondary Education*, in which a group made up mainly of authorities in educational administration argued that the high school curriculum should be differentiated to match students' vocational interests. In 1917, Congress passed the Smith-Hughes Act that for the first time provided federal funding for states to support high school vocational education (Stern, 1998). The Smith-Hughes Act of 1917 was the first legislation that separated CTE from the other parts of the comprehensive high school curriculum (Prentice Hall Documents Library, 2009). Career and Technical Education has existed as a federally funded program in various forms since the passage of the Smith-Hughes Act of 1917. The federal and state governments set aside monies to support career directed programs. Educational leaders of the time saw differentiated curriculum as a way to achieve social efficiency, as opposed to leaders such as John Dewey and others who wanted to offer the same rigorous academic curriculum to all students in order to sustain democratic equality (Stern, 1998).

After the Smith-Hughes Act of 1917, there was varied emphasis on vocationally focused legislative acts. The 1930s brought a focus on national defense and severe unemployment. The federal influence on vocational programs did not change much, but a new emphasis on the junior college did emerge. In the next decade, the War Production Training and the Rural War Production Training Acts were put in place to provide three educational tracks: general education, vocational education programs, and various job-training programs. In the 1940s and '50s, vocational education programs, originally developed to train high school students for work, were viewed as part of national defense strategy to assist with the war effort and to provide a transition to a peace-time economy. During the 1960s, vocational education experienced heavy enrollment growth. Due to technological advancements and increasing employment dislocation, the gap between the rich and the poor widened. Congress passed the Manpower Development and Training Act of 1961 (MDTA), followed by the Vocational Education Act of 1963 (VEA). Almost 50 years after the Smith-Hughes Act, in spite of all the intervening changes, the definition and purpose of vocational education as set out in the new VEA remained largely the same (Prentice Hall Documents Library, 2009).

The Carl D. Perkins Vocational and Technical Education Acts of 1984, 1998, and 2006 were designed to encourage and improve occupational education, with an emphasis on high school and associate degrees. It is imperative for educators and policy makers to understand how

Career and Technical Education experiences compare to those of students who are following a college bound course of study (Ed.gov, 2005). Career and Technical Education over the last decade, has been a part of a federal education policy debate for establishing rigorous academic standards and aligned assessment systems. Considered a key partner in educational reform movements, CTE programs are unique in their ability to promote student success (Schescke, 2008).

The Carl D. Perkins Vocational and Technical Education Act was first authorized by the federal government in 1984 and reauthorized in 1998 and 2006. The act aimed to increase the quality of CTE in the United States in order to assist the economy. Congress reauthorized the Carl D. Perkins Career and Technical Education Improvement Act of 2006 in July 2006. The 2006 Perkins reauthorization included three major areas:

1. Using the term “career and technical education” instead of “vocational education”;
2. Maintaining the Tech Prep program as a separate federal funding stream within the legislation and;
3. Maintaining state administrative funding at 5 percent of a state’s allocation (National Education Foundation, 2008).

One of the highlights of the new requirements was a program of study that would link academic and technical content across secondary and postsecondary education. This linkage would ensure strengthened local accountability and continuous program improvement (National Education Foundation, 2008). The purpose of the Carl D. Perkins Act of 2006 was to develop more fully the academic, career, and technical skills of secondary education students and postsecondary education students who elect to enroll in career and technical education programs. To reach this purpose, programs should:

1. build on the efforts of states and localities to develop challenging academic and technical standards and to assist students in meeting such standards, including preparation for high skill, high wage, or high demand occupations in current or emerging professions;
2. promote the development of services and activities that integrate rigorous and challenging instruction to link both secondary education and postsecondary education for participating career and technical education students;

3. increase state and local flexibility in providing services and activities designed to develop, implement, and improve career and technical education, including tech prep education;
4. conduct and disseminate national research and information on best practices that improve career and technical education programs, services, and activities; by providing technical assistance, promoting leadership, initial preparation, and professional development at the state and local levels, to improve the quality of career and technical education teachers, faculty, administrators, and counselors;
5. Support partnerships among secondary schools, postsecondary institutions, baccalaureate degree granting institutions, area career and technical education schools, local workforce investment boards, business and industry, and intermediaries;
6. Provide individuals with opportunities throughout their lifetimes to develop, in conjunction with other education and training programs, the knowledge and skills needed to keep the United States competitive (Carl D. Perkins Vocational and Technical Education Improvement Act of 2006, Public Law 109-270, 2006).

The Carl D. Perkins and Technical Education Act is the primary source of funding that supports educational programs that connect school to work. Continued program funding has been called into question, but the National Association of State Directors of Career and Technical Education Consortium believed that Perkins should not be eliminated, but should receive additional funding. (National Association of State Directors of Career and Technical Education Consortium, 2008). Career and Technical Education was in jeopardy based on the funding policies of former President George W. Bush, and in February 2008, the White House unveiled its Fiscal Year 2009 budget request that eliminated funding for the Carl D. Perkins Career and Technical Education Act of 2006 (National Association of State Directors of Career and Technical Education Consortium, 2008).

President Barack Obama's Fiscal year 2010 budget request recommended level funding for CTE. The budget request funds the Carl D. Perkins Technical Education Act at \$1.3 billion (US Politics Today, May 7, 2009). The Obama administration also has a focus on rebuilding the middle class with clean energy employment. This would be accomplished through the efforts of the White House Middle Class Task Force and the American Recovery and Reinvestment Act to

develop green-collar jobs and training. The American Recovery and Reinvestment Act will invest \$34 billion over the next two years to upgrade existing buildings and encourage new ones to be built utilizing green principles. Training for the new wave of green-collar jobs should help move America towards a sustainable economy (Schneider, 2009).

The Perkins Act has helped to make CTE more accountable by making schools report test scores, graduation rates, and academic targets consistently. Enrollment in CTE programs continues to grow, according to reports from the U. S. Department of Education's office of vocational and adult education (Education Week, 2007). Administrators, policy makers, and students will find it beneficial to study the effects of CTE on student engagement.

Value of CTE

Career and Technical Education provides transferable skills and provides learners with important skills such as problem solving, teamwork and the ability to locate and utilize information. According to Schescke, "Career and Technical Education is the intersection between rigorous academic, technical, and employability skills, resulting in capable, engaged, career-ready individuals" (2008, p. 1). Student engagement is a part of Career and Technical Education's contextual teaching that allows the teacher to bring relevance to academic content and motivates students with real-world learning experiences (Schescke, 2008).

Career and Technical Education offers unique support for student success that could increase student engagement. Students often do not make the connections between what they learn in high school and successful entry into the world of work. Contextual teaching strategies bring relevance to academic content, thereby engaging and motivating students with real-world learning opportunities. Career programs prepare students to be flexible and adaptive and to develop transferable work skills. The ability to be good at academic, technical and 21st century work skills allows students to adapt to shifts in the economy faster and easier. Through co-curricular student organizations, such as: Future Business Leaders of America (FBLA), Future Farmers of America (FFA), SkillsUSA, and DECA: An Association of Marketing Students (DECA), students are provided the opportunities and skills to work collaboratively with a team, to be resourceful and to find various forms of career information. Career and Technical Education closes the skilled workforce gap and increases America's competitiveness. Career and Technical Education also provides skilled workers and gives the country an advantage in a global economy. Career and Technical Education achieves these positive effects by aligning programs

to rigorous academic and technical content and preparing individuals for successful completion of industry based certification and credentials. “Career and Technical Education creates positive outcomes for students and should be supported and encouraged in any federal policy focused on high schools” (Schесke, 2008, p. 3).

Many depend on CTE, as part of the overall educational system, to provide immediate work skills to students. Career and Technical Education operates with three main components in each individual career program: classroom instruction, work-based or on the job work experiences, and co-curricular organizations. Value is offered to students’ overall educational experiences through varied teaching instruction, work, and competition and leadership. The studies discussed below offer evidence of the value of CTE.

In 1995 Arum and Shavit, examined Career and Technical Education in order to re-evaluate the effects of career and technical education and to determine if the programs inhibited the future earning potential of students or reduced the chances of students attending college and entering into high-prestige occupations. The researchers looked at the occupational transition of students from school to work by utilizing the High School and Beyond (HSB) data set (Carroll, 1987) to examine its longitudinal information on the educational and occupational outcomes of a high school, sophomore class cohort studied during the years of 1980 through 1986. Other researchers have used the HSB data set to study the consequences of Career and Technical Education.

For this particular study Arum and Shavit, utilized the Erikson, Goldthorpe, and Portocarero (EGP) class schema (1979), for occupational classification because it is widely used among stratification researchers, especially those engaged in comparative research. The study is a part of a larger international project in which similar issues are studied in a sample of industrialized societies. EGP does not correspond perfectly to the US Census’ major occupational categories. The study used both self-reported and transcript-based measures to track placement in high school (Arum and Shavit, 1995).

Arum and Shavit concluded that career and technical education /vocational education programs teach students skills needed to enter the work place. A young adult who has completed a career and technical education program has a better chance of avoiding the risk of unemployment and unskilled employment than an individual who has not participated in such a

program, and this was considered a benefit to students. Such benefits were studied and found to apply only to students on a non-college bound track (Arum & Shavit, 1995).

Adelman's study (2006), *The Toolbox Revisited: Paths to Degree Completion From High School Through College* was a quantitative, longitudinal study of a cohort of students who were eighth graders in 1988, graduated high school in 1992, and started out to earn a bachelor's degree. The data were collected via the National Center for Educational Statistics (NCES) and from interviews with students from the database. The results were determined utilizing high school transcripts of students through December 2000. *The Toolbox Revisited* is the second of two national longitudinal studies completed over a ten-year period. It is a replication of the study, *Answers in the Tool Box: Academic Intensity, Attendance Patterns, and Bachelor's Degree Attainment* (1999), which is currently referred to as "The Original Tool Box" (Adelman, 2006).

The purpose of the study was to learn if the numerous initiatives of states and private foundations to prepare high school students for postsecondary education and the No Child Left Behind legislation have affected the focus points of the original study: academic intensity, attendance patterns, and bachelor's degree attainment. The high school curriculum and its rigor and relevance were closely examined.

The conclusions were that of all the eighth graders in 1988:

1. 78% graduated on time in 1992 with a standard diploma;
2. 53% entered postsecondary education directly from high school;
3. 48% persisted from their first to their second year of postsecondary study; and
4. 35% earned a bachelor's or associate degree by December 2000 (Leggett, 2006 p.1).

The study also determined that the rigor and relevance of a high school curriculum counts because it is the link to preparedness. This study placed a great deal of emphasis on the quality and quantity of course offerings. The course offerings on some transcripts were unclear and did not provide momentum towards entering a postsecondary setting. It was imperative to be able to know exactly what was being taught in the course and how it aligned with a postsecondary curriculum. Timing was also important. Students who went directly to the postsecondary setting and obtained at least 20 credit hours by the end of the year stood a stronger chance of graduating. There was a definite math gap. "The world has gone quantitative: business, geography, criminal

justice, history, allied health fields- a full range of disciplines and job tasks tells students why math requirements are not just some abstract school exercise” (Adelman, 2006, p xix). High schools educators and postsecondary educators need to communicate more about their curriculum and expectations (Adelman, 2006).

This study indicates that curriculum is important; Career and Technical Education is a part of the high school curriculum and contributes to student academic success. This study also concluded that students should become agents of their own futures. They should understand that just wanting to go on to postsecondary education is not enough. They should take challenging course work, read, and come to know that a full range of disciplines and job tasks tells students why math requirements are necessary. (Adelman, 2006).

Amy Ryken’s (2006), case study *Goin’ Somewhere: How Career Technical Education Programs Support and Constrain Urban Youths’ Career Decision-Making*, used cross-case replication logic-cases intentionally selected to mirror similar intervention conditions. The study was set in a specific biotechnology-focused career and technical education program. Ryken cited Yin’s research strategies and the study utilized the case study method that followed replication logic and focused on student experiences. This method was well suited to investigations that examine contextual conditions. (Yin, 1994) In this study, student participants were “an embedded unit of analysis” (Yin, 1993, p. 83). Ryken sought to answer the following questions:

1. How does the program balance the tension between providing broad options versus specific training? How do program structures support and constrain students' educational and career progression?
2. How do students perceive the relationships between high school, college, and work? How do students support their own educational and career development?

(Ryken, 2006)

The purpose was to study how career and technical education programs affect urban students in making career decisions. By using the mixed approach of the phenomenology and case study, the researcher wished to gather a feeling of the essence of the experience and what it was like to live through the experience of being a part of the biotechnology program at its various stages. The researcher also wanted to know did the experience offer similar meaning, structure, and benefits to the participants. Review of the data looked for significant statements and meanings (Ryken, 2006).

The population in the study was observed over a seven-year time frame and was made up of 256 students in the biotechnology program that was part of two high school career academies, a community college and 40 biotechnology laboratories in the San Francisco Bay Area. Participation in the study was voluntary. Participants' experiences were studied and interviews were conducted. The sample targeted ethnically and linguistically diverse students who may not have otherwise had access to either the community college or biotechnology laboratory settings. Fifty percent of the students were the first in their family to graduate from high school and over eighty percent were the first in their family to enroll in a postsecondary program. Subgroups were defined by race, gender, and prior family enrollment in postsecondary programs. Three case studies within this study were reviewed as a phenomenon and multiple cases were studied to search for processes and outcomes and to understand how they are qualified by local conditions, how it feels or affects one to be a part of the phenomenon (Ryken, 2006).

Ryken's conclusions included implications for Career and Technical Education programs and for students. An implication revealed tensions in students' career decision-making as they gained knowledge, and learned about their varied options, allowed students to be more open to their future and the limits of the specialized program. The researcher determined that students should be allowed to advocate control over their educational career programs to fit their personal goals (Ryken, 2006).

In 2006, a consortium made up of The Conference Board, Corporate Voices for Working Families Partnership For 21st Century Skills, and The Society for Human Resource Management (SHRM) conducted a study, on the perspectives of employers examining the basic knowledge and applied skills of new employees. The mixed methods study included interviews with twelve human resources executives and results of an in-depth survey which define the perceptions of 400 employers on the readiness of new job entrants to the workforce as either "deficient" or "excellent". The employers spoke about the skill sets that new entrants needed to succeed in the workplace by recently hired graduates of high schools, two-year colleges, technical schools and four-year colleges. The data were divided into categories based on the highest education level obtained (Casner-Lotto & Barrington, 2006).

The four participating organizations jointly surveyed over 400 employers across the United States. The purpose of the study was to determine how employers viewed the job readiness of newly hired graduates entering the workforce directly from high school, community

college, or four-year institutions. The interviews and surveys focused on basic knowledge/skills and applied skills. Applied skills are the skills that enable new entrants to use the basic knowledge acquired in the classroom to perform in the workplace to achieve success.

The conclusions drawn from the study were that the three types of educational institutions did not prepare students to the expectations of the employers. Applied skills surpassed basic knowledge on the combined list of skills that employers said would increase in importance in the next five years. Employers place the primary responsibility for workforce readiness on the educational system. The employers gave low ratings to all three levels of education on their ability to prepare students in main core and applied skill categories. The study revealed that employers needed to build stronger relationships with educators in order to communicate the industry standards and skills needed and expected of new hires (Casner-Lotto & Barrington, 2006).

The researchers suggested that all stakeholders should examine the areas that appear to be strong based on employers' performance, as well as those that shared a noted "deficiency" in performance. Researchers also suggested that educators consider adjusting curricula to improve the areas in which deficiencies were noted. Businesses should provide remedial training and should work to develop community and work-based learning experiences (Casner-Lotto & Barrington, 2006).

State Initiative for Industry Certification

In Virginia, a state initiative was started in 2001 to provide opportunities for students to earn industry credentials. The purpose of industry credentialing is to gain several benefits for CTE by providing: program improvements, benefits to the students, verified credit, and to meet the technical skills performance standard (2S1) in the Carl D. Perkins Career and Technical Education Act of 2006. (www.doe.virginia.gov, 2009). The industry-credentialing program also serves as a significant achievement indicator while a student pursues a career pathway that requires post-secondary training, credentialing, or degrees. This achievement information is also reflected on the school report card that is reported through the Virginia School Report Card System. The Virginia Report Card System reports for each secondary school the number of industry certifications earned, occupational competency assessments passed, and state licensures achieved by its students (www.doe.virginia.gov, February 5, 2008). The industry credentialing initiative also provides an opportunity to collect valid information on both teachers and students

to strengthen requests for additional funding for program marketing, program improvement, and staff development planning. (Creasy, 2009).

Career and Technical Education Teachers Industry Certification/Licensure

Credentialing is a way to assess the CTE course work that a student has learned and to add value to the student's credentials. Industry credentialing is a means to express to employers and to others in the work place one's skill level, essential industry knowledge, and level of industry certification. Career and Technical Education educators face three important issues in credentialing through assessment. First, the credentialing arena is large and evolving, and a clear understanding of the domain is a requirement to examine prior to the adoption of a credential. The domain is so large because, there is a vast array of industries that are represented when discussing credentialing. Each industry has its own specific way of measuring and assessing knowledge and skill attainment. Second, a clear and comprehensive set of standards is required to define the quality and credibility of credentials. Thirdly, CTE policymakers and educators will require a rational and efficient process to be able to evaluate and check assessments against a set of standards (Mahlman, & Austin, 2002).

Mahlman, and Austin, (2002) completed a commissioned paper to the National Skill Standards Board, for the Center on Education and Training for Employment, on credentialing systems and the implications for secondary CTE programs. There are three types of credentialing: registration, certification, and licensure. Registration is the least restrictive form of credentialing, as it simply requires the recipient to place their name on a roster with a government agency indicating that they have a specific set of skills and qualifications. Second, certification usually requires the candidates to pass some form of assessment or examination to demonstrate that a predetermined set of skills has been mastered. Certification can be offered by a government agency or an organization in the private sector. Third, licensure is the most restrictive and is often considered "practice control". A primary reason for licensure is to protect the public and it provides status, protection of the reputation of the industry, respectability, and economic benefits, in order for students to be able to gain industry credentials, there is a need for CTE teachers to become trained (certified). In Virginia, CTE teachers are required to become certified in at least one credential they have chosen to target for the CTE programs they teach. Teachers benefit by:

1. expanding their content background in the skill set areas and job roles for which they train students
2. being able to better explain the requirements of specific jobs in related career pathways
3. provide perspective for their students on the relative “market value” of industry certifications and other credentials
(www.doe.virginia.gov, February 19, 2008).

CTE Teachers in Virginia have received ongoing training opportunities to become industry certified. The Office of CTE with 2,907 Virginia CTE teachers participating has conducted over 100-industry certification training and testing sessions. As of January 2008, 2,244 teachers had passed one or more credentialing exams. Seventy percent of CTE teachers in Virginia have passed at least one industry certification or licensure examination (www.doe.virginia.gov, February 19, 2008). For the 2009-2010 school year, all CTE teachers are required to become industry certified in at least one industry certification or licensure area. (www.doe.virginia.gov, 2009).

The Virginia Department of Education (VDOE) supports all aspects of the CTE credentialing initiative by providing reimbursement allocations to school divisions for student examination expenses as well as full state funding for industry certification, teacher-training academies. Some school divisions also offer additional locally sponsored training for teachers in selected industry certification areas. An Office of CTE staff member is also assigned to research and update information on industry credentials. Additional responsibilities of the CTE staff member include the coordination of training academies, data collection, and reporting on school division implementation of credentialing. Lastly, the worker serves as a consultant to school personnel and VDOE staff regarding credentialing issues (www.doe.virginia.gov, February 19, 2008).

Providing Industry Credentialing to Students

In a report to the Center on Education and Training for Employment, Mahlman, Austin and Jeong, (2002) outlined a nine-step process for adopting certification systems for use in educational settings.

1. Define Purposes and Used of Industry-based Student Certification Systems for CTE
2. Establish Public Standards for Evaluating Certification Systems

3. Identify Certification Systems and Preliminary Link to CTE Programs
4. Conduct Initial Screening of Identified Certification Systems
5. Determine the Quality of the Standards
6. Determine Quality of Remaining Certification Assessments
7. Conduct Final Linkage to the Curriculum
8. Determine Marketability and Recognition
9. Develop Data Collection Procedures (Mahlman, Austin, & Jeong, 2002, p. 2).

This process is suggested to help policy makers develop the most efficient industry-based credentialing systems, and allow for accountability. The nine steps provide fairness to certification assessment vendors and allow for ongoing review (Mahlman, Austin, & Jeong, 2002).

Virginia has been able to make significant industry credentialing developments drawing directly from industry. Virginia has developed a multifaceted process to incorporate industry-validated assessment into the state assessment system and provide students with portable credentials. By utilizing an instrument called the Snyder Taxonomy, made available through the Vocational-Technical Education Consortium of the States (V-TECS), the state cross-referenced industry standards with its own state academic standards. The state systematically identified the academic requirements embedded in nationally validated skill standards certification programs. Virginia's effort required some investment in software, but the state avoided substantial assessment development, and implementation costs. Overall, Virginia's approach is to address academic standards through state tests and ensure linkage to industry requirements by using assessments developed by industry.

One benefit to Virginia's career and technical education programs has been the ability to expand dual enrollment opportunities for students (American Youth Policy Forum, 2003). Another benefit from Virginia's approach is the building of students' resumes. Industry credentials help to communicate to employers that students are gaining relevant skills and knowledge that directly relate to jobs in their career path. Achieving industry credentials helps place students ahead of other candidates in the competition for entry-level positions. The Commonwealth of Virginia believes that "external" credentialing provides the following major benefits to students:

1. Evidence that the student has completed advance educational preparation by verifying competency in career and technical education skill areas that matter to business and industry,
2. Increased job opportunities for advancement in a chosen career pathway, and
3. Enhanced self-esteem for students because they have achieved a national occupational competency standard and/or standards recognized by business and industry (www.doe.virginia.gov, February 19, 2008, p. 3).

