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Examining the Relationship Between Program Satisfaction, Credential Earnings, and Gender on Full-Time Employment Outcomes of Career and Technical Program High School Graduates in Virginia

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EXAMINING THE RELATIONSHIP BETWEEN PROGRAM SATISFACTION,
CREDENTIAL EARNINGS, AND GENDER ON FULL-TIME EMPLOYMENT OUTCOMES
OF CAREER AND TECHNICAL PROGRAM HIGH SCHOOL GRADUATES IN VIRGINIA

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ABSTRACT

EXAMINING THE RELATIONSHIP BETWEEN PROGRAM SATISFACTION, CREDENTIAL EARNINGS, AND GENDER ON FULL-TIME EMPLOYMENT OUTCOMES OF CAREER AND TECHNICAL PROGRAM HIGH SCHOOL GRADUATES IN VIRGINIA

Margaret J. Turley
Old Dominion University, 2023
Director: Philip A. Reed

Career and technical education (CTE) incorporates occupational skills, workforce readiness skills, and credentials that make high school graduates better prepared for the workforce. Students who complete CTE programs of study have higher employment rates after high school graduation and often go on to postsecondary education. For those who do not go on to postsecondary education, CTE programs can provide opportunities for increased earnings and more access to the labor market.

This quantitative study used binary logistic regression, using data collected by the Center for Survey Research of the University of Virginia's Weldon Cooper Center to examine if satisfaction with CTE programs of study, earned credentials, and gender could predict if graduates used their CTE programs of study in their employment outcomes. The results showed that as satisfaction with their CTE programs increased, so did the likelihood they would choose to work full time in that same field of study. The results also showed that earning a credential in their CTE program increased the probability a student would choose full-time employment in their chosen CTE field within one year following high school. Gender was a nonsignificant factor in the study. The implications of this research are noteworthy for secondary school leadership, CTE advocates, and policymakers to help them understand how student satisfaction with CTE programs and providing human capital gains through earned industry credentials can

help improve student outcomes and provide a return on investment to industry partners who can bring valuable support and financial resources to CTE programs of study.

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This thesis is dedicated to the family, colleagues, and friends who encouraged me throughout this process. To my work colleagues Garry and Sam, you believed in me enough to recommend me for this doctoral program and were always interested in my progress. Thanks for lending your attention when I needed it; you are part of the reason I stayed on track and got through this! To my PhD partners Charlene and Susan, you all made this the journey of a lifetime! Here is to making new and lasting friendships! To my husband and children, you put up with late nights, missed meals, and all my frustration and still stood behind me every step of the way. You are always my reason. I appreciate it more than you will ever know! Much love to you all!

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College was not something I thought was in the cards for me as a teenager. In high school, I entered a vocational program because I thought that is where the non-college going kids went. Boy, was I wrong. Through my personal experiences in CTE and this doctoral program, I learned I was indeed the lucky one because I was fortunate enough to take part in CTE in high school. I learned many things in my CTE program, but most of all, I learned to stay committed even when it gets hard.

None of this would have been possible without the help of my committee. Dr. Kosloski, you have made this journey quite the adventure! Your willingness to set me straight when I would get discouraged helped more than you will ever know. And I will always be reminded of you when I hear Love in the Library (or any Jimmy Buffett song!). Dr. Yen, I can't thank you enough for all your help through this process and the valuable insight you have given me on this journey. My knowledge of statistics has expanded through your guidance. And to my chair, Dr. Reed, I appreciate everything you have taught me through both my master's and my doctorate. I knew right away that I wanted you to be my chair, and you did not disappoint. I appreciate all the feedback and guidance you provided throughout this journey, and your encouragement really kept me moving forward. Thank you so much for everything.

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CHAPTER 1

INTRODUCTION

Career and technical education (CTE) programs are an option for high school students who are looking to build career skills to enter the workforce. Today's rigorous, relevant, and industry driven programs in career and technical education prepare students for jobs that offer competitive wages, require a high level of skill, and are in demand in the workforce (Mindham & Schultz, 2019). For students who may not want to attend college directly after graduation, participation in career and technical education programs increases earnings and improves employment outcomes, reduces dropout and absentee rates, and improves postsecondary outcomes (Drage, 2009; Gottfried & Plasman, 2018). Also, students who decide to immerse themselves in CTE programs may experience positive tradeoffs such as better preparedness for entering the workforce without incurring large student loan debts for post-secondary education or trade school (Howard et al., 2022).