In August 2007, an industry certification survey in Virginia indicated, “of 136 school divisions and regional technical centers, 13,325 students were reported as having achieved an industry credential.” (www.doe.virginia.gov, February 19, 2008) Industry credentialing in Virginia continues to increase, during the 2008-2009 school year, 19,737 Virginia students passed either an industry certification exam, an occupational competency assessment, e.g., technical skill assessments from the National Occupational Competency Institute (NOCTI) assessment, or achieved state licensure in areas eligible for student-selected verified credit (www.doe.virginia.gov, October 2009).

A limitation of Virginia’s system, according to the American Youth Policy Forum, is its total reliance on industry-endorsed credentials for measurement of the U.S. Department of Labor Secretary's Commission on Achieving Necessary Skills (SCANS) skills. This approach may be too focused on a single occupation instead of an industry wide focus (American Youth Policy Forum, 2003).

Castellano, Stone, and Stringfield (2005), completed a mixed-method, longitudinal study to explore and increase the understanding of the use of industry-recognized credentials in high school, including student participation and the use of these credentials as a measure of high school CTE program quality. Student outcomes were studied from CTE programs to determine if students attending schools with career themes and rigorous academic preparation performed better than students attending schools without set structure and reform. Student outcomes were judged on student achievement and earned CTE industry credentials (Castellano, Stone, & Stringfield, 2005).

The mixed-method, longitudinal study included three high schools each offering career-themed academies and concentrated vocational programs. The three schools were matched to three similar schools not implementing reforms. The school populations of all of the schools

involved had to serve a high percent age of low socioeconomic students with many in danger of not graduating from high school. The selection of schools included different types of school organizational structures: career academics, comprehensive high school, regional skills centers, and vocational high schools. The most common organizational structure was the comprehensive high school. Many of the comprehensive programs utilize regional skill centers/technical centers. Data were collected from each school, from three grade cohorts, over a four-year period (2001-2004). Pseudonyms were used to protect the identity of the high schools (Castellano, Stone, & Stringfield, 2005).

Various means of data collection were based on each of the research questions. The first included examining the three state departments of education websites and the five division websites that correspond to the schools. Analyses were also performed on the various course catalogs, reports, grant proposals, and other documents gathered during the four years of data collection at the various sites. The second set of data collection was the number of students in the class of 2002 that earned industry certification. This required each school division to self-report by supplying the data, because industry certification data was not a part of the students' transcripts. The last set of data was obtained through 300 interviews with stakeholders in the schools. Teachers, administrators, and students were interviewed to determine the use of or value of industry certification. A total of 106 study participants were asked about industry certification since it was one of many outcomes that the study attempted to explore. The influence of industry certification may not have been addressed in direct interview questions, but was brought up through discussions in other questions, such as if a CTE program had a local business advisory council or during discussions of other ways of evaluating student progress besides for tests and grades. The interviews were recorded and transcribed and separated by type (Administrators, counselors, students, CTE teachers, academic teachers, school and district, community members), then coded, and analyzed (Castellano, Stone, & Stringfield, 2005).

The limitations of Castellano's (2005), study were that the industry certification data were gathered two years after the students in the class of 2002 graduated and the information had to be self-reported by the school divisions. There was no way to ensure that the data were completely accurate. The other limitation of the study was changing policies; three of the five states involved in the study modified their policies on CTE accountability. Although this was a

limitation for the study, it was considered a plus in program improvement for those three states (Castellano, Stone, & Stringfield, 2005).

The results of the Castellano (2005) study indicated that three of the five states reflected the range of the many trends in educational policies in place throughout the country. The researchers had trouble in collecting data from the five states because schools were not required to record data on the number of students earning industry certifications. Interview data from participants provided input on how industry credentials were perceived. Teachers and administrators believed that the credentials were valuable to students, but few students mentioned industry certification in their interviews. Those that did were very knowledgeable on the topic and could also articulate the benefits to themselves for working towards and obtaining industry certification. Teachers and administrators were concerned about the costs to maintain such programs (Castellano, Stone, & Stringfield, 2005).

Bartlett, Horwitz, Ipe, and Liu completed another study on industry credentialing in 2005. It addressed the perceived influence of industry-sponsored credentials on the recruitment of information technology (IT) employees. This quantitative study explored how the industry credentials were being valued and utilized in industry as potential employees sought to obtain employment. The study examined industry credentials from induction to the present. The researchers decided to focus on information technology credentials since the area seemed to have had one of the largest interests in industry certification. The role of industry certification for IT positions and recruitment follows the signaling theory. The signaling theory requires that employees demonstrate to employers, observable characteristics, and attributes to determine job positions and salaries. Industry certification serves as a signaling value (Bartlett, Horwitz, Ipe, & Liu, 2005).

The purpose of the study was to examine how perceptions may differ between employees and managers who oversee the recruitment of IT employees. The researchers compared the perceptions of human resource (HR) professionals and IT professionals. The researchers wanted to know if there were differences in employer and employee perceptions on the influence of IT industry certification on recruitment (Bartlett, Horwitz, Ipe, & Liu, 2005).

Data were collected through surveys. The surveys were administered through paper and pencil, and via email invitations. One paper and pencil form of the survey instrument was given to HR professionals and an Internet-based form of the survey was given to IT professionals in the

same firm. The participants came from large firms with stand alone IT departments. The firms were identified from the 2001 References database, which has over 12 million listings of organizations operating in the United States. Firms with over 500 or more employees were selected resulting in 3,330 firms being invited to participate in the study (Bartlett, Horwitz, Ipe, & Liu, 2005).

A total of 161 company executives responded to the invitation and with 111 indicating that their firms had policies that prohibited their participation. The result was that 50 firms agreed to participate in the study. Self-administered questionnaires were mailed to the participating 50 companies' HR executives; along with instructions on how to administer the second survey to IT employees hired within the last year. Participation at the end of the data collection cycle was a 66% response rate from HR executives. Two hundred and forty-five (245) completed IT employee surveys were returned. However, a response rate could not be determined because the researcher had no way of knowing how many were invited to participate. Questions on both forms of the surveys were set up on a 5-point Likert-type scale. The validity of content in the instrument was determined from an expert panel of five academics and five IT managers (Bartlett, Horwitz, Ipe, & Liu, 2005).

The data analysis was completed by conducting independent sample t-tests, to look for differences in perceptions between HR executives and IT employees and between IT employees with and without industry certifications. Results were divided into five parts: demographics and firm characteristics, importance of credentials in the hiring practice, type of qualifications, perceived influence of industry certification on recruitment, and a comparison of IT employees with and without industry certifications (Bartlett, Horwitz, Ipe, & Liu, 2005).

Conclusions from the study indicated that a growing number of applicants have industry credentials. The growth of applicants with industry credentials is in the area of new persons entering the field as opposed to veteran IT personnel. This is a new trend, since in the early days of industry credentials the majority of people who earned certifications were well-established IT professionals. Based on the survey results of IT employees, almost 70% of the 245 employee respondents had a least one IT industry credential. One drawback was the expectations of the new applicants to move directly into high paying positions. The jobs in the industry were not growing that fast. The HR executives surveyed indicated that industry credentials were important in their hiring decisions (Bartlett, Horwitz, Ipe, & Liu, 2005).

The certified IT employees who responded to the survey perceived the credentials as having a great influence on employment recruitment as opposed to the respondents who were non-certified. Few IT professionals, however, believe that industry certification was a direct correlation of an employee's abilities and felt industry certification should be a sole mechanism for justifying recruitment (Bartlett, Horwitz, Ipe, & Liu, 2005).

The researchers concluded that additional research would be required to determine if the provider of the industry certification had any influence on how employers perceived the industry credential. Career and Technical Education providers should examine the quality of the programs that the students complete prior to the certification being awarded. The researchers determined that industry credentials and certifications are now a major issue in education and training for many occupations and professions and that future research will be required to explore the influence of industry-sponsored credentials in other industries (Bartlett, Horwitz, Ipe, & Liu, 2005).

Traits of Student Engagement

Educators strive to create learning environments that meet the needs of students. Knowing when a student is in danger of not progressing in their school environment is desirable information. Educators seek indicators, traits, and characteristics to help identify when a student's school engagement is decreasing or extremely low. Utilizing information on student engagement helps educators develop strategies to promote student motivation and student engagement, thus leading to student academic success. The researcher examined studies that focused on student engagement and student engagement predictors.

Schools cannot control all of the factors that influence students' academic engagement, especially in disadvantaged, urban areas. Student engagement is negatively influenced by the economic and social marginalization of the families' status and the community. Low engagement to disengagement can be lessened by participating in engaging school activities, with high academic standards, skillful instruction, and support for students to reach both their academic goals and career goals. Engaging students, including those that have become disengaged is a formidable task, since many high school students are too old or simply too independent to follow teachers' instructions out of obedience. Many are too young or immature to fully appreciate the value of the education that is being provided to them and the need to be successful in school. Schools do not control all of the factors that contribute to their students' academic success,

especially in low socioeconomic backgrounds that usually have an adverse influence on student achievement. Schools can help to minimize those influences by providing an engaging school environment that has high academic standards, skillful instruction, and the support that students need to have the opportunities to pursue their academic and career goals (National Academy of Sciences, 2003).

The Committee on Increasing High School Students' Engagement and Motivation to Learn was organized by the National Academy of Science in 2003 to provide information and recommendations to educators to bring about meaningful engagement and improvements in student achievement. The researchers conducted a mixed methods study that examined data several ways, qualitative, correlational and quasi-experimental, falling short of the random-assignment design that many believe necessary for causal conclusions. Nevertheless, the researcher found that the evidence was consistent enough to provide credibility to the committee's recommendations.

Conclusions of the committee were formed into ten recommendations that could be used to create a school's reform model for improving student engagement. The recommendations addressed the following: high school courses and instructional methods, classroom assessments of students' understanding and developed skills, teacher preparation programs, high expectations for student learning, assessments reflective of the teaching of critical thinking and problem solving skills, and the creations of smaller learning environments in urban comprehensive programs. Schools should also eliminate formal and informal student tracking models, counselors and teachers supported by professionals should inform students about postsecondary educational and career options, and improve communication and trust between all stakeholders. Finally, schools should make greater efforts to identify and coordinate with social and health services in the community (National Academy of Sciences, 2003).

The National Center for School Engagement, 2006 examined multiple survey instruments and identified three types of engagement: behavioral, cognitive, and emotional. Observations of behavioral engagement include doing all schoolwork and behaving in classes. Observations of cognitive engagement include strong motivation and effort, plus a psychological investment in learning and a desire to be challenged. Observations of emotional engagement are values, emotions, and interest. Engagement overall is a multi-dimensional construct. Cognitive engagement has a strong correlation with academic progress and behavioral engagement has a

strong correlation with dropping out of school. There is little empirical evidence that emotional and cognitive engagement is related to dropping out. Nevertheless, cognitive engagement is related to achievement. If one is achieving then one is engaged, and those not achieving are probably less engaged and have a greater possibility of dropping out (The National Center for School Engagement, 2006).

Yazzie-Mintz (2007), works with an on-going longitudinal study on student engagement. The High School Survey of Student Engagement (HSSSE) is utilized to measure and try to understand student engagement. Each year schools participate in the HSSSE survey. In a report on the data gathered from the 2006 survey, the majority of the respondents of the 2006 HSSSE, reported being “content with their high school, cared about the high school, engaged in school, and felt that they are an important part of the school community” (Yazzie-Mintz, 2007, p 1). The HSSSE was developed on a multi-dimensional, research-based conception of student engagement, with three major dimensions of engagement:

1. Cognitive/intellectual/academic engagement, describing the work students do and the ways students go about doing their work
2. Social/behavioral/participatory engagement, describing the ways in which student interact within the school community
3. Emotional engagement, describing how students feel about where they are in school (Yazzie-Mintz, 2007, p 7).

The researchers focused on a variety of ways in which students may or may not be engaged in the life and work of a school. The HSSSE studied why students go to school, boredom and engagement, and student disengagement. Engagement is about relationships and is not a single activity. The word engagement is used in many ways outside the field of education and the nature of engagement usually reflects some form of relationship and commitment, as in “engaged” to be married or “engaged” in battle. ”Measuring and understanding student engagement is a challenge for schools and researchers” (Yazzie-Mintz, 2007).

Conclusions from survey data on student engagement indicate that students want to be actively involved in learning and their school community. They want to be vested in the entire school process, from being intellectually challenged to being taken seriously as an individual. The data also indicated gaps in the following levels of engagement:

1. Girls are more engaged in high school than boys;

2. White and Asian students seem to be more engaged than other races,
3. Talented and gifted students seem to be more engaged than students with disabilities, with general and CTE students in the middle of the spectrum, and
4. Students from low socioeconomic backgrounds are less engaged than those from wealthier homes (Yazzie-Mintz, 2007, p. 1).

These gaps require more research, especially surrounding the engagement gap and the achievement gap. Data show that students who are more actively engaged in their school life also give an indication that there is an effect on the level of their achievement (Yazzie-Mintz, 2007).

Beyond the original study, schools can still participate in the HSSSE. The HSSSE can be administered in the fall or the spring. Schools that participate in the HSSSE receive a confidential data report and an overview of critical trends in data. Schools use their data to understand their students' attitudes, thoughts, and beliefs. The schools utilize the data to make adjustments in how they work with and engage their students (Yazzie-Mintz, 2007).

In a study conducted by the National Foundation for Educational Research, (NFER) (2006), to identify common causes of disengagement from learning, the researchers studied the European perspective of different countries' educational systems to see how they reclaimed those disengaged from education and learning. They found that in some countries their practices seem to exacerbate disengagement from school. In other countries where CTE/vocational education was integrated into the curriculum, it was seen as a common influence on disaffection of disengaged students. The countries involved were: Austria, England, Belgium (Flanders), Hungary, the Netherlands, Norway, Spain, Switzerland and Wales (National Foundation for Educational Research, 2006).

The core considerations were that disengagement triggered one of two reactions from students- fight or flight. A fight reaction lead to behavioral problems and a flight reaction lead to truancy problems. Researchers were able to identify three points that administrators need to focus on to tackle disengagement:

1. maintaining and monitoring strategies with a focus on pupil attendance and behavior in school
2. non-curriculum support that focuses on providing direct support for students' emotional, social and/or behavioral needs

3. providing a diverse and differentiated curriculum, offering an alternative learning environment and/or experiences for the disaffected (National Foundation for Educational Research, 2006, p. 1).

During the study, the participants were asked to identify the various dimensions of disengagement. The administrators and educational experts representing the different countries found it useful to consider the division of successful strategies devised by the Netherlands into those that were curative and those that were preventative. Curative approaches focused on routes back into learning (education or work-related learning), both in and out of school, as well as ensuring reliable data at a national level, and enabling appropriate targeting of resources and evaluation of initiatives. Preventative approaches included bridging the gap between vocational and academic education, and strengthening transition stages (National Foundation for Educational Research, 2006).

The educational systems were categorized into two groups: More or less comprehensive or more selective or separated. Also noted was the variation in the length of compulsory attendance policies, which had an impact on disengagement. The longer the students were required to stay in school, the greater the problem of retaining and keeping disengaged students. The compulsory finishing range started at age 16 and ended at age 18 among the countries.

The level of autonomy over the curriculum had an impact. Increased autonomy led to increased segregation and selectivity with low levels of social equity. This in turn could lead to the needs of disengaged students not being adequately met. Autonomy was clearly found to be a policy factor that leads to disengagement. The researchers advised policy makers to stay away from policies that offered levels of selectiveness and autonomy. Students who could not get their first choice in these situations became vulnerable to dropping out.

The influence of CTE appears to impact disengagement. Career and Technical Education seemed to be better received when integrated into countries' overall curriculum. Countries such as Austria, Switzerland, Flanders, and the Netherlands offered a huge range of vocational schools or schools that included CTE for students age 14 and above. England on the other hand suffered a parity of esteem with academic qualifications, which proved to be a common influence on disengagement. In some areas of England CTE was seen as a "rubbish bin" for low achieving students, with poor employment chances, from poor families. Despite CTE courses having an impact on the disengaged, the researcher warns there is a danger to seeing CTE as the whole

solution to disengagement. The researcher states that administrators need to place a greater focus on teaching and learning styles, rather than just providing CTE as an alternative (2006).

The National Foundation for Educational Research researchers reported on insights that influence disengagement in the participating countries, in the areas of: pupil factors, curriculum factors, curriculum strategies, curriculum initiatives, and key ways to tackle disengagement.

Listed below are the key ways to handle disengagement:

1. Develop individualized learning opportunities
2. Ensure interventions that support disengaged students are sustainable
3. Ensure staff have the necessary skills to work with disaffected pupils
4. Have effective communication between outside agencies
5. Allow pupils to determine the pace of their learning
6. Provide effective forms of guidance to ensure students make the right choices
7. Provide pupils with mentors, from inside and outside the education system
8. Secure active parental involvement
9. Ensure students not in school have access to formal accreditation
10. Produce school attendance and behavior policies and promote these to students and parents
11. Adopt ICT registration and first-day absence follow-up systems
12. Re-timetable the school day, for example, to provide a continuous day
13. Provide a system of rewards and sanctions for attendance and behavior
14. Set up a system of peer ‘minders’ or parent pagers to monitor attendance
15. Monitor attendance and behavior to identify trends in disengagement

(National Foundation for Educational Research, 2006, p. 4).

The researcher concluded that school administrators could learn from the different strategies and practices used in the countries in the study. The researcher identified areas in which policy might be affected. The researcher also offered curriculum strategies and curriculum initiatives to improve opportunities for administrators to help disengaged students become re-engaged in the educational process. The researcher found CTE to be a key factor in reducing disaffection – but only if fully integrated into the curriculum and delivered as a mainstream option available to all.

Career and Technical Education was identified as a major source to combat low engagement and meet the educational needs of students (National Foundation for Educational Research, 2006).

Another study related to identifying disengaged students is from Balfanz, Herzog & Mac Iver (2007). Their study, *Preventing Student Disengagement and Keeping Students on the Graduation Path in Urban Middle-Grades Schools: Early Identification and Effective Interventions* (Balfanz, Herzog, & Mac Iver, 2007), was a longitudinal, mixed method study. The study was designed to identify the key indicators of middle school students in danger of becoming disengaged from school and therefore not graduate from high school in the future. The purpose of the study was to utilize the predictors of students who are at risk of becoming disengaged, and develop an intervention plan and a set of strategies that may assist schools in minimizing or re-engaging students back into the educational process. A typology of dropouts identified by the researchers indicated that there are four types of dropouts: quit, disengaged, low achiever, and maladjusted. Quit dropouts were students that were well behaved and had moderate to high commitment to school but fair to poor grades. The disengaged dropouts were students exhibiting average to low behavior problems, a low commitment to school and average grades. Low achiever dropouts had a weak commitment to school, average or low levels of behavior problems and failing grades. Maladjusted dropouts had very high levels of misbehavior coupled with a weak commitment to school and poor grades. The researchers sought to stop the process of student disengagement when only a few of the predictors were in place.

The researchers utilized a longitudinal analyses by following a sampling universe of approximately 13,000 students from 1996-2004. The students attended high-poverty middle-grades schools in Philadelphia. The analyses were to demonstrate how four predictive indicators could be used to identify 60% percent of the students who will not graduate from high school. The four predictors were poor attendance, misbehavior, course failures in sixth grade and status variables that might indicate underlying but unmeasured academic or behavioral outcomes. These status variables included special education status, English as a Second Language status, and being one or more years overage for grade (Balfanz, Herzog, & Mac Iver, 2007).

The study created an individual-level longitudinal dataset using data provided by the School District of Philadelphia. The sample included students enrolled in sixth grade in 1996-97 over an eight-year period through to 2003-04, or one year beyond expected graduation for the study's cohort. The sample was composed of predominantly minority students. Fifty percent

were female. Four percent were English Language Learners, six percent were special education, and nineteen percent were overage for their grade.

A two-pronged test was completed for each subject with each variable to determine its predictive power in determining graduation success. Nine variables analyzed in the study included: end of fifth grade test scores, English courses, behavior mark, suspensions, attendance rates, graduation status, dropout status, demographic variables, and special status. Once the nine variables had been examined, a logistic regression technique was used to establish that each variable had significant and independent predictive power, even after controlling for the other flags and for demographic variables. A survey was also conducted with 2,334 fifth to eighth grade students from six representative high-poverty, high-minority, and middle schools in the Philadelphia school district. The survey used structural equation modeling analyses to interpret survey data.

Conclusions of the study were a list of predictors and early warning signs. The predictors were attendance, behavior, and course failures. Time was also determined to be a factor and each indicator carried different weight and influence depending on the time in which it started to affect the student. Math and English scores were also frequent and persistent predictors of student future success. Student prior grade failures and age also served as a predictor for students who became disengaged. Researchers found through the survey data that academic motivation was highly predictive of good behavior. Math utility was the strongest predictor of student effort, and parent involvement. The researchers also suggested that school divisions and administrators also search for predictors that are specific to their circumstances. The predictors were incorporated into a comprehensive plan for keeping middle grades students on the correct timeline for graduation. The researchers still felt there was a need for future research to be able to develop a quick intervention plan that would allow schools to react without large quantities of yearly data review and record review (Balfanz, Herzog, & Mac Iver, 2007).