Educators, public officials, and policymakers must ensure that every student in our country graduates from high school prepared for college and a successful career (Jocson, 2018). For the past decade and a half, the proportion of students who enroll in postsecondary education immediately after completing high school has hovered just below 70% (McFarland et al., 2019). This implies that over 30% of high school graduates are choosing to not attend college for some other opportunity (Plasman, 2019). Career and technical education programs, by design, can prepare students who are not planning to attend college after graduation to enter the workforce.

One issue with the current career and technical education programs in the United States is there is no real standard to measure the performance of career and technical education because the federal government has no national system linking education to the workforce, Federal

accountability and reporting requirements for CTE programs has historically been focused on outcomes such as student achievement of academic or technical skills, graduation rates, postsecondary enrollment and students completing CTE programs in nontraditional roles (U.S. Department of Education, 2022). Stone and Lewis (2012) argued that because of this, the labor market continues to focus on a two-year or four-year degree as the primary pathway for transitioning youth rather than looking at the credentials students receive as part of career and technical education. Fischer (2013) and Stone (2014) pointed out that college graduates often lack employability skills such as problem solving, working in groups, and communication skills and adaptability, according to employer surveys.

Students who feel they have a say in their educational pursuits, have an interest in the content, and can relate the knowledge to something tangible would gain satisfaction from the realization that learning will be of some benefit to them in the future (Lawrence & Vimala, 2013). Pham et al. (2020) concluded that students who complete a CTE program at the community college level improved their employment outcomes. This study will focus on the employment outcomes of CTE students at the high school level and whether their satisfaction with that program of study, whether a credential was earned, and gender were factors in that employment outcome one year after graduating from high school.

Statement of the Problem

Students who are considering their postsecondary options following high school graduation can look to CTE programs of study to learn skills or earn credentials to build human capital while they consider their options for the future. The human capital gained in these CTE programs of study may increase the likelihood students will pursue full-time employment in their CTE field of study following high school graduation. Several factors contribute to student

choices after graduation, both academic and non-academic. Students may be persuaded by influencers (e.g., teachers, counselors, parents) to pursue the college option solely based on the perception that a four-year degree is needed to be successful (Fleming, 2016). Other students may find high levels of satisfaction in their CTE program of study which persuades them to continue down that path, whether it be full-time employment or continuing postsecondary education in their chosen industry. This study attempts to predict whether a student chooses full-time employment following high school graduation in their chosen CTE program of study based on how satisfied they were with that CTE program of study in high school, whether they earned a credential during that CTE program of study, and their gender. The analysis in this study is based on binary logistic regression, which is a commonly used algorithm for this type of problem (Harrell, 2015).

The problem of this study was to identify to what extent graduates' satisfaction with their CTE programs of study, earned credentials, and gender predicted if graduates used their CTE programs of study in their employment outcomes. Research shows the influence of employability can be substantiated by the application of human capital theory, where a person's human capital (i.e., qualifications, knowledge, skills, and experience) is likely to increase earnings or productivity in their field (Becker, 1993; Wittekind et al., 2010). CTE program completers that come away with the qualifications, knowledge, skills, and experience in their chosen pathway have a higher overall satisfaction with their school experience after taking CTE courses than their non-CTE counterparts (Fitzgerald, 2018). There is limited research on how high school students' satisfaction with their programs has affected the employment decisions students make following graduation. Research on this subject could be used by CTE leadership to update and

revise their current CTE programs to increase employment outcomes for their industry partners who invest in CTE programs at the secondary level.

Research Questions

To provide insight on high school graduates' perceptions of their human capital and employability after completing a career and technical education program of study, three questions were explored:

RQ1: How will CTE program graduates' satisfaction with their high school programs of study predict if their full-time employment is related to their CTE fields of study?

RQ2: How will professional certification or license in CTE program graduates' high school fields of study predict if their full-time employment is related to their CTE fields of study?

RQ3: How will gender of CTE program graduates predict if their full-time employment is related to their high school CTE fields of study?