The report discussed how schools, districts, and states had better address career and educational planning. Also discussed was how a rigorous academic core and high-quality career and technical studies are essential for student success in the workplace. The study noted that more students would do well in the rigorous academic core if the courses could be grouped with apprenticeships and in-depth study in a high-quality career and technical program during high school. The forums focused on student achievement and it was noted during state forums that

students must have good reasons to finish high school. “Dropping out of high school is not a sudden act. Dropping out of high school is a gradual process of disengagement” (Bottoms & Young, 2008, p 6). The study also examined the timing of when CTE courses are offered and the levels of performance expected from students were a discussion topic during the forums.

Participants attending the forums also helped to organize actions that their state could take to develop or improve student achievement and the various transitions that students often face. The conclusion was that each state has to develop a set of actions needed to avoid a bleak future. Additionally, all shareholders have a shared responsibility for taking the steps to implement these actions, including breaking down many of the traditional barriers that hinder collaboration among the shareholders. The correct actions taken today will develop a prepared workforce able to succeed in a global economy (Bottoms & Young, 2008).

Problems Associated with Low Engagement

Problems associated with low engagement are that young people do not learn or experience the most from their high school educational careers. Unfortunately, some drop out and leave school with little to no productive means of generating an income. That lack of education and training does not provide an advantaged style of living. Researchers continue to study the problems associated with students’ low school engagement.

Bridgeland, Dilulio, and Morison, (2006), discussed in the study, *The Silent Epidemic*, the reasons why students drop out, the efforts that need to be devoted to improving education and keeping students in school. *The Silent Epidemic*, a grounded theory study, gathered data from students who had actually dropped out of high school. The researchers asked dropouts for their points of view as to why they dropped out, what could have been done to motivate them to stay in school, and what factors contributed to them dropping out of school. The research study included a large group set of interviews in which the researcher analyzed the data using open coding to axial coding, and narrowed down to selective coding. The selective coding created a story line or a hypothesis. The notes from the interviews, comments, and references to situations, emotions, and circumstances are all a part of developing that hypothesis which in turn relates to a specific incident leading to a theory.

The primary purpose of this study was to approach the dropout issue from the perspective of former students, a path not considered in past studies. The study utilized a poll methodology consisting of four focus groups. A survey was also conducted with young people between the

ages of 16 to 25 who identified themselves as high school dropouts. The interviews took place in 25 different locations throughout the United States, in large cities, suburbs, and small towns with high dropout rates. In almost half of the 25 locations surveyed, the former students resided in areas in which the schools are considered to have “weak promoting power.” These schools have a difficult time moving students from ninth grade to twelfth grade on time. The researchers did not attempt to obtain a sample of students that represented national demographics as a whole, but the sample did offer reflections from a broad cross-section of the students most affected, the dropouts, themselves.

The factors reported by students in the study are that students were engrossed in circumstances, such as, poor attendance, school boredom, uninspired teachers, unmotivated students, too much freedom, lack of parent awareness, and real life events that got in the way of school. The schools did not have adequate responses to the various circumstances. While the reasons varied, the general categories remain the same whether in an urban, suburban, or rural environment (Bridgeland, Dilulio, & Morison, 2006).

Summary of Research

The review of the literature in this chapter was synthesized and the information yielded six qualities of student engagement. Table 1 indicates the six qualities’ of engagement of students that have appeared in at least two or more of the research studies presented in the literature.

Table 1

Six Qualities of Student Engagement

Quality of engagement	Sources identified in the research & studies on quality of engagement
Positive Conduct and Absence of Disruptive Conduct	Daggett, 2008, Harrison, 2004; National Academy of Sciences, 2003; National Center of School Engagement, 2006; Reschly, & Appleton, 2008; Yazzie-Mintz, 2007
Attendance/ School Attendance and Class Attendance	Daggett, 2008, Harrison, 2004; National Academy of Sciences, 2003; National Center of School Engagement; 2006; Reschly, & Appleton, 2008; Yazzie-Mintz, 2007
Academic Progress/Academic Achievement/Grades/Graduation	Daggett, 2008, Harrison, 2004; National Center of School Engagement, 2006; McMahon, & Portelli, 2004; Reschly, & Appleton, 2008; Yazzie-Mintz, 2007
Social/Feels like a member of the school community	Daggett, 2008, Harrison, 2004; National Academy of Sciences, 2003; National Center of School Engagement, 2006; Reschly, & Appleton, 2008; Yazzie-Mintz, 2007
High Expectations in students' ability to achieve	Daggett, 2008, Harrison, 2004; McMahon, & Portelli, 2004; National Academy of Sciences, 2003; Reschly, & Appleton, 2008
Emotional	National Academy of Sciences, 2003; National Center for School Engagement, 2006; Reschly, & Appleton, 2008; Yazzie-Mintz, 2007

In conclusion, the literature addressed the need to find ways to keep students actively engaged in school. Conclusions included implications for CTE Programs and for students. The tensions in students' career decision-making became more open as they viewed their options for the future and the limits of the specialized program. Students should be allowed to advocate control over their educational career programs to fit their personal goals. The programs studied seemed to have attracted students and increased their interests in a career field and the students worked to be actively involved in their own educational process. The study that addressed dropouts provided an overview of the students' perspectives and the researchers' views on next steps to alert educators, policymakers, and other leaders to what the researchers view as an epidemic. From the study on why students drop out with the information coming directly from the "horse's mouth" to the specific review of a CTE program to the transition from school to work. Each study put value on data collected from students and the experiences of those students to make suggestions on how to improve curriculum and program planning for students.

The researchers did not all go into their studies expecting to find value added from CTE programs. Young adults through CTE programs are protected from the risk of unemployment and unskilled employment and this was considered a benefit to students. Researchers were open to learning from their participants while completing their individual studies. The articles also pushed the reader to reflect on current practices where they are. While reviewing these articles it became clear that studies on the impact of CTE are varied and can be designed many ways. The purpose of this chapter was to review the literature that has relevance to identifying and engaging students. Literature was also reviewed to examine the impact of engaging students through Career and Technical Education (CTE) and industry credentialing, and to provide a basic level of understanding regarding Virginia's Industry Certification Initiative.

Chapter 3

Introduction to Methodology

After reviewing the studies in the literature review, it was determined that the effects of CTE on students' engagement had not been explored from the teachers' perspective. This quantitative study seeks to determine the perceptions of CTE teachers regarding the influence of CTE and industry credentialing on the level of engagement of their students. The researcher will utilize a descriptive research model to study CTE teachers' perceptions of the effectiveness of CTE programs and instruction on student school engagement. This study will provide additional insight to help administrators, parents, and students examine if the various components, industry credentialing and teaching strategies characteristic to CTE are developing a change in student engagement.

Purpose of the Study

The purpose of this study is to determine the perceptions of CTE teachers regarding their programs' influence on the active engagement of their students and whether or not industry credentialing of the students or teachers adds to that influence. The researcher will seek to answer the following research questions:

1. What are CTE teachers' perceptions regarding CTE course influence on the domains of student engagement?
2. What are CTE teachers' perceptions on whether or not industry certification adds to student engagement?
3. What are the differences between the perceptions of industry certified and non-industry certified CTE teachers regarding their programs as a means to increase student engagement?
4. What do CTE teachers say about changes that occur in students' academic and social engagement when the students are enrolled in CTE courses?

Research Design

The design of this study is quantitative in nature. The researcher utilized a survey research design (Pedhazur & Schmelkin, 1991). The study sought to determine the perceptions of CTE teachers and their views on the influence of CTE programs and industry credentialing on student engagement. The study compared the perceptions of CTE teachers who are industry

certified to those who are not industry certified. CTE teachers' perceptions were analyzed for their perceived influences of CTE programs and perceived differences on student engagement when industry credentials are offered to students. The researcher hoped to gather data providing an understanding of CTE teachers' perceptions of the effect of CTE programs and industry credentialing on student engagement.

Specific statistical tests were used to analyze the survey data for relevance to the hypothesis. The descriptive statistics were summarized. Secondly, the researcher verified the reliability of the data and calculated the response rate. A 1 x 3 ANOVA and Post hoc analyses using the Bonferroni post hoc criterion for significance were utilized as needed to measure the difference in variables being used to measure student engagement domains (SPSS Tutorial, 2008). A 1 x 3 ANOVA was run utilizing industry certification (the independent variable) and all of the student engagement domain questions that addressed the six student engagement domains (the dependent variables) as needed.

Research Context

This study took place in five central Virginia, public school divisions in the Commonwealth of Virginia. The five participating school divisions were not identified to preserve confidentiality. One division was urban, two were suburban and two were rural. The high schools in the five divisions had traditional CTE programs in their buildings and they also participated in division technical center programs or in regional technical center programs. Collectively the suburban school divisions represented 13 high schools, the rural divisions represented two high schools, and the urban school division represented eight high schools. (VDOE, 2010)

Population

The study sample consisted of high school CTE teachers, located in five school divisions. The population of the CTE teacher survey participants was diverse, so the demographics of the group were a part of the descriptive data that were collected through the survey.

Instrumentation

The researcher developed the survey being used for this study. The following steps were taken during the process of developing the survey:

1. The survey developed from the literature review based on the qualities of student engagement that were identified in the literature.
2. The survey questions were matched back to the language in the literature for each question.
3. The survey was edited for grammar and punctuation.
4. The survey was reviewed by a small group of retired CTE teachers
5. The survey questions were scrambled and a sample group matched the questions back to the quality of student engagement. Some questions were re-worded and some were eliminated.
6. The survey was edited again for grammar and punctuation.
7. The survey was given to a sample group to complete. During this session the survey was also timed to see how long it would take to complete.
8. The survey was distributed by the participating school divisions to the CTE high school teachers.

SPSS Graduate Pack 16.0 statistical software package was used for data analysis related to this study.

Procedures

For this study, the researcher requested and received approval from the appropriate resources. The researcher completed: an IRB Proposal Request Application from the researcher's sponsoring institution, the urban school division's External Research and Evaluation Projects Proposal, the two suburban school divisions' External Research Project Proposals, and letters to the Superintendents of the two rural school divisions. Additionally, the researcher gained approval from all persons participating in the study, and met all confidentiality requirements. The researcher sought and received permission to conduct the study within the five school divisions. The researcher maintained confidentiality of all teacher data. Teacher data located on the Internet survey database will be deleted one year after the researcher's defense examination. All other data will be destroyed one year after the researcher's defense examination. Documents containing research data will be maintained in a locked file desk drawer prior to complete liquidation of all research data. All five school divisions will be provided summary data from this study.

The survey for this study was administered through the Internet-based program Survey.vt.edu. Survey.vt.edu allowed the researcher to administer the survey via e-mail. Survey.vt.edu was selected because this program has the ability to meet the researcher's needs for this study (www.survey.vt.edu, 2009). Paper and pencil forms were provided upon request and the researcher recorded the responses on line. This quantitative survey study gathered CTE teachers' perceptions. The researcher reviewed and analyzed the survey data from the CTE teachers and examined the teachers' perceptions.

Descriptive frequencies distribution tests were conducted to examine survey distributions. These survey distributions were also used to identify industry certified and non-industry certified teachers. The researcher employed descriptive statistical tests for the significance of the difference between the survey domains, which reflect the six qualities of student engagement. A comparison analysis was used to answer selected research questions; the researcher employed an ANOVA 1x3 to determine the differences among the teachers of CTE with industry certification, those without industry certification and those seeking industry certification and their programs as a means to increase student engagement. With three levels to compare, an ANOVA is one of the most widely used statistical test. The ANOVA is straightforward, easy to use, and adaptable to many situations. The ANOVA answers the basic question of if the three variables are related. If one level is altered, will there be a difference in the others? A difference was determined based on a significance level of $p < .05$. (Lowry, 1999, The Survey System's Tutorial, 2008).

After the surveys were completed, the two open ended questions' raw data were transcribed into notes. The researcher read the notes from the survey participants' comments. Those notes were condensed into a useful format and a brief summary was developed. Once again, the researcher continued to read the notes and completed a frequency analysis of how many times words were referenced. Clear observations drew links between the research statement and the raw data. The inductive coding resulted in a theory or a hypothesis. When coding the researcher established categories: label for category with word or short phrases, focus on descriptions, create a hierarchy, and build a theory/hypothesis. The researcher reviewed the multiple views and drew conclusions.

Data Analysis

The statistical software package used for data analysis related to this study was SPSS Graduate Pack 16.0. The theoretical reasoning behind this software is that it is a comprehensive

system for analyzing data. It can take data from almost any type of file and use it to generate tabulated reports, charts, and plots of distribution and trends, descriptive statistics and complex statistical analyses (SPSS Inc., 2007). This statistical software package has the ability to meet the researcher's needs for this study

Assessment tools to determine the engagement levels of students were developed from the previously identified engagement studies and research that are identified in Table 1. In order to analyze effectively the data, SPSS was utilized to run statistical test and create tables, charts, and graphs.

A frequencies distribution was run to gain a general understanding of the data. The distribution is a summary of the frequency of individual values of ranges of values for a variable. The frequency distribution is one of the most common ways to describe a single variable (Trochim, 2006).

The researcher completed an ANOVA to assess whether or not there was a difference in the studied student engagement domains. The ANOVA assesses whether the means of three groups are statistically different from each other. The analysis compares the means of three groups by showing the distributions for the treated group and the control group in a study (Trochim, 2006). The researcher sought to observe a difference at a significance level of $p < .05$. Observed differences could indicate to others that CTE can make a change in disengaged students' educational experiences.

Limitations

A limitation of this study was the period that the researcher was allowed to administer the survey to high school CTE teachers by each of the school divisions. The rural and urban school division allowed the researcher to complete the study during the months of March and April with selected blackout periods. The suburban schools divisions both had policies that blocked external research during this period prior to the administration of the Virginia Standards of Learning. The researcher had limited assesses to the CTE teachers in June, with the survey being administered to the teachers during the last week of school

Delimitations

A delimitation of this study was that it examined five school divisions in the Commonwealth of Virginia, one urban, two suburban and two rural school divisions. The

teachers in the study were a self-selected volunteer sample. The teacher sample elected to teach CTE and the sample elected to participate in the survey. The teacher sample also had control over which questions on the survey they wanted to answer.

Summary of the Methodology

The researcher conducted a quantitative, descriptive statistical study mixed with a qualitative review of two open ended questions included on the survey. It involved gathering data from five schools divisions. The study reported frequencies, averages, and percentages for the perceptions and attitudes of CTE high school teachers toward student engagement and industry certification. The school divisions represented three settings: urban, suburban, and rural. The data were gathered by utilizing a survey, (see Appendix A) which obtained the views and perceptions of high school CTE teachers. The data were analyzed and the findings were developed into meaningful conclusions. The data are reported in Chapter 4. Conclusions and recommendations are shared in Chapter 5.

Chapter 4

Results

Introduction of Findings

This chapter presents and examines the research findings for this study. The researcher utilized a descriptive research model and developed a survey in order to study CTE teachers' perceptions of the effectiveness of CTE programs and instruction on student school engagement. The survey administered during this study aligned six domains of student engagement identified throughout the review of the literature. The six domains are: positive conduct and absence of disruptive conduct, attendance, academic achievement and grades, social/feels like a member of the school, high expectations in students' ability to achieve, and emotional development (Daggett, 2008, Harrison, 2004; National Academy of Sciences, 2003; National Center of School Engagement, 2006; Reschly, & Appleton, 2008; Yazzie-Mintz, 2007). Demographic information concerning the population is also presented. This study provides additional insight to help administrators, parents, and students examine if the various components and teaching strategies, characteristic to CTE, are developing a change in student engagement across the six domains of student engagement.

Problem Statement

The purpose was to determine the perceptions of CTE teachers regarding their programs influence on the level of engagement of their students and whether or not industry credentialing of the students or teacher adds to that influence. This chapter is organized in terms of the four specific research questions posed by the researcher. It first reports the CTE teachers' perceptions regarding their influence on the levels of student engagement, and whether or not industry credentialing adds to that influence, and their progress towards completing high school. Secondly, it reports the CTE teachers' views of their programs as a means to create a difference in student engagement. Thirdly, it reports the differences between the perceptions of teachers of CTE with industry certification and those without industry certification on their perceptions of their programs as a means to increase student engagement. Lastly, the chapter reports the changes CTE teachers perceive occur in students' academic and social engagement when the students are enrolled in CTE courses.

During the data gathering process for this study the researcher was limited by time windows in which the survey could be given in each school division. As a result, the data were collected in the urban and rural school divisions before the Virginia Standards of Learning (SOL) Spring Assessment window. The data were collected in the suburban school divisions after the SOL Assessment window. Letters inviting CTE teachers to participate in the study were distributed by officials in each school division. When participation seemed to be moving moderately to slowly the school division officials sent the letter again to the potential study participants. When allowed and warranted, the researcher made phone calls to building level administrators to assist in the collection of data. This chapter compiles all of the data collected from 134 CTE teachers spread across the five school divisions. The chapter is divided into five sections, which will report demographic data, and the findings of research questions one through four.

Demographics for Survey Respondents

The population participants in this study were the CTE high school teachers from five different school divisions. The population and sample were created from the five school divisions, which represented rural, urban and suburban areas. Among the five school divisions, approximately two hundred teachers were given the opportunity to complete the survey. A total of 134 teachers responded to the survey. Tables 2 through 12 provide an overview of the demographic data on the study participants.

Table 2 shows the frequency in which various CTE programs are represented in the study. The top five CTE programs represented were: Business Education, 20, (15.9%), Marketing Education, 20, (15.9%), Business and Information Technology, 17, (13.5%), Family and Consumer Science, 10, (7.9%), and Health Care/Nursing, 9, (7.1%).

Table 2

Frequency of CTE instructional area(s) of respondents in descending rank order (n=126)

	N	%
Business Education	20	15.9%
Marketing Education	20	15.9%
Business and Information Technology	17	13.5%
Family and Consumer Sciences	10	7.9%
Health Care/Nursing	9	7.1%
Agriculture	7	5.6%
Automotive Service Technology	4	3.2%
Computer Science	4	3.2%
Culinary Arts	4	3.2%
Industrial Technology	4	3.2%
Cosmetology	3	2.4%
Career Education/Investigations	2	1.6%
Drafting	2	1.6%
Engineering	2	1.6%
Sports Medicine	2	1.6%
Workplace Readiness/Prevocational skills	2	1.6%
Communications Technology	1	0.8%
Computer Repair	1	0.8%
Construction	1	0.8%
Dental Laboratory Technology	1	0.8%
Education	1	0.8%
Electricity	1	0.8%
Electronics	1	0.8%
Horticulture	1	0.8%
Manufacturing	1	0.8%
Masonry	1	0.8%
Navel Science (NJROTC)	1	0.8%
Optician (Allied Health Dept.)	1	0.8%
Pharmacy Technician	1	0.8%
Welding	1	0.8%

**8 participants did not respond to the question.*

Tables 3 and 4 show frequency of the number of years CTE teachers have taught (Table 3) and the number of years CTE teachers have worked in the field (Table 4). When examining the teachers' years of experience a Table 3 shows the range most represented was 13 or more

years, 45, (34.4%), of experience in the classroom. This group, 13 or more years, 68, (51.5%), was also most represented in the number of years worked in the trade area (Table 4).

Table 3

Frequency of the number of years of CTE teaching experience in descending rank order (n=131)

	n	%
13 or more years	45	34.4%
4-7 years	34	26.0%
8-12 years	29	22.1%
0-3 years	23	17.6%

**3 participants did not respond to the question.*

Table 4

Frequency of the number of years worked in the trade area in descending rank order (n=132)

	n	%
13 or more years	68	51.5%
0-3 years	23	17.4%
8-12 years	22	16.7%
4-7 years	19	14.4%

**2 participants did not respond to the question.*

Participants' levels of education are shown in Table 5. CTE teachers with a Masters degree, 53 (39.6%), and those with a Bachelors, 52 (38.8%) made up most of the study participants. Education was in multiple levels, including some teachers whose highest level of education was a high school diploma, 10, (7.5%).

Table 5

Frequency of the highest level of education in descending rank order (n=134)

	n	%
Masters	53	39.6%
Bachelors	52	38.8%
Advanced certificate/Degree	13	9.7%
High school	10	7.5%
Associates	6	4.5%

Table 6 shows the frequency of teacher industry certification. Participants that are industry certified, 85, (63.4%), made up the largest group. Teachers working toward industry certification were 13, (9.7%).

Table 6

Frequency of industry certified/industry licenses in descending rank order (n=134)

	n	%
Yes	85	63.4%
No	36	26.9%
Working Towards	13	9.7%

Table 7 provides insight into the reasons why some teachers are not industry certified 36, (26.9%). Those who were not industry certified provided the following three reasons shown in Table 7: other, 17, (34.7%), industry certification not available in their content area/trade, 14(28.6%), and have not completed industry assessment, 8 (16.3%).

Table 7

Frequency of why the participant is not industry certified/industry licensed (n=49)

	Working towards (n=13)		No (n=36)	
	n	%	n	%
Financial costs	2	15.4%	3	8.3%
Have not completed industry assessment	5	38.5%	3	8.3%
Not available in my content area/or trade area	0	0.0%	13	36.1%
Need additional training	5	38.5%	0	0.0%
Other	1	7.7%	17	47.2%

Table 8 shows the frequency of students being taught at the time by the participants in the study. The case load of 51-above student had the largest response, 78, (59.1%).

Table 8

Frequency of students currently taught in 2009-2010 in descending rank order (n=132)

	n
51-above	78
0-25 students	28
26-50 students	26

**2 participants did not respond to the question.*

Table 9 shows the range of numbers of students in the participants' classes receiving industry certification or licenses. The numbers varied; the most frequent response was zero, 44, (40.0%), the second highest response was, not applicable to the class taught, 20, (18.2%). When the CTE teacher did have industry certified or licenses completed the answer most frequently selected was 1-4 students, 15, (13.6%), followed by 5-9 students, 9, (8.2%), and 10-14 students, 8, (7.3%).

Table 9

Frequency of certified or licensed completers from 2008-2009 in descending rank order (n=110)

	n
0	44
Not applicable to the class taught	20
1-4	15
5-9	9
10-14	8
20-50	7
Do not know	4
15-19	2
More than 50	1

**24 participants did not respond to the question.*

Table 10 shows the number of overall program completers that participants had at the end of the year. 1-10 students, 23, (22.5%) was selected most frequently, followed by zero, 21, (20.6%).

Table 10

Number of overall completers from 2008-2009 in descending rank order (n=102)

	n
1-10	23
0	21
11-20	16
Not applicable to the class taught	13
31-40	10
Do not know	7
21-30	5
41-50	4
More than 50	3

**32 participants did not respond to the question.*

Table 11 and Table 12 offer some insight into the frequency in which the participants are active in the course content's industry, via industry awards and professional organizations.

Table 11 shows the number of industry awards gained over the last five years. The most frequent answer was zero, 64, (49.6%), followed by 1-3 industry awards, 40, (31.0%).

Table 11

Frequency of professional industry awards over the last five years in descending rank order (n=129)

	n
0	64
1-3	40
4-7	19
13 or more	3
8-12	3

**5 participants did not respond to the question.*

Table 12 provides insight into participants involvement in their course content's industry professional organizations. Participants' involvements were high, 86, (66.2%).

Table 12

Frequency of membership in the specific industry's professional organization (n=130)

	n	%
Yes	86	66.2%
No	44	33.8%

**4 participants did not respond to the question.*

The Influence on the Levels of Student Engagement

A comparison analysis was used to answer the research question, what are CTE teachers' perceptions regarding their influence on the levels of student engagement, and whether or not industry credentialing adds to that influence and their progress towards completing high school? Tables 13 through 18 show the response to each survey question broken down by the six student engagement domains. The six qualities' of engagement of students appeared in at least two or more of the research studies presented in the literature.

CTE teachers that participated in the survey expressed how they felt about the six domains of student engagement; Tables 13-18 show that in the overall domain scores most teachers agree that the domains increased student engagement. Table 13 reflects the data on the student engagement domain, Positive conduct and absence of disruptive conduct. Teachers strongly agree, 78, (58.2%) or agree, 48 (35.8%) that students participating in direct hands on learning were less likely to be disruptive. Teachers also agree, 83 (61.9%) or strongly agree, 43 (32.1%) that students demonstrate their problem solving skills. Regarding students being involved in activities that contribute to leadership, 85 (63.4%) agree, and 43 (32.1%) strongly agree. Overall, 94.5% of the responses were positive in this domain.

Table 14, examines the student engagement domain of attendance and the relationship to school attendance, and class attendance. Teachers strongly agreed and agreed, 84.4% overall that CTE influenced student attendance. They also strongly agreed or agreed that collaborative classroom instructional methods, 86.6%, and technology incorporated instruction, 94.7%, encourages students towards regular classroom attendance, participation and involvement.

Table 13

Responses to the domain- Positive Conduct and Absence of Disruptive Conduct

9	Strongly Agree		Agree		Disagree		Strongly Disagree		No Response	
	n	%	n	%	n	%	n	%	n	%
When engaging my students in direct hands on learning they are less likely to be disruptive										
	78	58.2%	48	35.8%	6	4.5%	1	0.7%	1	0.7%
Through the team approach my students demonstrate their problem solving skills and resolve differences										
	43	32.1%	83	61.9%	5	3.7%	1	0.7%	2	1.5%
My students engage in activities that both create and challenge necessary leadership and social skills while maintaining classroom control										
	43	32.1%	85	63.4%	3	2.2%	2	1.5%	1	0.7%
Overall Domain Score										
	40.8%		53.7%		3.5%		1.0%		1.0%	

Table 14

Responses to the domain- Attendance/School Attendance and Class Attendance

	Strongly Agree		Agree		Disagree		Strongly Disagree		No Response	
	n	%	n	%	n	%	n	%	n	%
My students can relate to the parallel between regular school attendance and the job performance										
	24	17.9%	72	53.7%	31	23.1%	5	3.7%	2	1.5%
Collaborative classroom instructional methods encourage my students towards regular school and class attendance										
	32	23.9%	84	62.7%	13	9.7%	2	1.5%	3	2.2%
Technology incorporated instruction encourages my students towards regular classroom participation and involvement										
	44	32.8%	83	61.9%	5	3.7%	1	0.7%	1	0.7%
Overall Domain Score										
	24.9%		59.5%		12.2%		2.0%		1/5%	

Table 15 shows responses to questions on the student engagement domain, academic progress, academic achievement, grades and graduation. Most participants, 73, (54.5%) strongly agree or agree, 45, (33.6%) that CTE instruction was different from other classes.

The majority of the teachers responded that they agreed or strongly agreed on each response in this domain. However, the lowest number of positive responses was on the question regarding continued engagement when given the opportunity for industry certification but not successful.

Table 16, shows study participants' responses to the student engagement domain social/feels like a member of the school community. Teachers responding to the student engagement domain high expectations in students' ability to achieve, overwhelmingly strongly agreed, 62, (46.2%) and agreed, 61, (45.5%) that higher education opportunities are introduced in CTE career pathways that lead to training, technical development, and post-secondary degrees. Overall, they agreed 59.5% or strongly agreed, 31.3% that students desire to feel like a member of the school community.

Table 15

Response to the domain-Academic Progress/Academic Achievement/Grades/Graduation

	Strongly Agree		Agree		Disagree		Strongly Disagree		No Response	
	n	%	n	%	n	%	n	%	n	%
CTE students are encouraged to explore the benefits of dual enrollment and the rigors required to obtain college credit	30	22.4%	72	53.7%	25	18.7%	2	1.5%	5	3.7%
CTE instruction differs from other classes	73	54.5%	45	33.6%	11	8.2%	1	0.7%	4	3.0%
Industry certification/licensing serves as a motivational force for student achievement	25	18.7%	78	58.2%	23	17.2%	4	3.0%	4	3.0%
Industry certification/licensing align student career pathways with training, credentialing and degrees	41	30.6%	71	53.0%	16	11.9%	2	1.5%	4	3.0%
The graduates of my CTE program are successful in gaining college acceptance	35	26.1%	81	60.4%	10	7.5%	2	1.5%	6	4.5%
Preparing for industry/certification licensing assessments increases student engagement	28	20.9%	71	53.0%	29	21.6%	1	0.7%	5	3.7%
The enthusiasm gained from the learning activities in my class encourages students' academic achievement	49	36.6%	79	59.0%	3	2.2%	1	0.7%	2	1.5%
When my students are given the opportunity to obtain industry certification/licensing and are successful, they showed increased engagement in class	28	20.9%	68	50.7%	21	15.7%	3	2.2%	14	10.4%
When my students are given the opportunity to obtain industry certification/licensing but are not successful they continued to show increased engagement in class	9	6.7%	68	50.7%	39	29.1%	3	2.2%	15	11.2%
Overall Domain Score		26.4%		52.5%		14.7%		1.6%		4.9%

Table 16

Responses to the domain- Social/Feels like a member of the school community

	Strongly Agree		Agree		Disagree		Strongly Disagree		No Response	
	n	%	n	%	n	%	n	%	3	2.2%
CTE co-curricular organizations provide a unifying force for instruction	46	34.3%	76	56.7%	9	6.7%	0	0.0%	3	2.2%
My students share opportunities to combine school and community, through social and service projects	35	26.1%	82	61.2%	12	9.0%	2	1.5%	1	0.7%
My students enjoy classroom endeavors that bring school-wide recognition	45	33.6%	81	60.4%	5	3.7%	2	1.5%	7	1.7%
Overall Domain Score	31.3%		59.5%		6.5%		1.0%		2.2%	

Table 17, indicates that CTE teachers strongly agreed 64, (47.8%) that students are able to see how the class work they complete has practical application and direct career relevance. Overall, the study participants agreed, 45.5%, and strongly agreed, 45.0% that high expectations influenced CTE student engagement.

Table 18 shows teachers' responses to the student engagement domain of emotional needs. Teachers indicated that they strongly agreed, 83, (61.9%) or agreed, 48 (35.8%) on students gaining enhanced confidence and self esteem through the skills learned in CTE courses and that improved self esteem and confidence improved their overall outlook and behaviors. Teachers agreed, 83, (61.9%) or strongly agreed. 26 (19.4%) that displaying CTE teacher industry credentials added value and motivated students. They also agreed, 69, (17.2%) that CTE programs are a means to reach disengaged students. Overall, the teachers agreed, 405, (50.4%) that the emotional needs domain influenced student engagement.

Table 17

Response to the domain- High Expectations in students' ability to achieve

	Strongly Agree		Agree		Disagree		Strongly Disagree		No Response	
	n	%	n	%	n	%	n	%	n	%
Higher education opportunities are introduced in CTE career pathways that lead to training, technical development, and post-secondary degrees	62	46.3%	61	45.5%	7	5.2%	2	1.5%	2	1.5%
My students participate in engagement activities that display skill development levels through work-based learning experiences, co-op work experiences, competitions, internships, and industry certification	55	41.0%	63	47.0%	10	7.5%	2	1.5%	4	3.0%
My students see how the class work they complete has practical application and direct career relevance	64	47.8%	59	44.0%	7	5.2%	0	0.0%	4	3.0%
Overall Domain Score		45.0%		45.5%		6.0%		1.0%		2.5%

Table 18

Responses to the domain- Emotional

	Strongly Agree		Agree		Disagree		Strongly Disagree		No Response	
	n	%	n	%	n	%	n	%	n	%
Enhanced confidence and self esteem is gained through skills learned in my CTE courses, improves overall outlook and student behaviors	83	61.9%	48	35.8%	2	1.5%	0	0.0%	1	0.7%
My students enjoy emotional support from being involved in a class that rewards and recognizes participation	63	47.0%	65	48.5%	3	2.2%	1	0.7%	2	1.5%
Displayed CTE teacher industry credentials certificates (certificates, licenses) adds value and motivates CTE students	26	19.4%	83	61.9%	22	16.4%	0	0.0%	3	2.2%
Emotional needs/satisfaction is enhanced through CTE instruction and classroom participation	44	32.8%	75	56.0%	12	9.0%	0	0.0%	3	2.2%
My students value the awards, rewards and recognition that come from co-curricular competitive events	53	39.6%	65	48.5%	10	7.5%	2	1.5%	4	3.0%
My program is a means to reach disengaged students	39	29.1%	69	51.5%	18	13.4%	6	4.5%	2	1.5%
Overall Domain Score		38.3%		50.4%		8.3%		1.1%		1.9%

Perceptions on Whether or Not Industry Credentialing Adds to Student Engagement

A comparison analysis was used to answer the research question, what are CTE teachers' perceptions on whether or not industry credentialing adds to student engagement? Questions 22, 24, 27, 28, 32, 36, and 37 reached across the student engagement domains and were linked together to examine teachers' perceptions pertaining to industry credentialing and student achievement. Each question asks something specifically about industry certification in its content.

Table 19 shows CTE teachers' views on industry certification. The descriptive data in this table are drawn from survey questions that focus on the student engagement domains and industry certification. Teachers agreed, 78, (58.2%), that industry certification served as a

motivational force for student achievement. They overwhelmingly, strongly agreed, 55, (41.0%) and agreed 63, (47.0%) that student participate in engagement activities that display skill development levels with industry certification being one of those activities. They also agreed, 71, (53.0%) that preparing for industry certification or licensing assessment increases student engagement. Teachers also felt that when given the opportunity to obtain industry certification or licensing they agreed whether successful, 68, (50.7%) or unsuccessful, 68, (50.7%), that students showed increased engagement in class. Overall, CTE teachers agreed, 502, (53.5%) that having industry certification adds value to their programs and student engagement.

Table 19

Responses to questions pertaining to industry credentialing and student achievement (n=134)

<hr/>				
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Displayed CTE teacher industry credentials certificates (certificates, licenses) adds value and motivates CTE students				
Strongly Agree	19	22.4%	7	14.3%
Agree	53	62.4%	30	61.2%
Disagree	11	12.9%	11	22.4%
Strongly Disagree	0	0.0%	0	0.0%
No response	2	2.4%	1	2.0%
<hr/>				
Industry certification/licensing serves as a motivational force for student achievement				
Strongly Agree	18	21.2%	7	14.3%
Agree	46	54.1%	32	65.3%
Disagree	15	17.6%	8	16.3%
Strongly Disagree	4	4.7%	0	0.0%
No response	2	2.4%	2	4.1%
<hr/>				
Industry certification/licensing align student career pathways with training, credentialing and degrees				
Strongly Agree	28	32.9%	13	26.5%
Agree	42	49.4%	29	59.2%
Disagree	11	12.9%	5	10.2%
Strongly Disagree	2	2.4%	0	0.0%
No response	2	2.4%	2	4.1%
<hr/>				

(Table continued)

Table 19 (continued)

	Industry Certified (n=85)		Non- Industry Certified (n=49)	
	n	%	n	%
My students participate in engagement activities that display skill development levels through work-based learning experiences, co-op work experiences, competitions, internships, and industry certification				
Strongly Agree	42	49.4%	13	26.5%
Agree	36	42.4%	27	55.1%
Disagree	2	2.4%	8	16.3%
Strongly Disagree	1	1.2%	1	2.0%
No response	4	4.7%	0	0.0%
Preparing for industry certification/licensing assessments increases student engagement				
Strongly Agree	22	25.9%	6	12.2%
Agree	39	45.9%	32	65.3%
Disagree	22	25.9%	7	14.3%
Strongly Disagree	1	1.2%	0	0.0%
No response	1	1.2%	4	8.2%
When my students are given the opportunity to obtain industry certification/licensing and are successful, they showed increased engagement in class				
Strongly Agree	19	22.4%	9	18.4%
Agree	42	49.4%	26	53.1%
Disagree	13	15.3%	8	16.3%
Strongly Disagree	3	3.5%	0	0.0%
No response	8	9.4%	6	12.2%
When my students are given the opportunity to obtain industry certification/licensing but are not successful they continued to show increased engagement in class				
Strongly Agree	4	4.7%	5	10.2%
Agree	45	52.9%	23	46.9%
Disagree	25	29.4%	14	28.6%
Strongly Disagree	2	2.4%	1	2.0%
No response	9	10.6%	6	12.2%
Overall Domain				
Strongly Agree		25.5%		17.5%
Agree		50.9%		58.0%
Disagree		16.6%		17.8%
Strongly Disagree		2.2%		0.6%
No response		4.7%		6.1%

The Differences Among CTE Teachers With Industry Certification and Those Without Industry Certification And Their Perceptions of Their Programs

A comparison analysis was used to answer the research question, "what are the differences between industry certified and non-industry certified CTE teachers on their perceptions of their programs as a means to increase student engagement? Tables 20-29 are the data demographic results categorized for teacher certification status and frequencies.

Table 20 shows the frequency of CTE instructional areas of respondents by industry certification status.

Table 20

Frequency of CTE instructional area(s) of respondents by industry certification status (n=126)

	Working towards (n=13)		No (n=36)		Yes (n=85)	
	n	%	n	%	n	%
Agriculture	0	0.0%	0	0.0%	7	8.2%
Automotive Service Technology	1	7.7%	0	0.0%	3	3.5%
Business and Information Technology	2	15.4%	4	11.1%	11	12.9%
Business Education	2	15.4%	4	11.1%	14	16.5%
Career Education/Investigations	0	0.0%	2	5.6%	0	0.0%
Communications Technology	0	0.0%	1	2.8%	0	0.0%
Computer Repair	1	7.7%	0	0.0%	0	0.0%
Computer Science	0	0.0%	4	11.1%	0	0.0%
Construction	0	0.0%	0	0.0%	1	1.2%
Cosmetology	0	0.0%	0	0.0%	3	3.5%
Culinary Arts	0	0.0%	2	5.6%	2	2.4%
Dental Laboratory Technology	0	0.0%	0	0.0%	1	1.2%
Drafting	0	0.0%	1	2.8%	1	1.2%
Education	0	0.0%	1	2.8%	0	0.0%
Electricity	0	0.0%	0	0.0%	1	1.2%
Electronics	0	0.0%	0	0.0%	1	1.2%
Engineering	0	0.0%	2	5.6%	0	0.0%
Family and Consumer Sciences	3	23.1%	6	16.7%	1	1.2%
Health Care/Nursing	0	0.0%	0	0.0%	9	10.6%
Horticulture	0	0.0%	0	0.0%	1	1.2%

(Table continued)

Table 20 (continued)

	Working towards (n=13)		No (n=36)		Yes (n=85)	
	n	%	n	%	n	%
Industrial Technology	0	0.0%	1	2.8%	3	3.5%
Manufacturing	0	0.0%	1	2.8%	0	0.0%
Marketing Education	1	7.7%	4	11.1%	15	17.6%
Masonry	0	0.0%	1	2.8%	0	0.0%
Navel Science (NJROTC)	0	0.0%	0	0.0%	1	1.2%
Optician (Allied Health Dept.)	0	0.0%	0	0.0%	1	1.2%
Pharmacy Technician	0	0.0%	0	0.0%	1	1.2%
Sports Medicine	0	0.0%	0	0.0%	2	2.4%
Welding	0	0.0%	0	0.0%	1	1.2%
Workplace Readiness/Prevocational skills	0	0.0%	2	5.6%	0	0.0%

**8 participants did not respond to the question.*

Table 21 shows the frequency of the number of years of CTE teaching experience. The group of teachers working toward certification was represented similarly in each of the groups except 8-12 years, where none were represented. The group without certification was most represented in the 13 or more years group as was the certification group.

Table 21

Frequency of the number of years of CTE teaching experience (n=131)

	Working towards (n=13)		No (n=36)		Yes (n=85)	
	n	%	n	%	n	%
0-3 years	4	30.8%	9	25.0%	10	11.8%
13 or more years	5	38.5%	13	36.1%	27	31.8%
4-7 years	4	30.8%	7	19.4%	23	27.1%
8-12 years	0	0.0%	6	16.7%	23	27.1%

**3 participants did not respond to the question.*

Table 22 reports the frequency of the number of years worked in the trade area. More teachers, regardless of their certification status were represented in the 13 or more years experience range.

Table 22

Frequency of the number of years worked in the trade area (n=132)

	Working towards (n=13)		No (n=36)		Yes (n=85)	
	n	%	n	%	n	%
0-3 years	3	23.1%	11	30.6%	9	10.6%
13 or more years	6	46.2%	15	41.7%	47	55.3%
4-7 years	3	23.1%	4	11.1%	12	14.1%
8-12 years	1	7.7%	5	13.9%	16	18.8%

**2 participants did not respond to the question.*

Table 23 is the frequency of the highest level of education. For those working toward or without certification, the most represented level was Bachelors, followed by Masters. The reverse is true for those with certification.

Table 23

Frequency of the highest level of education (n=134)

	Working towards (n=13)		No (n=36)		Yes (n=85)	
	n	%	n	%	n	%
Advanced certificate/Degree	1	7.7%	5	13.9%	7	8.2%
Associates	0	0.0%	1	2.8%	5	5.9%
Bachelors	6	46.2%	19	52.8%	27	31.8%
High school	1	7.7%	0	0.0%	9	10.6%
Masters	5	38.5%	11	30.6%	37	43.5%

Table 24 shows the frequency of why the participant is not industry certified or licensed. As might be expected, those working toward certification indicated either they had not completed the assessment or they needed additional training. Those without industry certification indicated that it was either not available or other.

Table 24

Frequency of why the participant is not industry certified/industry licensed (n=49)

	Working towards (n=13)		No (n=36)		Yes (n=85)	
	n	%	n	%	n	%
	Financial costs	2	15.4%	3	8.3%	0
Have not completed industry assessment	5	38.5%	3	8.3%	0	0.0%
Not available in my content area/or trade area	0	0.0%	13	36.1%	1	1.2%
Need additional training	5	38.5%	0	0.0%	0	0.0%
Other	1	7.7%	17	47.2%	3	3.5%

Table 25 reports the frequency of students taught in descending rank order. The majority of the respondent teachers taught 51 or more students.

Table 25

Frequency of students currently taught in 2009-2010 in descending rank order (n=132)

	Working towards (n=13)		No (n=36)		Yes (n=85)	
	N	%	n	%	n	%
	0-25 students	4	30.8%	4	11.1%	20
26-50 students	0	0.0%	7	19.4%	19	22.4%
51-above	9	69.2%	23	63.9%	46	54.1%

**2 participants did not respond to the question.*

Table 26 shows the frequency of certified or licensed completers. The respondents without certification and those working toward certification reported most frequently that there were no certification or licensed completers or the designation was not applicable to their class. Industry certified teachers most frequently had no certified or licensed completers followed by 1-4.

Table 26

Frequency of certified or licensed completers from 2008-2009 (n=110)

	Working towards (n=13)		No (n=36)		Yes (n=85)	
	n	%	n	%	n	%
0	4	30.8%	14	38.9%	26	30.6%
1-4	1	7.7%	0	0.0%	14	16.5%
5-9	1	7.7%	0	0.0%	8	9.4%
10-14	1	7.7%	1	2.8%	6	7.1%
15-19	0	0.0%	0	0.0%	2	2.4%
20-50	0	0.0%	0	0.0%	7	8.2%
More than 50	0	0.0%	0	0.0%	1	1.2%
Not applicable to the class taught	3	23.1%	10	27.8%	7	8.2%
Do not know	0	0.0%	1	2.8%	3	3.5%

**24 participants did not respond to the question.*

Table 27 shows the number of overall completers. The most frequent response for teacher working toward industry certification was 0. The most frequent response for non industry certified teachers was not applicable. The most frequent response for industry certified teachers was 1-10.

Table 27

Number of overall completers from 2008-2009 (n=102)

	Working towards (n=13)		No (n=36)		Yes (n=85)	
	n	%	N	%	n	%
0	4	30.8%	6	16.7%	11	12.9%
1-10	2	15.4%	3	8.3%	18	21.2%
11-20	0	0.0%	1	2.8%	15	17.6%
21-30	1	7.7%	0	0.0%	4	4.7%
31-40	0	0.0%	3	8.3%	7	8.2%
41-50	0	0.0%	0	0.0%	4	4.7%
More than 50	1	7.7%	0	0.0%	2	2.4%
Do not know	0	0.0%	2	5.6%	5	5.9%
Not applicable to the class taught	2	15.4%	8	22.2%	3	3.5%

**32 participants did not respond to the question.*

Table 28 shows the frequency of professional industry awards over the last five years. Industry certified teachers reported a lower percentage of receiving no awards than the teachers who were not industry certified or the working toward industry certification. 40% of the industry certified teachers reported having received 1-3 awards.

Table 28

Frequency of professional industry awards over the last five years (n=129)

	Working towards (n=13)		No (n=36)		Yes (n=85)	
	N	%	n	%	n	%
0	6	46.2%	26	72.2%	32	37.6%
1-3	2	15.4%	4	11.1%	34	40.0%
4-7	3	23.1%	3	8.3%	13	15.3%
8-12	0	0.0%	0	0.0%	3	3.5%
13 or more	1	7.7%	1	2.8%	1	1.2%

**5 participants did not respond to the question.*

Table 29 reports the frequency of membership in the specific industry's professional organization. The teachers without industry certification reported most frequency that they were not members of the professional organization. However, both the industry certified and the group working toward industry certification reported membership most frequently.

Table 29

Frequency of membership in the specific industry's professional organization (n=130)

	Working towards (n=13)		No (n=36)		Yes (n=85)	
	n	%	n	%	n	%
No	3	23.1%	22	61.1%	19	22.4%
Yes	10	76.9%	12	33.3%	64	75.3%

**4 participants did not respond to the question.*

The data results from the survey questions categorized by student engagement domains are in Tables 30 through 35. The actual survey instrument is documented in Appendices A and B. The data are categorized for each available response including number of respondents, industry certification status and percentiles for each question.

Table 30 shows responses to domain Positive Conduct and Absence of Disruptive Conduct indicate that overall the CTE teachers agree (working towards, 25, (64.1%), not certified, 55, (50.9%) and certified, 136, (53.3%), that they provide activities that encourage positive conduct. Teachers working towards 8, (61.5%) non certified, 20, (55.6%) and industry certified 50, (58.8%) strongly agree that when using direct hands on learning students are less likely to be disruptive.

Table 30

Responses to the domain- Positive Conduct and Absence of Disruptive Conduct

	Working towards (n=13)		No (n=36)		Yes (n=85)	
	n	%	n	%	n	%
When engaging my students in direct hands on learning they are less likely to be disruptive						
Strongly Agree	8	61.5%	20	55.6%	50	58.8%
Agree	5	38.5%	12	33.3%	31	36.5%
Disagree	0	0.0%	3	8.3%	3	3.5%
Strongly Disagree	0	0.0%	1	2.8%	0	0.0%
Through the team approach my students demonstrate their problem solving skills and resolve differences						
Strongly Agree	2	15.4%	13	36.1%	28	32.9%
Agree	10	76.9%	21	58.3%	52	61.2%
Disagree	1	7.7%	2	5.6%	2	2.4%
Strongly Disagree	0	0.0%	0	0.0%	1	1.2%
My students engage in activities that both create and challenge necessary leadership and social skills while maintaining classroom control						
Strongly Agree	3	23.1%	13	36.1%	27	31.8%
Agree	10	76.9%	22	61.1%	53	62.4%
Disagree	0	0.0%	1	2.8%	2	2.4%
Strongly Disagree	0	0.0%	0	0.0%	2	2.4%
Overall Domain Score						
Strongly Agree		33.3%		42.6%		41.2%
Agree		64.1%		50.9%		53.3%
Disagree		2.6%		5.6%		2.7%
Strongly Disagree		0.0%		0.9%		1.2%

Table 31 shows that overall the teachers agreed that daily attendance and class attendance is a factor in student engagement. The majority of the teachers in each group agreed or strongly agreed with every descriptor in this domain.

Table 31

Responses to the domain- Attendance/School Attendance and Class Attendance

	Working towards (n=13)		No (n=36)		Yes (n=85)	
	n	%	n	%	n	%
My students can relate to the parallel between regular school attendance and the job performance						
Strongly Agree	1	7.7%	6	16.7%	17	20.0%
Agree	8	61.5%	16	44.4%	48	56.5%
Disagree	4	30.8%	12	33.3%	15	17.6%
Strongly Disagree	0	0.0%	2	5.6%	3	3.5%
Collaborative classroom instructional methods encourage my students towards regular school and class attendance						
Strongly Agree	1	7.7%	11	30.6%	20	23.5%
Agree	9	69.2%	21	58.3%	54	63.5%
Disagree	3	23.1%	4	11.1%	6	7.1%
Strongly Disagree	0	0.0%	0	0.0%	2	2.4%
Technology incorporated instruction encourages my students towards regular classroom participation and involvement						
Strongly Agree	4	30.8%	15	41.7%	25	29.4%
Agree	9	69.2%	19	52.8%	55	64.7%
Disagree	0	0.0%	2	5.6%	3	3.5%
Strongly Disagree	0	0.0%	0	0.0%	1	1.2%
Overall Domain Score						
Strongly Agree		15.4%		29.6%		24.3%
Agree		66.7%		51.9%		61.6%
Disagree		17.9%		16.7%		9.4%
Strongly Disagree		0.0%		1.9%		2.4%

Table 32 indicates that the majority of CTE teachers participating in the survey strongly agreed that CTE instruction differs from other classes. Overall the CTE teachers agreed that academic progress/ academic achievement/grades/ graduation are all student engagement factors. The most

frequent disagree responses were associated with the engagement of students who worked toward but did not receive industry certification.

Table 32

Responses to the domain- Academic Progress/Academic Achievement/Grades/ Graduation

	Working towards (n=13)		No (n=36)		Yes (n=85)	
	n	%	n	%	n	%
CTE students are encouraged to explore the benefits of dual enrollment and the rigors required to obtain college credit						
Strongly Agree	2	15.4%	9	25.0%	19	22.4%
Agree	9	69.2%	22	61.1%	41	48.2%
Disagree	2	15.4%	4	11.1%	19	22.4%
Strongly Disagree	0	0.0%	0	0.0%	2	2.4%
CTE instruction differs from other classes						
Strongly Agree	6	46.2%	18	50.0%	49	57.6%
Agree	5	38.5%	15	41.7%	25	29.4%
Disagree	1	7.7%	3	8.3%	7	8.2%
Strongly Disagree	0	0.0%	0	0.0%	1	1.2%
Industry certification/licensing serves as a motivational force for student achievement						
Strongly Agree	2	15.4%	5	13.9%	18	21.2%
Agree	9	69.2%	23	63.9%	46	54.1%
Disagree	2	15.4%	6	16.7%	15	17.6%
Strongly Disagree	0	0.0%	0	0.0%	4	4.7%
Industry certification/licensing align student career pathways with training, credentialing and degrees						
Strongly Agree	6	46.2%	7	19.4%	28	32.9%
Agree	6	46.2%	23	63.9%	42	49.4%
Disagree	1	7.7%	4	11.1%	11	12.9%
Strongly Disagree	0	0.0%	0	0.0%	2	2.4%
The graduates of my CTE program are successful in gaining college acceptance						
Strongly Agree	2	15.4%	8	22.2%	25	29.4%
Agree	11	84.6%	20	55.6%	50	58.8%
Disagree	0	0.0%	3	8.3%	7	8.2%
Strongly Disagree	0	0.0%	1	2.8%	1	1.2%

(Table continued)

Table 32 (continued)

	Working towards (n=13)		No (n=36)		Yes (n=85)	
	n	%	n	%	n	%
Preparing for industry/certification licensing assessments increases student engagement						
Strongly Agree	3	23.1%	3	8.3%	22	25.9%
Agree	7	53.8%	25	69.4%	39	45.9%
Disagree	3	23.1%	4	11.1%	22	25.9%
Strongly Disagree	0	0.0%	0	0.0%	1	1.2%
The enthusiasm gained from the learning activities in my class encourages students' academic achievement						
Strongly Agree	1	7.7%	15	41.7%	33	38.8%
Agree	12	92.3%	19	52.8%	48	56.5%
Disagree	0	0.0%	1	2.8%	2	2.4%
Strongly Disagree	0	0.0%	0	0.0%	1	1.2%
When my students are given the opportunity to obtain industry certification/licensing and are successful, they showed increased engagement in class						
Strongly Agree	2	15.4%	7	19.4%	19	22.4%
Agree	7	53.8%	19	52.8%	42	49.4%
Disagree	3	23.1%	5	13.9%	13	15.3%
Strongly Disagree	0	0.0%	0	0.0%	3	3.5%
When my students are given the opportunity to obtain industry certification/licensing but are not successful they continued to show increased engagement in class						
Strongly Agree	1	7.7%	4	11.1%	4	4.7%
Agree	6	46.2%	17	47.2%	45	52.9%
Disagree	5	38.5%	9	25.0%	25	29.4%
Strongly Disagree	0	0.0%	1	2.8%	2	2.4%
Overall Domain Score						
Strongly Agree		21.4%		23.5%		28.4%
Agree		61.5%		56.5%		49.4%
Disagree		14.5%		12.0%		15.8%
Strongly Disagree		0.0%		0.6%		2.2%

Table 33 shows results for the student engagement domain, social/ feels like a member of the school community. Overall CTE teachers agreed that CTE courses provide activities that appeal to this domain.

Table 33

Responses to the domain- Social/Feels like a member of the school community

	Working towards (n=13)		No (n=36)		Yes (n=85)	
	n	%	n	%	n	%
CTE co-curricular organizations provide a unifying force for instruction						
Strongly Agree	4	30.8%	14	38.9%	28	32.9%
Agree	9	69.2%	19	52.8%	48	56.5%
Disagree	0	0.0%	3	8.3%	6	7.1%
Strongly Disagree	0	0.0%	0	0.0%	0	0.0%
My students share opportunities to combine school and community, through social and service projects						
Strongly Agree	3	23.1%	7	19.4%	25	29.4%
Agree	10	76.9%	22	61.1%	50	58.8%
Disagree	0	0.0%	6	16.7%	6	7.1%
Strongly Disagree	0	0.0%	1	2.8%	1	1.2%
My students enjoy classroom endeavors that bring school-wide recognition						
Strongly Agree	2	15.4%	9	25.0%	34	40.0%
Agree	10	76.9%	25	69.4%	46	54.1%
Disagree	1	7.7%	2	5.6%	2	2.4%
Strongly Disagree	0	0.0%	0	0.0%	2	2.4%
Overall Domain Score						
Strongly Agree	23.1%		27.8%		34.1%	
Agree	74.4%		61.1%		56.5%	
Disagree	2.6%		10.2%		5.5%	
Strongly Disagree	0.0%		0.9%		1.2%	

Table 34 shows CTE teachers opinions about the student engagement domain high expectations in students' ability to achieve. CTE teachers regardless of whether industry certified, non certified or working towards, strongly agreed/agreed that higher education opportunities are introduced in CTE career pathways that lead to training, technical development, and post-secondary degrees. The majority of the three groupings also strongly agreed and agreed that their students see how the class work they complete has practical application and direct career relevance. Overall the majority of the CTE teachers either strongly agreed/ agreed that they have high expectations in students' ability to achieve.

Table 34

Responses to the domain- High Expectations in students' ability to achieve

	Working towards (n=13)		No (n=36)		Yes (n=85)	
	n	%	n	%	n	%
Higher education opportunities are introduced in CTE career pathways that lead to training, technical development, and post-secondary degrees						
Strongly Agree	7	53.8%	20	55.6%	35	41.2%
Agree	6	46.2%	12	33.3%	43	50.6%
Disagree	0	0.0%	4	11.1%	3	3.5%
Strongly Disagree	0	0.0%	0	0.0%	2	2.4%
My students participate in engagement activities that display skill development levels through work-based learning experiences, co-op work experiences, competitions, internships, and industry certification						
Strongly Agree	3	23.1%	10	27.8%	42	49.4%
Agree	8	61.5%	19	52.8%	36	42.4%
Disagree	2	15.4%	6	16.7%	2	2.4%
Strongly Disagree	0	0.0%	1	2.8%	1	1.2%
My students see how the class work they complete has practical application and direct career relevance						
Strongly Agree	3	23.1%	18	50.0%	43	50.6%
Agree	9	69.2%	14	38.9%	36	42.4%
Disagree	1	7.7%	3	8.3%	3	3.5%
Strongly Disagree	0	0.0%	0	0.0%	0	0.0%
Overall Domain Score						
Strongly Agree		33.3%		44.4%		47.1%
Agree		59.0%		41.7%		45.1%
Disagree		7.7%		12.0%		3.1%
Strongly Disagree		0.0%		0.9%		1.2%

Table 35 indicates that CTE teachers agreed overall that students' emotional needs are met through activities and skills learned in CTE courses. Those teachers with industry certification were less likely to disagree that industry credentials should be displayed.

Table 35

Responses to the domain- Emotional

	Working towards (n=13)		No (n=36)		Yes (n=85)	
	n	%	n	%	n	%
Enhanced confidence and self esteem is gained through skills learned in my CTE courses, improves overall outlook and student behaviors						
Strongly Agree	5	38.5%	24	66.7%	54	63.5%
Agree	8	61.5%	12	33.3%	28	32.9%
Disagree	0	0.0%	0	0.0%	2	2.4%
Strongly Disagree	0	0.0%	0	0.0%	0	0.0%
My students enjoy emotional support from being involved in a class that rewards and recognizes participation						
Strongly Agree	4	30.8%	12	33.3%	47	55.3%
Agree	8	61.5%	23	63.9%	34	40.0%
Disagree	1	7.7%	1	2.8%	1	1.2%
Strongly Disagree	0	0.0%	0	0.0%	1	1.2%
Displayed CTE teacher industry credentials certificates (certificates, licenses) adds value and motivates CTE students						
Strongly Agree	2	15.4%	5	13.9%	19	22.4%
Agree	7	53.8%	23	63.9%	53	62.4%
Disagree	4	30.8%	7	19.4%	11	12.9%
Strongly Disagree	0	0.0%	0	0.0%	0	0.0%
Emotional needs/satisfaction is enhanced through CTE instruction and classroom participation						
Strongly Agree	4	30.8%	12	33.3%	28	32.9%
Agree	7	53.8%	21	58.3%	47	55.3%
Disagree	2	15.4%	2	5.6%	8	9.4%
Strongly Disagree	0	0.0%	0	0.0%	0	0.0%
My students value the awards, rewards and recognition that come from co-curricular competitive events						
Strongly Agree	3	23.1%	11	30.6%	39	45.9%
Agree	9	69.2%	20	55.6%	36	42.4%
Disagree	1	7.7%	3	8.3%	6	7.1%
Strongly Disagree	0	0.0%	0	0.0%	2	2.4%
My program is a means to reach disengaged students						
Strongly Agree	5	38.5%	13	36.1%	21	24.7%
Agree	6	46.2%	20	55.6%	43	50.6%
Disagree	1	7.7%	2	5.6%	15	17.6%
Strongly Disagree	1	7.7%	0	0.0%	5	5.9%

(Table continued)

Table 35 (continued)

	Working towards (n=13)		No (n=36)		Yes (n=85)	
	n	%	n	%	n	%
Overall Domain Score						
Strongly Agree		29.5%		35.6%		40.8%
Agree		57.7%		55.1%		47.3%
Disagree		11.5%		6.9%		8.4%
Strongly Disagree		1.3%		0.0%		1.6%

The Differences Between CTE Teachers With Industry Certification and Those Without Industry Certification and Their Perceptions of Their Programs

A 1 x 3 analysis of variance (ANOVA) was used to answer the research question, what are the differences between the teachers of CTE with industry certification and those without industry certification on their perceptions of their programs as a means to increase student engagement. A 1 x 3 ANOVA was run utilizing industry certification (the independent variable) and all of the student engagement domain questions that addressed the six student engagement domains (the dependent variables): Positive Conduct and Absence of Disruptive Conduct, Attendance/ School Attendance and Class Attendance, Academic Progress/Academic Achievement/Grades/Graduation, Social/Feels like a member of the school community High Expectations in students' ability to achieve, and Emotional.

Tables 36 through 47 show the 1 x 3 ANOVA comparing the three levels of industry certification with responses from each of the domain questions, the mean and standard deviation of each grouping, and the one Bonferroni post hoc test for the significant result. An alpha level of .05 was used for all statistical tests and η^2 was calculated as the effect size.

In Table 36 an analysis of variance (ANOVA) was calculated on each student engagement domain question of each specific student engagement domain on industry certification. Table 37 shows the means and standard deviations. The analysis was not significant for the following variables:

Positive conduct and absence of disruptive conduct

- Engaged students in direct hands on learning

F (2, 130) = .809, $p > .05$ (.448).

- Team approach students demonstrate their problem solving skills and resolve differences: $F(2, 129) = .867, p > .05 (.423)$.

Students engage in activities that both create and challenge necessary leadership and social skills while maintaining classroom control: $F(2, 130) = .292, p > .05 (.747)$.

Table 36

Summary of 1 x 3 ANOVA for industry certification vs. responses to the domain: Positive Conduct and Absence of Disruptive Conduct

Source	Sum of Squares	df	Mean Square	F	η^2
When engaging my students in direct hands on learning the they are less likely to be disruptive					
Factor	.629	2	.314	.809	.021
Within Groups (Error)	50.529	130	.389		
Total	51.158	132			
Through the team approach my students demonstrate their problem solving skills and resolve differences					
Factor	.560	2	.280	.867	.027
Within Groups (Error)	41.622	129	.323		
Total	42.182	131			
My students engage in activities that both create and challenge necessary leadership and social skills while maintaining classroom control					
Factor	.198	2	.099	.292	.045
Within Groups (Error)	44.058	130	.339		
Total	44.256	132			

* $p < .05$

Table 37

Means and Standard Deviation for each of the test conditions for the domain: Positive Conduct and Absence of Disruptive Conduct

Working towards	No	Yes	
M (SD)	M (SD)	M (SD)	
When engaging my students in direct hands on learning the they are less likely to be disruptive	1.38 (.506)	1.58 (.770)	1.44 (.567)
Through the team approach my students demonstrate their problem solving skills and resolve differences	1.92 (.494)	1.69 (.577)	1.71 (.574)
My students engage in activities that both create and challenge necessary leadership and social skills while maintaining classroom control	1.77 (.439)	1.67 (.535)	1.75 (.618)

In Tables 38 an analysis of variance (ANOVA) was calculated on each student engagement domain question of each specific student engagement domain on industry certification. Table 39 shows the means and standard deviations. The analysis was not significant for the following variables:

Positive conduct and absence of disruptive conduct

School and Class Attendance

- Students can relate to the parallel between regular school attendance and the job performance: $F(2, 129) = 1.332, p > .05 (.267)$.
- Collaborative classroom instructional methods encourage my students towards regular school and class attendance: $F(2, 128) = 1.495, p > .05 (.228)$.
- Technology incorporated instruction encourages my students towards regular classroom participation and involvement: $F(1, 128) = 1.495, p > .05 (.548)$.

Table 38

*Summary of 1 x 3 ANOVA for industry certification vs. responses to the domain:
Attendance/School Attendance and Class Attendance*

Source	Sum of Squares	df	Mean Square	F	η^2
My students can relate to the parallel between regular school attendance and the job performance					
Factor	1.473	2	.737	1.332	.105
Within Groups (Error)	71.337	129	.553		
Total	72.811	131			
Collaborative classroom instructional methods encourage my students towards regular school and class attendance					
Factor	1.171	2	.585	1.495	.017
Within Groups (Error)	50.112	128	.391		
Total	51.282	130			
Technology incorporated instruction encourages my students towards regular classroom participation and involvement					
Factor	.394	2	.197	.605	.063
Within Groups (Error)	42.313	130	.325		
Total	42.707	132			

* $p < .05$

Table 39

Means and Standard Deviation for each of the test conditions for the domain: Attendance/School Attendance and Class Attendance

	Working towards M (SD)	No M (SD)	Yes M (SD)
My students can relate to the parallel between regular school attendance and the job performance	2.23 (.599)	2.28 (.815)	2.05 (.731)
Collaborative classroom instructional methods encourage my students towards regular school and class attendance	2.15 (.555)	1.81 (.624)	1.88 (.636)
Technology incorporated instruction encourages my students towards regular classroom participation and involvement	1.69 (.480)	1.64 (.593)	1.76 (.573)

Table 40 shows an analysis of variance for industry certification vs. responses to domain, academic progress/academic achievement/grades/graduation. In Table 40 students are encouraged to explore the benefits of dual enrollment and the rigors required to obtain college credit $F(2, 126) = .917, p > .05 (.402)$. Table 41 indicates the mean and standard deviation for each group.

Table 40

Summary of 1 x 3 ANOVA for industry certification vs. responses to domain: Academic Progress/Academic Achievement/Grades/Graduation

Source	Sum of Squares	df	Mean Square	F	η^2
CTE students are encouraged to explore the benefits of dual enrollment and the rigors required to obtain college credit					
Factor	.904	2	.452	.917	.029
Within Groups (Error)	62.088	126	.493		
Total	62.992	128			
CTE instruction differs from other classes					
Factor	.153	2	.077	.162	.004
Within Groups (Error)	60.154	127	.474		
Total	60.308	129			
Industry certification licensing serves as a motivational force for student achievement					
Factor	.054	2	.027	.054	.023
Within Groups (Error)	63.669	127	.501		
Total	63.723	129			
Industry certification/licensing align student career pathways with training, credentialing and degrees					
Factor	.832	2	.416	.869	.077
Within Groups (Error)	60.776	127	.479		
Total	61.608	129			

(Table continued)

Table 40 (continued)

Source	Sum of Squares	df	Mean Square	F	η^2
The graduates of my CTE program are successful in gaining college acceptance					
Factor	.228	2	.114	.289	.022
Within Groups (Error)	49.327	125	.395		
Total	49.555	127			
Preparing for industry certification licensing assessments increases student engagement					
Factor	.009	2	.005	.009	.031
Within Groups (Error)	60.921	126	.484		
Total	60.930	128			
The enthusiasm gained from the learning activities in my class encourages students' academic achievement					
Factor	1.022	2	.511	1.636	.088
Within Groups (Error)	40.311	129	.312		
Total	41.333	131			
When my students are given the opportunity to obtain industry certification/licensing and are successful, they showed increased engagement in class					
Factor	.204	2	.102	.196	.015
Within Groups (Error)	60.788	117	.520		
Total	60.992	119			
When my students are given the opportunity to obtain industry certification/licensing but are not successful they continued to show increased engagement in class					
Factor	.247	2	.123	.293	.028
Within Groups (Error)	48.862	116	.421		
Total	49.109	118			

* $p < .05$

Table 41

Means and Standard Deviation for each of the test conditions for the domain: Academic Progress/Academic Achievement/Grades/Graduation

	Working towards	No	Yes
	M (SD)	M (SD)	M (SD)
CTE students are encouraged to explore the benefits of dual enrollment and the rigors required to obtain college credit	2.00 (.577)	1.86 (.601)	2.05 (.757)
CTE instruction differs from other classes	1.58 (.669)	1.58 (.649)	1.51 (.707)
Industry certification licensing serves as a motivational force for student achievement	2.00 (.577)	2.03 (.577)	2.06 (.771)
Industry certification/licensing align student career pathways with training, credentialing and degrees	1.62 (.650)	1.91 (.570)	1.84 (.740)
The graduates of my CTE program are successful in gaining college acceptance	1.85 (.376)	1.91 (.689)	1.81 (.634)
Preparing for industry certification licensing assessments increases student engagement	2.00 (.707)	2.03 (.474)	2.02 (.760)
The enthusiasm gained from the learning activities in my class encourages students' academic achievement	1.92 (.277)	1.60 (.553)	1.65 (.591)
When my students are given the opportunity to obtain industry certification/licensing and are successful, they showed increased engagement in class	2.08 (.669)	1.94 (.629)	2.00 (.761)
When my students are given the opportunity to obtain industry certification/licensing but are not successful they continued to show increased engagement in class	2.33 (.651)	2.23 (.717)	2.33 (.619)

In Table 42 an analysis of variance (ANOVA) was calculated on each student engagement domain question of each specific student engagement domain on industry certification. Table 43 shows the mean and standard deviation for each group. The analysis was not significant for the following variables:

Table 42

Summary of 1 x 3 ANOVA for industry certification vs. responses to domain: Social/Feels like a member of the school community

Source	Sum of Squares	df	Mean Square	F	η^2
CTE co-curricular organizations provide a unifying force for instruction					
Factor	.044	2	.022	.063	.042
Within Groups (Error)	44.506	128	.348		
Total	44.550	130			
My students share opportunities to combine school and community, through social and service projects					
Factor	1.489	2	.744	1.877	.041
Within Groups (Error)	50.756	128	.397		
Total	52.244	130			
My students enjoy classroom endeavors that bring school-wide recognition					
Factor	1.027	2	.514	1.413	.009
Within Groups (Error)	47.229	130	.363		
Total	48.256	132			

* $p < .05$

Table 43

Means and Standard Deviation for each of the test conditions for the domain: Social/Feels like a member of the school community

	Working towards M (SD)	No M (SD)	Yes M (SD)
CTE co-curricular organizations provide a unifying force for instruction	1.69 (.480)	1.69 (.624)	1.73 (.589)
My students share opportunities to combine school and community, through social and service projects	1.77 (.439)	2.03 (.696)	1.79 (.623)
My students enjoy classroom endeavors that bring school-wide recognition	1.92 (.494)	1.81 (.525)	1.67 (.646)

In Table 44, an analysis of variance (ANOVA) was calculated on the dependent variable, student engagement domain- high expectations for students' ability to achieve students participating in engagement activities that display skill development levels (co-op work, competitions, internships, and industry certification) on the independent variable of industry certification. The analysis was significant, $F(2, 127) = 5.872, p < .05 (.004)$. The effect size, $r = .086$, shows that although the relationship is not due to chance, it is weak.

Table 44

Summary of 1 x 3 ANOVA for industry certification vs. responses to domain: High Expectations in students' ability to achieve

Source	Sum of Squares	df	Mean Square	F	η^2
Higher education opportunities are introduced in CTE career pathways that lead to training, technical development, and post-secondary degrees					
Factor	.622	2	.311	.707	.014
Within Groups (Error)	56.674	129	.439		
Total	57.295	131			
My students participate in engagement activities that display skill development levels through work-based learning experiences, co-op work experiences, competitions, internships, and industry certification					
Factor	5.084	2	2.542	5.872*	.086
Within Groups (Error)	54.985	127	.433		
Total	60.069	129			
My students see how the class work they complete has practical application and direct career relevance					
Factor	1.256	2	.628	1.782	.075
Within Groups (Error)	44.752	127	.352		
Total	46.008	129			

* $p < .05$

Table 45, Post hoc analyses using the Bonferroni Post Hoc Criterion for significance indicated that industry certification (1.53, .614) versus non-industry certification (1.94, .754) are statistically, significantly different from each other. An alpha level of .05 was used for all statistical tests and η^2 was calculated as the effect size.

Social/ Feels like a member of the school community

- CTE co-curricular organizations provides a unifying force for instruction:
F (2, 128) = .063, $p > .05$ (.939).
- My student share opportunities to combine school and community through, social and service projects: F (2, 128) = 1.877, $p > .05$ (.157).
- My students enjoy classroom endeavors that bring school wide recognition:
F (2, 130) = 1.413, $p > .05$ (.247).

Table 45

Bonferroni Comparison for Responses to question; My students participate in engagement activities that display skill development levels through work-based learning experiences, co-op work experiences, competitions, internships, and industry certification

Comparisons	Mean Difference	Std. Error	95% CI	
			Lower Bound	Upper Bound
Working Towards vs. No	-.021	.213	-.54	.50
Working Towards vs. Yes	.392	.197	-.08	.87
No vs. Yes	.414*	.132	.09	.73

* $p < 0.05$

An analysis of variance (ANOVA) was calculated on each student engagement domain question of each specific student engagement domain on industry certification. The results are in Table 46 the analysis was not significant for the following variables:

Positive conduct and absence of disruptive conduct

High Expectations in students' ability to achieve

- Higher education opportunities are introduced in CTE career pathways that lead to training, technical development, and post-secondary degrees:
F (2, 129) = .707, $p > .05$ (.495).
- My students see how the class work they complete has practical application and direct career relevance: F (2, 127) = 1.782, $p > .05$ (.172).

Table 46

Means and Standard Deviation for each of the test conditions for the domain: High Expectations in students' ability to achieve

Working towards	No	Yes
M (SD)	M (SD)	M (SD)
Higher education opportunities are introduced in CTE career pathways that lead to training, technical development, and post-secondary degrees	1.46 (.519)	1.56 (.695)
My students participate in engagement activities that display skill development levels through work-based learning experiences, co-op work experiences, competitions, internships, and industry certification	1.92 (.641)	1.53 (.614)
My students see how the class work they complete has practical application and direct career relevance	1.85 (.555)	1.51 (.572)

An analysis of variance (ANOVA) was calculated on each student engagement domain question of each specific student engagement domain on industry certification. The results are in Table 47 the analysis was not significant for the following variables:

Emotional

- Enhances confidence and self esteem is gained through skills learned in my CTE courses, improves several outlook and student behaviors: $F(2, 130) = 1.458, p > .05 (.236)$.
- My students enjoy emotional support from being involved in a class that rewards and recognizes participation: $F(2, 129) = 1.464, p > .05 (.061)$.
- Displayed CTE teacher industry credentials certificates adds value and motivates CTE student $F(2, 128) = 1.464, p > .5 (.235)$.
- Emotional need/satisfaction is enhances through CTE instruction and classroom participation: $F(2, 128) = .223, p > .05 (.800)$.
- My students value the awards, rewards and recognition that come from co-curricular competitive events: $F(2, 127) = .674, p > .05 (.512)$.

- My program is a means to reach disengaged students: $F(2, 129) = 2.798, p > .05$ (.065).

Table 48 shows the means and standard deviation for all groups.

Table 47

Summary of 1 x 3 ANOVA for industry certification vs. responses to domain: Emotional

Source	Sum of Squares	df	Mean Square	F	η^2
Enhanced confidence and self esteem is gained through skills learned in my CTE courses, improves overall outlook and student behaviors					
Factor	.783	2	.391	1.458	.001
Within Groups (Error)	34.886	130	.268		
Total	35.669	132			
My students enjoy emotional support from being involved in a class that rewards and recognizes participation					
Factor	1.894	2	.947	2.866	.037
Within Groups (Error)	42.621	129	.330		
Total	44.515	131			
Displayed CTE teacher industry credentials certificates (certificates, licenses) adds value and motivates CTE students					
Factor	1.071	2	.535	1.464	.001
Within Groups (Error)	46.807	128	.366		
Total	47.878	130			
Emotional needs/satisfaction is enhanced through CTE instruction and classroom participation					
Factor	.167	2	.084	.223	.001
Within Groups (Error)	48.016	128	.375		
Total	48.183	130			
My students value the awards, rewards and recognition that come from co-curricular competitive events					
Factor	.623	2	.311	.674	.029
Within Groups (Error)	58.677	127	.462		
Total	59.300	129			
My program is a means to reach disengaged students					
Factor	3.342	2	1.671	2.798	.049
Within Groups (Error)	77.045	129	.597		
Total	80.386	131			

* $p < .05$

Table 48

Means and Standard Deviation for each of the test conditions for the domain: Emotional

	Working towards M (SD)	No M (SD)	Yes M (SD)
Enhanced confidence and self esteem is gained through skills learned in my CTE courses, improves overall outlook and student behaviors	1.62 (.506)	1.33 (.478)	1.38 (.536)
My students enjoy emotional support from being involved in a class that rewards and recognizes participation	2.15 (.599)	2.06 (.525)	1.90 (.591)
Displayed CTE teacher industry credentials certificates (certificates, licenses) adds value and motivates CTE students	2.15 (.689)	2.06 (.591)	1.90 (.597)
Emotional needs/satisfaction is enhanced through CTE instruction and classroom participation	1.85 (.689)	1.71 (.572)	1.76 (.617)
My students value the awards, rewards and recognition that come from co-curricular competitive events	1.85 (.555)	1.76 (.606)	1.65 (.723)
My program is a means to reach disengaged students	1.85 (.899)	1.69 (.583)	2.05 (.820)

An analysis of variance (ANOVA) was calculated on the dependent variable, student engagement domain- high expectations for students' ability to achieve students participating in engagement activities that display skill development levels (co-op work, competitions, internships, and industry certification) on the independent variable of industry certification. The analysis was significant, $F(2, 127) = 5.872, p < .05 (.004)$. The effect size, $r = .086$, shows that although the relationship is not due to chance, it is weak. Post hoc analyses using the Bonferroni post hoc criterion for significance indicated that industry certification (1.53, .614) versus non-industry certification (1.94, .754) are statistically, significantly different from each other. An alpha level of .05 was used for all statistical tests and η^2 was calculated as the effect size.

An analysis of variance (ANOVA) was calculated on each student engagement domain question of each specific student engagement domain on industry certification. The analysis was not significant for the following variables: Positive conduct and absence of disruptive conduct.

Social and Academic Engagement Changes- What are the changes CTE teachers' feel occur in students' academic and social engagement when the students are enrolled in CTE courses

A qualitative analysis was used to answer the research question, what are the changes CTE teachers' feel occur in students' academic and social engagement when the students are enrolled in CTE courses? The actual data are documented in Appendices 4 and 5. A summary of these findings are presented. The following trends emerged from the CTE teachers' perceptions gathered through the open-ended survey questions number 39 and 40.

What social changes have occurred with students who participated in your program? There were 102 respondents to the question. Sixty-three of the respondents were industry certified, twenty-nine were not, and ten were working towards gaining industry certification. The hierarchy of the top emerging themes was: Team concept/team work, extra curricular activities, social skills/grows socially, improved communication skills, improved confidence with public speaking, skills learned and applied, higher levels of self-esteem, learning to work and interpersonal skills.

What academic changes have occurred with students who participated in your program? There were ninety-eight respondents to the question. Fifty-nine were industry certified, twenty-nine were not, and ten were working towards gaining industry certification. The hierarchy of the top emerging themes was: Core grades improve, involved in and/or improved class work, students not normally academically successful are successful in CTE class, able to see the relationship between career and classroom, reinforces concepts in core areas, and grades increase through application.

The results of the statistical tests on the survey questions have been shared in this chapter. Major findings and implications will be shared in Chapter Five.

Chapter 5

Findings Implications and Recommendations

Introduction

The purpose of this study was to determine the perceptions of CTE teachers regarding their programs' influence on the level of engagement of their students and whether or not industry credentialing of the students or teachers adds to that influence. This study focused on CTE teachers' perceptions of the influence that CTE programs and industry credentialing have on student engagement. The study viewed the perceived changes in student engagement and performance once a student is involved in a CTE program of study. A teacher survey was conducted of 134 teachers to collect data on CTE teachers' perceptions.

This chapter reports the findings of this study, the implications of the findings and makes recommendations for further research. The researcher will discuss the findings of CTE teachers' perceptions regarding their influence on the six levels of student engagement, and whether or not industry credentialing adds to that influence. The researcher will look at the differences between CTE teachers with industry certification vs. those without industry certification and their perceptions of their programs. The researcher will also review the changes CTE teachers' feel occur in students' academic and social engagement when the students are enrolled in CTE courses.

Summary of Findings

Finding 1. CTE teachers who participated in the study feel that CTE programs actively engage students in the domain of positive conduct and absence of disruptive conduct. As shown in Table 13, CTE teachers agree or strongly agree that students are less likely to be disruptive (94.0%), students demonstrate problem solving and resolve differences (94.0%), and students engage in activities that both create and challenge leadership and social skills (95.5%). The statements in that section of the survey referred to direct hands on and team approaches that resulted in the CTE teachers' perceived benefits to students.

There is no significant difference in the responses of industry certified and non-industry certified CTE teachers on the domain of positive conduct and absence of disruptive conduct. Table 30 indicates the responses of each of the categories of industry certification status, and Table 36 provides the results of the ANOVA with indicators of lack of significant difference.

Finding 2. CTE teachers who participated in the study feel that components of the CTE programs encourage regular school and class attendance. In Table 14, the data indicate that teachers agree or strongly agree that collaborative classroom instructional methods (86.6%) and incorporated technology (94.7%) encourage regular attendance. The CTE teachers also agree or strongly agree that students can relate to the parallel between regular attendance and job performance (71.6%). However, fewer CTE teachers agree or strongly agree that students can make the association between attendance and performance.

There is no significant difference in the responses of industry certified and non-industry certified CTE teachers on the domain of attendance/school attendance and class attendance. Table 31 indicates the responses of each of the categories of industry certification status, and Table 38 provides the results of the ANOVA with indicators of lack of significant difference.

Finding 3. CTE teachers who participated in the study feel that CTE programs are supportive of student academic success. Table 15 shows the results related to the academic progress/academic achievement/grades/graduation domain of engagement. The overall agree and strongly agree response percentages are not as high as those in the other domains of student engagement, but still indicate positive perceptions (78.9%). The highest agree or strongly agree response rate was for the statement related to enthusiasm gained from the earning activities (95.6%). The agree or strongly agree responses from CTE teachers about CTE instruction differing from other classes (88.1%) and college acceptances (86.5%) also support their perceptions regarding the academic achievement domain of student engagement.

The majority of CTE teachers agreed or strongly agreed with the statements that connect opportunities for industry certification to academic achievement in all cases. The CTE teachers saw industry certification as a motivator (76.9%), as aligning student career pathways with training and degrees (83.6%), and as increasing student engagement (73.9%). The CTE teachers also agreed or strongly agreed that when students are given the opportunity to receive industry certification, they show increased engagement if they are successful (71.6%) and even if they are not successful (57.4%) in obtaining the industry certification.

There is no significant difference in the responses of industry certified and non-industry certified CTE teachers on the domain of academic progress/academic achievement/ grades/ graduation. Table 32 indicates the responses of each of the categories of industry certification

status, and Table 40 provides the results of the ANOVA with indicators of lack of significant difference.

Finding 4. CTE teachers who participated in the study believe that the CTE programs support students in the social/feels like a member of the school community domain of student engagement. In Table 16, the CTE teachers agree or strongly agree that CTE co-curricular organizations provide a unifying force for instruction (91.0%). They also agree or strongly agree that students share opportunities to combine school and community through social and service projects (87.3%). Finally, CTE teachers agree or strongly agree that students enjoy classroom endeavors that bring school-wide recognition (94.0%).

There is no significant difference in the responses of industry certified and non-industry certified CTE teachers on the domain of social/feels like a member of the school community. Table 33 indicates the responses of each of the categories of industry certification status, and Table 42 provides the results of the ANOVA with indicators of lack of significant difference.

Finding 5. CTE teachers who participated in the study believe that the CTE programs provide high expectations for students' ability to achieve. The results in Table 17 indicate that CTE teachers agree or strongly agree that higher education opportunities are introduced (91.8%), that students display skill development levels (88.0%), and that students see the relationship between practical application and career relevance (91.8%).

There is a weak significant difference in the responses of industry certified and non-industry certified CTE teachers on the domain high expectations in student ability to achieve. Table 34 indicates the responses of each of the categories of industry certification status, and Table 44 and Table 45 provide the results of the ANOVA with indicators and strength of the significant difference.

Finding 6. CTE teachers who participated in the study believe that CTE programs actively engage students in the emotional domain of student engagement. The CTE teacher responses in Table 18 indicate that they agree or strongly agree that confidence and self-esteem are enhanced (97.7%), emotional support is enjoyed (95.5%), emotional needs and satisfaction are enhanced (88.8%), and rewards are valued (88.1%) by students.

There is no significant difference in the responses of industry certified and non-industry certified CTE teachers on the domain of. Table 35 indicates the responses of each of the

categories of industry certification status, and Table 47 provides the results of the ANOVA with indicators of lack of significant difference.

Finding 7. CTE teachers who participated in the study believe that industry certification adds to student engagement. CTE teachers perceive value in student opportunities for industry certification, even though 26.9% of teachers lack industry certification and an additional 9.7% are working toward industry certification. CTE teachers' survey responses indicate that industry certification is a motivator, but they also report a small number of students being offered or receiving industry certification. In Table 19, where the responses of those who are industry certified and those who are not industry certified, have been shared, the majority of both groups agree or strongly agree to each of the statements.

Educational legislation, such as the No Child Left Behind Act, has caused schools to drop arts and CTE programs in order to increase academics. In some instances, the test became the end line rather than the starting line of what we should be doing (Daggett, 2010). According to Dr. Willard Daggett, students in CTE courses go beyond learning academic core concepts; they learn how to apply these concepts, enhancing their retention. In essence, CTE programs must show officials that they now contribute to academics and continue to contribute to the workplace. Considering the outcomes for both academic education and career and technical education, the next few years could be "the best of times" or "the worst of times." The last decade has presented great challenges for all educators, brought about first by No Child Left Behind Act and now by Race to the Top, coupled with dramatic changes in the workplace. Outstanding programs have responded to the challenges by preparing students very well for academic and workplace success. They have done this by making CTE and academic education a seamless system (2010).

Ryken's research provided implications for Career and Technical Education Programs and for students. It was revealed that tensions in students' career decision-making as they gained knowledge, and learned about their varied options, allowed students to be more open to their future and the limits of the specialized program. The researcher determined that students should be allowed to advocate control over their educational career programs so that their programs fit their personal goals. (Ryken, 2006).

Finding 8. CTE teachers who participated in the study and who hold industry certification or are working towards industry certification appear to be more engaged in the

instructional process while utilizing projects, work-based learning, competitions, and industry based certification.

Demographic data indicate that CTE teachers who are industry certified or working towards industry certification are more active in the overall CTE programs, based on their membership in industry based professional organizations and the number of awards that they and their students have won in the last five years. The data also indicate that this group of CTE teachers overall tend to strongly agree or agree upon questions that indicate that students in their class are active in CTE activities, improve in their classes, learn valued work skills, gain leadership skills and become more social.

CTE teachers who participated in the study appear to benefit from obtaining industry certification by expanding their content background in the skill set areas and job roles for which they train students. The industry certified teacher are better able to explain the requirements of specific jobs in related career pathways, and can provide perspective for their students on the relative “market value” of industry certifications and other credentials (www.doe.virginia.gov, February 19, 2008).

Finding 9. CTE teachers who participated in the study perceived that students increased their social skills as a result of being in their classes. In the CTE teachers’ responses to the open ended question, they listed team concepts/teamwork, extra-curricular activities, social growth, improved communication skills, confidence, self-esteem, learning to work and interpersonal skills.

Finding 10. CTE teachers who participated in the study perceived that students increased their academic performance in core classes as a result of being in CTE classes. The teachers also indicated that the connection between career and classroom, the reinforcement of concepts and the application of core material in CTE classes supported student academic growth. CTE teachers believe that students’ core grades improved, students are involved in class work, students not normally academically successful are successful in CTE class, and are able to see the relationship between career and classroom.

In a survey conducted by The Partnership for 21ST Century Skills revealed in its 2007 survey that 99 percent of respondents say that teaching students a wide range of 21st century skills-including critical thinking and problem-solving skills, technology skills, communication and self-direction skills is important to our country’s future economic success (Partnership for

21ST Century Skills, 2008). The Partnership for 21ST Century Skills survey also indicated that 80 percent say students need to learn skills to prepare them for the workplace and that those skills are different from those needed 20 years ago. Sixty-six percent of voters also felt that students needed to learn a broader range of skills beyond the core academic content (Partnership for 21ST Century Skills and Vockley-Lang, 2007). CTE teachers feel that they are assisting in teaching 21st Century Skills while keeping students engaged in school.

According to Willard R. Daggett, his research and studies have developed his belief that focusing on just academic rigor for the 43 percent high achievers and on just job skills for the other 57 percent were both doomed approaches. Instead, give both types of students rigorous, relevant education, and most will become life-long learners with the critical skills. He goes on to state, “I also think the present economic downturn will lead to a major focus on workforce development-related programs and a much heavier emphasis on the integration of academics and career and technical education for kids.” (Daggett, 2010)

Finding 11. CTE programs and course work provide instructional experiences that can keep school from being boring and uninteresting to students. The vast majority of the CTE teachers surveyed indicate that their programs provide hands-on activities and work place readiness skills. The CTE teachers work to inspire their students by providing access to competitions and classroom activities that engage students. CTE teachers surveyed indicated their support that CTE courses seem to motivate students, and offer exposure to students regarding the world of work. CTE serves as the bridge for some to understand core academic skills and transition into real life experiences. CTE offers immediate access to the work force and meaningful classroom and work experiences.

Implications

Several implications for practitioners were identified through the major findings of this study. Those implications are shared below, because administrators should consider them as they seek to address student engagement, based on the perceptions of CTE teachers.

Implication 1. School administrators should encourage students to Consider CTE courses, especially if the students are less engaged. The research shows that teachers felt that student engagement got better the longer they stayed in the classes. CTE helps students apply learning to the world of work and real world situations. Learning is important for students to

progress towards graduation, college or meaningful employment and keeping students engaged in the learning process helps.

Implication 2. Administrators need to continue to offer CTE courses even when industry certification is not available or teachers fail to have it. While research indicates that industry certification is a driving force, the survey results indicate that while it is a significant factor, industry certification does not serve as a driving force to CTE endeavors. The limited number of students who were engaged in coursework leading to industry certification or who received industry certification was low, as reported by the teachers. Teachers felt that the certification was not the ending factor affecting the benefits derived from the program. Because of the research that supports industry certification, administrators might encourage the students and teachers to pursue the certification to enhance their employability skills. Certification recognition would enhance social recognition and enhance emotional development and confidence in the recipient.

Implication 3. Successful and proven CTE teaching strategies may be incorporated across the curricula to encourage the engagement of all students. With the current teaching demands to increase rigor and relevance, as well as, the expectation that administrators ensure that these demands are being met, CTE strategies would be beneficial to enhance teacher, student and parent relationships. Raising the teacher expectations to enhance their essential industry knowledge assists in motivating CTE teachers to overall develop programs that engage students and provide them with current industry skills and knowledge. Activities that emphasize individual expansion, direction and creativity would provide a basis for program enhancement and expanded interest and behavior.

CTE teachers actively engage students in all six domains through the course of instruction and program activities. It appears that the strategies could also be applied in general as well as academic courses with anticipated success. Leadership training, professional development, community development and academic enhancement all play a vital part in the CTE program. CTE teachers engage students and help to raise the academic standards of the students who they serve. School administrators should encourage core teachers to incorporate varied and successful practices and strategies utilized by the CTE teachers by providing time and resources for peer observations, cross curricular planning and integration of alternative teacher/student assessments.

Recommendations for Further Research

This study addressed the perceptions of CTE teachers through a quantitative study of teachers from five school divisions in the central Virginia area. Further study of CTE and its relationship with student engagement are warranted. Areas that may require further research that were not explored in this study are provided below.

Recommendation 1. A case study of a group of students who are enrolled in CTE classes might provide valuable information. In the study, one might look at academic and social changes as reported by the students and the faculty.

Recommendation 2. The CTE teachers that are working towards industry certification in the data seemed to have higher ratings for other CTE activities. Further research could be completed to see if CTE teachers working towards industry certification are more idealistic and more aware of current educational trends, as an ancillary outcome from the continuous learning process to obtain the industry certification.

Recommendation 3. Replicate this study with a larger sample of participants, comparison of teachers' perspectives of the effectiveness of CTE programs and instruction on student engagement in various regional areas, urban versus suburban and rural. The increased participation will offer a greater view of how CTE teachers view their programs and the importance of them.

Recommendation 4. A qualitative study that includes interviews with high school graduates who have completed a CTE sequence of courses with or without industry certification would allow the researcher the opportunity to hear from the students regarding the impact of CTE on their level of engagement.

Summary and Conclusions

The conclusions drawn from the study were addressed to administrators at all levels, educators, students and parents. The results addressed the efforts that are needed to improve education and keep students in school. The literature addressed the need to find ways to keep students actively engaged in school. The following conclusions were drawn regarding CTE teacher perceptions: CTE programs and course work provide instructional experiences that can keep school from being boring and uninteresting to students. The programs provide hands-on activities and work place readiness skills. The CTE teachers work to inspire their students by

providing access to competitions and classroom activities that engage students. CTE courses seem to motivate students, and offer exposure to students regarding the world of work. CTE serves as the bridge for some to understand core academic skills and transition into real life experiences. CTE offers immediate access to the work force and meaningful classroom and work experiences. Social skills appear to improve as students become empowered and come to understand the importance of articulating and expressing their ideas and opinions. Students gain skills that they can utilize whether they go to college or they go directly into the workforce. CTE programs seem to enable disengaged students to become more actively involved in their education. CTE programs allow students to apply the instruction that they receive to real life situations. According to the teachers in this study, for some students the ability to make those connections is enough to allow them to take an active role in their educational experience and move on to graduate and attend college or find meaningful employment.

Industry certification, although an important benefit to some CTE programs, is not the major reason that students participate in CTE courses. Students who are able to obtain industry certification do receive documentation of a set of skills that have been mastered, but students benefit from coursework even if they don't obtain industry certification.

Reflections

In developing and conducting the study there were several situations brought to light that were worthy of note. The cooperative effort from each school division participant was excellent. Not only did the respondents fully complete the questionnaire, but also many freely provided comments that were both constructive and insightful.

Since the study covered 5 school divisions and involved urban, rural and suburban communities, the responses were particularly valuable. So often instructional techniques can be both shared and implemented in many different and often challenging settings. Not surprising, many of the techniques used to engage students were available in both an academic and CTE setting with a large degree of success.

As an administrator responsible for implementing successful instruction, it was valuable to read about the dedication and instructional expertise that each teacher in each program gave in an attempt to actively engage students and gain student success. Observing the implementation time frame, the researcher realized that a survey of this nature would be administered at the discretion of the five systems' central administrative offices. Competing with individual school

schedules, events, SOL testing, and other challenges made it at times difficult to plan. However, the cooperation of each school divisions' central administration, principals, assistant principals and teaching staff, made the process successful.

There was the need for the researcher to be successful and effective in guiding this process and seeing it to the end. The researcher benefited from this experience. A survey of this nature has implications for every instructional area within a system and even offers an additional indicator of student engagement, because it offered an insight into CTE teachers' knowledge about their students and how they are engaged. With the changing needs of students today, it is particularly important for the administration and teachers to stay ahead of successful program strategies, such as industry certification and other CTE industry trends to benefit each student and the school division as a whole.

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Appendix A
Career and Technical Education (CTE) Teacher Survey
Teacher Perceptions on the Impact of CTE on Student Engagement

Kim M. Allen

Thank you for your participation in this survey. These questions cover a range of topics related to your CTE program, including your work, perceptions, beliefs, and interactions with your students. Engagement is a term often used to mean “involvement” or “participation.” We are particularly interested in the ways in which you engage your students in learning activities. Your responses, along with responses from other teachers, will help administrators; policy makers and other stakeholders, examine the influence of industry credentialing and better understand CTE program needs to create an engaging, challenging program that leads to increased student engagement. Please answer thoughtfully and honestly-we appreciate the time and energy you put into this survey.

Teacher Demographics

1. What is your CTE instructional area(s) (example: Marketing Education, Nursing, etc.)?

2. How many years of CTE teaching experience do you have?

(0-3 years) (4-7 years) (8-12 years) (13 or more years)

3. How many years have you worked in trade area?

(0-3 years) (4-7 years) (8-12 years) (13 or more years)

4. What is your highest level of education?

High school Bachelors Masters Advanced certificate/Degree

5. Are you industry certified or industry licensed?

Yes No Working Towards

6. If you are not industry certified or industry licensed, why?

Financial costs Need additional training Have not completed industry assessment Industry certification not available in my content area/or trade area
 Other

7. Number of students you currently teach?
 (0-25 students) (26-50 students) (51-above)
8. Number of certified or licensed completers from 2008-2009?
9. Number of overall completers from 2008-2009?
10. Number of professional/industry awards over last five years (2004-2009)?
 (0) (1-3) (4-7) (8-12) (13 or more)
11. Are you a member of your industry's professional organization(s)?
 Yes No

Student Engagement

Scale-- Strongly Agree Agree Neutral Disagree Strongly Disagree

Survey Domain- Positive Conduct and Absence of Disruptive Conduct

12. When engaging my students in direct, hands-on learning, they are less likely to be disruptive.
13. Through the team approach, my students demonstrate their problem solving skills and resolve differences.
14. My students engage in activities that both create and challenge necessary leadership and social skills while maintaining classroom control.

Survey Domain- Attendance/School Attendance and Class Attendance

15. My students can relate to the parallel between regular school attendance and the job performance.
16. Collaborative classroom instructional methods encourage my students towards regular school and class attendance.
17. Technology incorporated instruction encourages my students towards regular classroom participation and involvement.

Survey Domain- Academic Progress/Academic Achievement/Grades/Graduation

18. CTE students are encouraged to explore the benefits of dual enrollment and the rigors required to obtain college credit.
19. CTE instruction differs from other classes.
20. Industry certification/licensing serves as a motivational force for student achievement.
21. Industry certification/licensing align student career pathways with training, credentialing and degrees.
22. The graduates of my CTE program are successful in gaining college acceptance.
23. Preparing for industry certification/licensing assessments increases student engagement.
24. When my students are given the opportunity to obtain industry certification/licensing and are successful, they showed increased engagement in class.
25. When my students are given the opportunity to obtain industry certification/licensing but are not successful they continued to show increased engagement in class.
26. The enthusiasm gained from the learning activities in my class encourages students' academic achievement.
27. What academic changes have occurred with students who participated in your program?

Survey Domain- Social/Feels like a member of the school community

28. CTE co-curricular organizations provide a unifying force for instruction.
29. My students share opportunities to combine school and community, through social and service projects.
30. What social changes have occurred with students who participated in your program?

31. My students enjoy classroom endeavors that bring school wide recognition.

Survey Domain- High Expectations in students' ability to achieve

32. Higher education opportunities are introduced in CTE career pathways that lead to training, technical development, and post-secondary degrees.

33. My students participate in engagement activities that display skill development levels through work-based learning experiences, co-op work experiences, competitions, internships, and industry certification.
34. My students see how the class work they complete has practical application and direct career relevance.

Survey Domain- Emotional

35. Enhanced confidence and self-esteem is gained through skills learned in my CTE courses, improves overall outlook and student behaviors.
36. My students enjoy emotional support from being involved in a class that rewards and recognizes participation.
37. Displayed CTE teacher industry credentials (certificates, licenses) adds value and motivates CTE students.
38. Emotional needs/satisfaction is enhanced through CTE instruction and classroom participation.
39. My students value the awards, rewards, and recognition that come from co-curricular competitive events.
40. My program is a means to reach disengaged students.

Appendix B
Career and Technical Education (CTE) Teacher Survey
Teacher Perceptions on the Impact of CTE on Student Engagement

Kim M. Allen

Thank you for your participation in this survey. These questions cover a range of topics related to your CTE program, including your work, perceptions, beliefs, and interactions with your students. Engagement is a term often used to mean “involvement” or “participation.” We are particularly interested in the ways in which you engage your students in learning activities. Your responses, along with responses from other teachers, will help administrators; policy makers and other stakeholders, examine the influence of industry credentialing and better understand CTE program needs to create an engaging, challenging program that leads to increased student engagement. Please answer thoughtfully and honestly-we appreciate the time and energy you put into this survey.

Teacher Demographics

1. What is your CTE instructional area(s) (example: Marketing Education, Nursing, etc.)?
2. How many years of CTE teaching experience do you have?
 (0-3 years) (4-7 years) (8-12 years) (13 or more years)
3. How many years have you worked in trade area?
 (0-3 years) (4-7 years) (8-12 years) (13 or more years)
4. What is your highest level of education?
 High school Bachelors Masters Advanced certificate/Degree
5. Are you industry certified or industry licensed?
 Yes No Working Towards
6. If you are not industry certified or industry licensed, why?
 Financial costs Need additional training Have not completed industry assessment Industry certification not available in my content area/or trade area
 Other
7. Number of students you currently teach?
 (0-25 students) (26-50 students) (51-above)

8. Number of certified or licensed completers from 2008-2009?
9. Number of overall completers from 2008-2009?
10. Number of professional/industry awards over last five years (2004-2009)?
- (0) (1-3) (4-7) (8-12) (13 or more)
11. Are you a member of your industry's professional organization(s)?
- Yes No

Student Engagement

Scale-- Strongly Agree Agree Neutral Disagree Strongly Disagree

Survey Domain- Positive Conduct and Absence of Disruptive Conduct

12. When engaging my students in direct, hands-on learning, they are less likely to be disruptive. (Barton, 2007)
13. Through the team approach, my students demonstrate their problem solving skills and resolve differences.
14. My students engage in activities that both create and challenge necessary leadership and social skills while maintaining classroom control.

Survey Domain- Attendance/School Attendance and Class Attendance

15. My students can relate to the parallel between regular school attendance and the job performance. (Bridgeland, Dilulio, & Morison, 2006)
16. Collaborative classroom instructional methods encourage my students towards regular school and class attendance. Balfanz, Herzog, & MacIver, 2007, Bottoms & Young, 2008, National Foundation for Educational Research, 2006)
17. Technology incorporated instruction encourages my students towards regular classroom participation and involvement.

Survey Domain- Academic Progress/Academic Achievement/Grades/Graduation

18. CTE students are encouraged to explore the benefits of dual enrollment and the rigors required to obtain college credit. (Lynch, 2000, VDOE, 2/19/2008)
19. CTE instruction differs from other classes. (Arum & Shavit, 1995)

20. Industry certification/licensing serves as a motivational force for student achievement. (Bartlett , Horwitz, Ipe, & Yuwan, 2005, Office of Vocational and Adult Education, 2008)
21. Industry certification/licensing align student career pathways with training, credentialing and degrees. (Bartlett , Horwitz, Ipe, & Yuwan, 2005, VDOE, 2/19/2008)
22. The graduates of my CTE program are successful in gaining college acceptance.
23. Preparing for industry certification/licensing assessments increases student engagement. (Bartlett , Horwitz, Ipe, & Yuwan, 2005, Office of Vocational and Adult Education, 2008)
24. When my students are given the opportunity to obtain industry certification/licensing and are successful, they showed increased engagement in class. (Bartlett , Horwitz, Ipe, & Yuwan, 2005, Office of Vocational and Adult Education, 2008, Ryken, 2006, VDOE, 2/19/2008)
25. When my students are given the opportunity to obtain industry certification/licensing but are not successful they continued to show increased engagement in class. (Bartlett , Horwitz, Ipe, & Yuwan, 2005, Office of Vocational and Adult Education, 2008, Ryken, 2006, VDOE, 2/19/2008)
26. The enthusiasm gained from the learning activities in my class encourages students' academic achievement. (National Academy of Science, 2003)
27. What academic changes have occurred with students who participated in your program?

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Survey Domain- Social/Feels like a member of the school community

28. CTE co-curricular organizations provide a unifying force for instruction. (Arum & Shavit, 1995, Schescke, 2008)
29. My students share opportunities to combine school and community, through social and service projects. (Yazzie-Mintz, 2007)
30. What social changes have occurred with students who participated in your program?

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31. My students enjoy classroom endeavors that bring school wide recognition. (Schescke, 2008)

Survey Domain- High Expectations in students' ability to achieve

32. Higher education opportunities are introduced in CTE career pathways that lead to training, technical development, and post-secondary degrees. (Barton, 2007, Lynch, 2000)
33. My students participate in engagement activities that display skill development levels through work-based learning experiences, co-op work experiences, competitions, internships, and industry certification. (Arum & Shavit, 1995, Balfanz, Herzog, & MacIver, 2007, Barton, 2007, Lynch, 2000)
34. My students see how the class work they complete has practical application and direct career relevance. (Balfanz, Herzog, & MacIver, 2007, Barton, 2007, Lynch, 2000)

Survey Domain- Emotional

35. Enhanced confidence and self-esteem is gained through skills learned in my CTE courses, improves overall outlook and student behaviors. (Bottoms & Young, 2008, VADOE, February 19, 2008)
36. My students enjoy emotional support from being involved in a class that rewards and recognizes participation. (Yazzie-Mintz, 2007)
37. Displayed CTE teacher industry credentials (certificates, licenses) adds value and motivates CTE students. (Mahlman & Austin, 2002, VADOE, February 19, 2008)
38. Emotional needs/satisfaction is enhanced through CTE instruction and classroom participation. National Foundation for Educational Research, 2006, Yazzie-Mintz, 2007)
39. My students value the awards, rewards, and recognition that come from co-curricular competitive events. (Schescke, 2008, Yazzie-Mintz, 2007)
40. My program is a means to reach disengaged students. (National Foundation for Educational Research, 2006)

Appendix C
Qualitative Data Question 39

Industry Certified or not	Question 39	Theme
No	All students see the value in learning to work. Completers are most likely to take instruction and be successful on the job.	
No	Been able to adapt to situations more readily and compete at levels w/others.	
No	Emotionally withdrawn students or even autistic students thrive in my program.	
No	Exceptional students interact and work cooperatively with all levels of students to benefit each other and increase mutual appreciation of their collaborative skills. FCCLA has given my students an opportunity to move beyond their own school environment and interact with students from across the state and nation. Developing leadership skills and service learning are very successful aspects of the FCCLA experience.	
No	Happy with work.	
No	Higher levels of self esteem-feelings of value & accomplishment.	
No	I encourage them to be a part of other extra curricular activities (clubs/organizations). Employers like it when they are aware of the team concept.	
No	Improved confidence with public speaking and idea sharing in an educational environment.	
No	I've seen students who have become involved in FCCLA mature during the year and enjoy belonging to the group. I feel students who have participated in FACS feel more worthy about themselves, and therefore, will be more successful in the future.	
No	Many find employment within the food service industry. Some even enter activities that promote culinary arts skills to participate for funds to attend culinary institutes.	
No	Many have gained employment in the area and many through skills gained have increased self-esteem, team work.	
No	Many students have found their niche because everyone is not going to college.	
No	Many went on to post-secondary education when they were not really planning to. Many students gained employment thought the skills they learned and applied.	
No	NA.	
No	None- we take a diverse population.	
No	Rise in self esteem.	

No	Some students do gain leadership skills through group projects.	
No	Students are able to align themselves with peers that have the same interest.	
No	Students are exposed to real life learning situations. Students tend to take this class serious because it teaches those independent living skills, consumer math skills, budgeting and money skills, and drivers training.	
No	Students began expressing themselves, Students are more comfortable with themselves, no longer shy.	
No	Students grow socially and their leadership skills are enhanced. Students learn how to solve problems. Students learn better ways to resolve conflict. Students have a true understanding of work ethics, what makes a good job performance, and a better understanding of customer service.	
No	Students learn real work interpersonal skills including communication, team building, and group problem solving.	
No	Students who are reserved have gained confidence and self-esteem to present to the class and participate in group activities. Students have learned negotiating strategies with peers and adults. Students gained networking skills to use in business and social relationships.	
No	Students who were indecisive as to what career path to pursue upon completion of high school have been accepted into 4 year colleges and those not so fortunate are able to enroll in 2 year colleges and transfer their credits. These students either seek MBA's or want to give back to society by majoring in the educational field.	
No	Students have become more aware of proper educate when speaking to people out side of the normal environment and the importance of proper social skills.	
No	Team projects promote cooperation and social interaction within and outside the classroom.	
No	The extended time students spend in a tech center program create a family atmosphere. My students have become close socially outside of the classroom and are more effective as a team.	
No	Their attitudes have improved.	
No	Their confidence and self-esteem appear to increase with time.	
Working Towards	Students are willing to participate in regional and State competitive events whether or not it is an individual event or group event.	
Working Towards	A greater sense of wanting to learn.	
Working Towards	Attendance.	
Working	more confidence and willing to support the students	

Towards	organizations.	
Working Towards	Some have lost bitterness from previous experiences by being exposed to the caring environment and nurturing they have received from CTE program teachers.	
Working Towards	Some students have been willing to participate in after-school activities showcasing the skills they have learned in class.	
Working Towards	Students are often eager to help those in need with specific tasks.	
Working Towards	Students are willing to work as a group and not be self-centered in the outcomes of the projects.	
Working Towards	Students from "rival" schools became friends. Students have an opportunity to socialize and work with students across the county.	
Working Towards	The majority of the students come to class on time and are ready to engage in class work.	
Yes	Being able to care for self and their dependents. Improved living conditions and a career instead of a job.	
Yes	Better communication skills Better outlook on future prospects.	
Yes	Better communication skills, improvement in self-motivation, improvement in organization skills.	
Yes	By working in collaboration activities and testing my students are highly engaged in the classes and learn to work with others.	
Yes	Children w/exceptionalities learn to communicate and work on a team with each other.	
Yes	Continued educational pursuits. Increased confidence and better sense of direction. Better citizenship and social skills.	
Yes	CTE is a means to reach disengaged students- Yes- High performers. Increased maturity and better focus on future.	
Yes	Encourages students to reassess their career goals.	
Yes	Great classroom climate, love coming to class, cohesiveness of students.	
Yes	Higher life success rate- (job, education, etc.) compared to school wide percentage.	
Yes	I have had disruptive, unmotivated students realize this is something they can actually do!	
Yes	I have had very shy students who would not speak in front of others, midway through the year become more outgoing and confident because of the creative lesson plans.	
Yes	I have seen students become more social through the program, especially when engaged in collaborative activities.	
Yes	I have seen students mature as they master certain computer and financial skills in my classes.	

Yes	I have witnessed students become more confident based on the participation in FBLA. Certain functions that we held allowed students to showcase their ideas, skills and talents have given them a place among their peers.	
Yes	I haven't seen any social changes. Maybe their parents see our classes as necessary instead of something that have to take.	
Yes	I think some of them have become better people.	
Yes	Improved collaboration skills and working in teams.	
Yes	Improved self confidence in professional and social environments.	
Yes	Increase maturity.	
Yes	Increased confidence.	
Yes	Interpersonal skills are enhanced.	
Yes	It is a growth experience. They learn to work in a team environment, are less intimidated engaging in oral presentations and employ a higher level of critical thinking skills.	
Yes	I've seen improved interest in building real life practical kits/systems and see how it's all put together, feeling of accomplishment.	
Yes	Many gain confidence and pride in their education. They can see a finished product they are proud of-ei shop project, greenhouse plants, handle houses well.	
Yes	Many students have decided to continue their education and have chosen majors that enhance their knowledge of business and technology.	
Yes	Maturity growth.	
Yes	Maturity, self-esteem definitely comes with the students successful on the job and easily makes connections in the classroom curriculum.	
Yes	More acceptive to adult guidance, more respectful and willing to participate in activities both in and outside of school.	
Yes	More aware of CTE education career goals. Personal & Professional aware.	
Yes	More involvement in school activities.	
Yes	My program is a means to reach disengaged students? It does happen-often- but that is not our purpose and neither are we a magic bullet. * Maturity & confidence especially via extra-curricular events.	
Yes	My students get a chance to meet students from throughout the county and become friends with people they may not have otherwise known. It serves as a diversified classroom and allows them opportunity to work with people of all nationalities, economic backgrounds, and educational levels. This prepares them for work in the future. Each student learns to work with others and develop team working skills.	

Yes	n/a.	
Yes	None.	
Yes	None.	
Yes	One of my classes, Sports Marketing, contains students that administration told me - no one likes to teach. Using project based learning in a team approach, my students were engaged with each other and learned, socially how to interact. They made great progress learning in that fashion.	
Yes	Provides a ready made group or friends for those rising 9th graders. (Instant social acceptability).	
Yes	Raise self-esteem, raise assertiveness and self starting, raise communication skills, raised independence, raise team work, and raise ability to work with mentally and physically challenged points.	
Yes	Responsibility, stewardship and teamwork.	
Yes	Some students have become more vocal, and even more comfortable in big groups/ I have had students who would never leave for an over night trip now going on 2, 3, and even 5 day trips with DECA.	
Yes	Some students see the value in a hard work ethic. Many begin to mature based on the hard work standard we developed.	
Yes	Some students who are very shy at first have found an avenue to come "out of their shell."	
Yes	Sometimes the student, who remains quiet, is found to have powerful academic skills and is paired with another student forming an unlikely friendship. Due to small class size, students bond together.	
Yes	Students are able to interact with people from different schools through competitions, interviews, etc.	
Yes	Students are engage in activities that both create and challenge leadership and social skills needed in today's work force.	
Yes	Students are independent and develop more communication skills. They are able to express themselves more openly.	
Yes	Students are more self confident.	
Yes	Students have evolved with positive enhancements in areas of attitude, behavior, self-esteem and respect for themselves and others.	
Yes	Students obtain interpersonal skills with peers from other schools and learn how to interact outside their home school. Communication skills are improved and gets them ready to deal with the public in healthcare.	
Yes	Students share information.	
Yes	Students that are not otherwise successful in other classes are able to work well and show skills.	

Yes	the ability to work as a team with many different types of people.	
Yes	The students as a whole have responded in a positive manner with the diverse gathering of schools.	
Yes	The students have become more outgoing.	
Yes	The worst students make the other students worse.	
Yes	They are more able to voice their opinions. They are more engaged with the public.	
Yes	They build self confidence and self-esteem.	
Yes	They exhibited greater self confidence and a desire to pursue education beyond the secondary offerings. There is also an increased positive display of communication skills and their place in the workplace.	
Yes	They gain confidence and pride in the production arena. Serving is a morale booster!!!	
Yes	They learn to work through diversity. And they develop the skill of emotional detachment when working with people who have challenging attitudes and personality.	
Yes	They take responsibility more seriously.	
Yes	Those who work part time seem to be more independent than other academic students who do not work. The wages they obtain allow them to buy symbols of their achievement.	

Appendix D
Qualitative Data Question 40

Industry Certified or not	Q 40	Theme
No	a better understanding of the relationship between career and classroom and understand the importance of community service.	
No	A few students who were under achievers were inspired to challenge themselves to set their academic goals higher than previously expected.	
No	A number of students who are not academically successful have found they are successful in my program in the practical, hands-on aspects of the class. Certification testing is however still a big issue for students with academic challenges (at least in my program.	
No	Been able to pursue higher education.	
No	CTE courses gives students the opportunity to be reinforced concepts from their core academic classes and gives kids an outlet to express themselves and do more hands on activities. I do not have Industry Certification in my class so those questions were N/A to me.	
No	Grades increase through application. Students learn better when they can apply what they learn.	
No	I have seen students who participate in these programs that they are really motivated to excel.	
No	Increased participation and focus on research and current events.	
No	Many students core class grades improved. Many students change their attitude about school in a positive way.	
No	Many students have become more focused as well as self reliant.	
No	More involved with class work.	
No	Most of my students have no interest in academics. They will work with their hands but resist anything requiring reading and writing.	
No	NA.	
No	Not enough information available.	
No	overall grades improve.	
No	Overall, students do very well in my classes and, hopefully, will increase their math, English, and science skills as well as economic knowledge.	
No	Some take higher math & science courses or continue to take a full course load as a senior.	
No	Some take on more advanced classes such as chemistry to learn about food sciences.	
No	Stronger math & science capabilities.	
No	Students grades tend to go up not only in CTE, but in their core classes as	

	well.	
No	Students have become aware of the importance of keeping their academic assignments neat and most are beginning to understand the carry over between having good attendance and grades within the school setting to an outstanding job performance.	
No	Students have become more professional, more self-reliant, and student achievement has increased.	
No	Students have gone on the perform better in other classes.	
No	Students see the connection between academic classes and CTE classes, and how together the knowledge/skills interact in the real world. Students who were on the fence about college have decided to attend college to further their business and marketing skills.	
No	Students that have been engaged in CTE programs place a high value on achieving more than the minimal grade. Most students find that any grade below a "B" is unacceptable. Those students who like to compete with one another are more likely to succeed at the higher institute of learning because the idea of being labeled a nerd or brainy are simply empty words that will not benefit them in their future endeavors.	
No	The ability to solve problems and increased inference.	
No	The few students who do further their education in a similar field have completed the same or similar projects at college and are able to use the past experience in here to expand on the project and be more successful. Students need to learn more problem solving skills at earlier levels of education. The few students that I have had go on to college for engineering/industry have said that the class has helped them.	
No	The students put forth more effort in learning "real life" situations because they know that they will encounter these situations through their daily lives. Students want to function independently as possible and will generally put forth more effort in classes that teach tangible real life skills.	
No	Their grades have shown improvement.	
Working Towards	Improved academic achievement.	
Working Towards	improved grades.	
Working Towards	Seniors miss class at end of school year.	
Working Towards	Some improve in other classes also.	
Working Towards	Students compete for higher grades each marking period.	
Working Towards	Students have improved attendance at school in order to participate in labs and other activities. Less students had failed at the end of the 4th quarter.	

Working Towards	Students make the connection between the real world and school and it starts to makes sense. As a result they get better grades.	
Working Towards	Students use skills acquired in the CTE program to enhance academic development in Core classes.	
Working Towards	The extra help they receive via CTE coursework encourages them to achieve elsewhere.	
Working Towards	They practice and follow directions with more detail.	
Yes	1. Found their calling and interest which lead to better grades and attention 2. This foundation will lead to better grades and next level-ex. nursing school 3. Some work hard to get a job at the end, so grades went up. I have many success stories and have seen some life changing situations. The reason is a power higher than me!	
Yes	A big difference in skill levels, when students see success they want more. The industry certification motivated some but others say I am going to college and will not use it. Others say I am not going into the field therefore it means nothing to them and the effort was poor by several.	
Yes	Academic achievement improves.	
Yes	All have passed SOL's. Attendance is about 90.	
Yes	At the beginning of the school year, there were a number of students who decided they were not going to participate in the classroom because they did not need the credit to graduate. The majority of those students have changed their attitudes and are engaged in the creative classroom projects.	
Yes	At the middle school level I do not see the impacts of CTE. At the high school level the students begin to see the correlation between life and CTE and make the academic necessary changes.	
Yes	Attendance improvement.	
Yes	better math skills.	
Yes	Better study strategies and skills. Do not display industry credentials perhaps I should!	
Yes	General appreciation for useable math, communication skills, and environmental science.	
Yes	Grades have increased in their core discipline areas. Students have utilized their skills in assisting other departments.	
Yes	Has been very positive.	
Yes	High numbers of licensed practical nurses continue their education and become registered nurses with BSN and MSN degrees. if not successful as LPN remain CAN.	

Yes	I feel the students gain a great foundation for what career they may pursue in the future. Some students that do not excel in their regular academic classes excel greatly in a CTE program. My biggest complaint is that a national sports medicine test for them to gain credentialing. They have to take a computer based test and workplace readiness test.	
Yes	I have no way of tracking this.	
Yes	I have seen many students become more actively engaged once they see the curriculum ties to their employment. I usually get a number of students who contact me after graduation to let me know how much my class was valuable and prepared them for their college major courses.	
Yes	Increase in passing of Industry Credential test.	
Yes	Increased grades.	
Yes	Interest in class - up in grades.	
Yes	More focused on learning, improved study skills.	
Yes	Motivated to get good grades and attend higher education.	
Yes	N/A.	
Yes	N/A.	
Yes	None.	
Yes	None.	
Yes	None noted-students who do well in other classes continue to do well, students who struggle in other classes continue to struggle.	
Yes	None.	
Yes	Often mainstream courses like geometry are very theoretical. My drafting classes represent an application which provides a concrete basis for grasping the same concepts.	
Yes	Over the years more academic students have enrolled in the program because of the social interaction and the notice they my program brought to the schools in the area of competitive events and the opportunity to participate in local and national events. The students were successful and this was brought back to the school. Students did not have to be athletics to get noticed.	
Yes	Overall grades improvements in my class.	
Yes	Project based learning in cooperative groups academically challenged those who are lazy to perform at a level higher than normal. Grades were higher in my CTE classes than other CTE classes that were taught out of the book.	
Yes	Some are more focused.	
Yes	Some realize there is an academic pathway for them where they can explore their CTE interest.	
Yes	Some students get discouraged when material becomes difficult. Others are not motivated in any class and or are in a class w/ a friend who despite seating arrangements will distract each other so very little work is done.	

Yes	Some students have shown more interest in other subject areas.	
Yes	Some students recognize their maximum potential through participation in my program.	
Yes	Student success in my class has generated confidence toward better achievement in their other classes.	
Yes	Students are able to recognize their potential to receive "good" grades which pushes them in their core classes.	
Yes	Students are encourage to use life skills learned to set goals and improve their academic skills in preparation for meeting these goals.	
Yes	Students are more eager to learn.	
Yes	Students come to explore career paths they want to learn. Most students make better grades in a tech program because they want to be here, which improves on study skills.	
Yes	Students continued to show increased engagement in class, the learning activities in my class encourage students' academic achievement. Students see how the class work they complete has practical application and direct career relevance.	
Yes	Students enroll and attend college - mostly 4 years for a degree, usually in health but not necessarily in the area I taught.	
Yes	Students gained more confidence in their math skills, and often a student who does not excel "on paper", may have outstanding hands-on skills, which gives them more confidence overall, improving classroom participation and test scores later on. It's remarkable!	
Yes	Students have learned basic math and reading skills.	
Yes	Students overall GPA increased. Students are interested in the subject and strive for high scores.	
Yes	Students strive to get good grades in my class which in turn shows them that they are able to achieve this in their other subject areas.	
Yes	Students tend to strive for higher achievement.	
Yes	Students who had grades of "C" or below became more motivated to achieve because I would give incentives and encouragement.	
Yes	The most rewarding is the Adobe Industry Certification for my web design class. They have excelled in Adobe Photoshop and are the 1st in the county to take the certification. This was indeed a success for my students. However, we are not allowed to participate in the Dual Enrollment as other classes as CTE Administrator will not add on any new classes that did not participate two years ago due to cost. This is definitely a disadvantage as other schools do and keeps some students from taking the classes.	
Yes	The students become engaged in critical thinking skills, their study habits improve, they strive to maintain their grades.	
Yes	The students develop better organizational skills.	

Yes	The students display a greater desire to pursue education/training in order to secure employment. They seem to recognize the relationship between education and earnings (\$\$\$\$\$).	
Yes	The students have used the skills taught in this class prepare other class work.	
Yes	They began to learn how to learn independently.	
Yes	They have taken more interest in retaining the information, as oppose to just earning a grade.	
Yes	They may realize that if they do hand-on projects, they have uncovered a hidden talent! Improved GPAs.	
Yes	This is the first year we gave the test. We had 14 out of 19 to pass the test. 98% of my students are very successful in all their areas of school.	
Yes	With using different modals to adhere to the different learning styles, my students have success in this program. There was only a 2% failure rate, which is phenomenal.	

Appendix E

Participant Recruitment Letter

Potential Research Study Participants,

My name is Kim M. Allen, and I am a doctoral student in Educational Leadership and Policy at Virginia Tech University. I am requesting your help with a research study for my dissertation. This is a study about the perceptions of Career and Technical Education (CTE) teachers about the influence of CTE on student engagement. The purpose of this study is to determine the perceptions of CTE teachers regarding their programs' influence on the level of engagement of their students and in addition, whether or not industry credentialing of the students or teacher adds to that influence. Of particular interest to the researcher will be the perceptions of the CTE teachers on student engagement. Your participation in this study will provide additional insight to help administrators, parents, and students to examine if the various components and teaching strategies, characteristic to CTE, are developing a change in student engagement.

Based on your role as a school district CTE professional, you have been selected to participate in a quick survey. Participants in this study are high school, CTE teachers located in three school divisions. Because my research focuses on student engagement, your views on CTE, student engagement, and industry certification are important. The data you provide on this survey will be analyzed and the findings will be developed into meaningful conclusions and recommendations that will assist divisions with selecting new course offerings, building master schedules, and finding ways to keep students engaged or enhance current strategies to re-engage students as they progress towards graduation. I need your help to make these recommendations and conclusions as insightful as possible.

If you wish to participate in this study, please click on the link below. This link will carry you to the short survey. All of your survey information will be kept confidential and your identity will not be revealed in the study. This information is being collected only for research purposes and will not be shared with anyone except the researcher. What the researcher finds from this study may be presented at meetings or published in papers, but your name will not ever be used in these presentations or papers. If at any time, you feel uncomfortable with a survey

question(s) you may choose not to answer the question(s) or you may choose to discontinue participation in the study.

In the future, you may have questions about your participation in this study. If you have any questions, complaints, or concerns about the research, you may contact Kim M. Allen via email at kmallen@vt.edu. Thank you for your time and input contributed to this study. Your guidance and support is greatly appreciated.

By clicking on the survey link and completing the survey, you are providing consent to participate in this study.

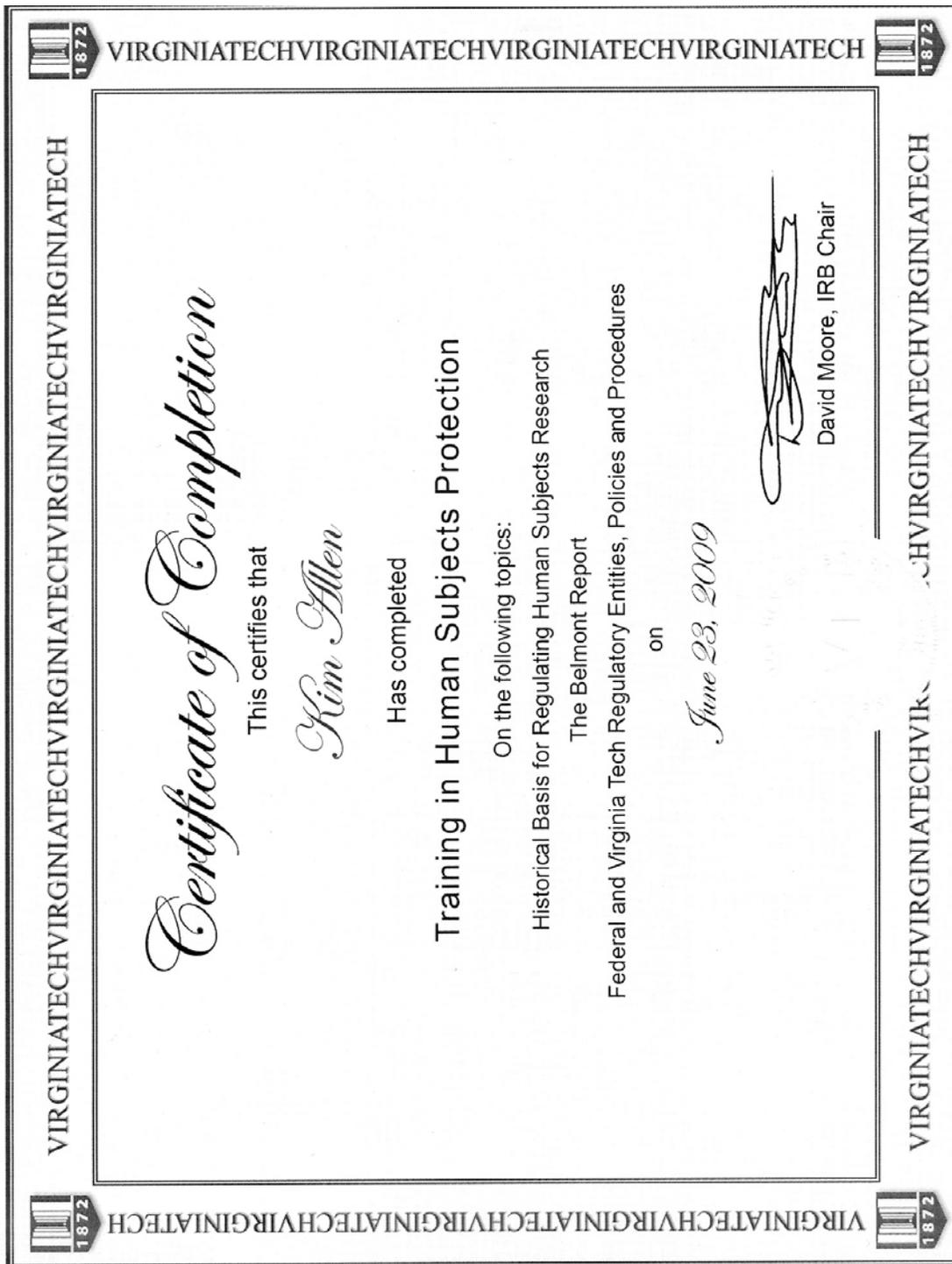
Sincerely,

Kim M. Allen

Kim M. Allen

Doctoral Candidate, Educational Leadership and Policy

Appendix F
IRB Training Certificate



Appendix G

IRB Exempt Approval



Office of Research Compliance
 Institutional Review Board
 2000 Kraft Drive, Suite 2000 (0497)
 Blacksburg, Virginia 24061
 540/231-4991 Fax 540/231-0959
 e-mail moored@vt.edu
 www.irb.vt.edu

FWA00000572 (expires 6/13/2011)
 IRB # is IRB00000967

DATE: March 3, 2010

MEMORANDUM

TO: Carol Cash

FROM: David M. Moore 

SUBJECT: **IRB Exempt Approval:** "The Perception of Career and Technical Education (CTE) Teachers on the Influence on CTE on Student Engagement", IRB # 10-161

I have reviewed your request to the IRB for exemption for the above referenced project. The research falls within the exempt status, CFR 46.101(b) category(ies) 2.

Approval is granted effective as of March 3, 2010.

As an investigator of human subjects, your responsibilities include the following:

1. Report promptly proposed changes in the research protocol. The proposed changes must not be initiated without IRB review and approval, except where necessary to eliminate apparent immediate hazards to the subjects.
2. Report promptly to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

cc: File

Invent the Future