Background and Significance

Making a career choice is a defining phase of any student's life (Kazi & Akhlaq, 2017). Many students struggle with these decisions because they do not feel ready to commit to a particular career field, causing young workers to struggle to find their place in the labor force (Hanushek et al., 2017). For this reason, many student influencers (i.e., parents, teachers, counselors) push students toward postsecondary education and students comply because of the perceived social capital created in social circles. This is because the prevailing mindset is that the way to succeed economically is to pursue a bachelor's degree (Symonds et al., 2011). This created demand for higher education, leading to a 500% increase in the number of postsecondary programs between 1985 and 2010, with college tuitions rising 19 times faster than incomes

(Decker, 2019). For some students, especially those with limited financial means, postsecondary education may not be a viable option. Students who have little interest in continuing education may not see college as the most appropriate option. For these students, career and technical education programs can provide a foundation in a potential career while also building workforce skills such as critical thinking, problem solving, logic, collaboration, and research and development (Gottfried & Plasman, 2018; Schargel & Smink, 2001). Career and technical education programs can also open doors to new postsecondary options that are affordable and attainable for all students.

Some believe career and technical education programs are intended for students at risk of dropping out, not graduating on time, or fall in a lower socioeconomic status. While there is evidence these students are well served in career and technical education programs (Bridgeland & Milano, 2012; Kelly & Price, 2009; Wonacott, 2002), research also suggests that high academic achievement students also benefit. Michaels and Liu (2020) found students in certain CTE programs achieved higher American College Testing (ACT) scores in mathematics, science, and English as compared to their peers. Advocates for career and technical education stress that our highly competitive market mandates exposure to occupation-specific skills and practices during students' formative years (Lanford & Maruco, 2018). Career and technical education provides the link between the needs of the labor market and the needs of young people to be prepared to move into the workforce or continue career-focused education and training beyond high school (Stone, 2014). Even with the benefits career and technical programs provide, schools are still faced with the growing pressures of increasing the academic achievement of students (Blowe & Price, 2012). Because of this, career and technical education programs rose to this challenge by providing not only workforce education, but increased the academic rigor

within career and technical programs of study (Stone et al., n.d.). Even with these changes, federal policy, parents, and guidance counselors still emphasize the importance of having a degree to achieve middle class success (Rosenbaum, 2001).

In recent years, there has been an increase in career and technical education course taking, but relatively little is known about what makes up high-quality career and technical education and whether it allows participants to accumulate meaningful human capital (Dougherty, 2018). There is research that suggests human capital is created by changes in students who learn new skills and abilities, which make them behave in new ways (Becker, 1993; Coleman, 1988). Students who complete career and technical programs of study learn new skills and abilities in a field that interests them and may lead them to perceive a higher level of human capital, which can positively affect employability.

There is research on student satisfaction when they are in their CTE programs (Loera et al., 2013), but research is limited when looking at satisfaction as a predictor of high school graduate full-time employment outcome. This study will use the research on student satisfaction, credential earnings, and gender as a guide to examine the relationship between satisfaction with their chosen CTE program of study, credential earning, and gender on full-time employment outcomes. The goal of this study is to better inform career and technical education leaders on how to maximize student satisfaction in career and technical education programs to increase youth employment when postsecondary education is not being considered immediately following high school graduation.

Conceptual Framework

Human capital is any activity that influences future income by increasing resources in people (Becker, 1993). Becker (1993) argued that, while many people consider capital to be

something tangible, like a bank account or stock shares, investing in schooling, employment training, and soft skills are also considered investments into human capital. Becker also suggested investment in human capital at younger ages could increase wages faster over time. For students who do not plan to attend postsecondary education after high school, the skills earned in high school CTE programs can be a catalyst for increased human capital at an earlier age, as students are prepared to enter the workforce after high school. From an employer's perspective, if an employee has basic skills when hired, employers can use that employee on a trial basis before investing in further training, creating benefits for both employer and employee (Becker, 1993).

Limitations

Factors that limit this study include:

1. This study was limited to students who graduated from high school, completed a CTE program of study in the Commonwealth of Virginia during the 2017-2018 school year, and completed the 2019 CTE follow-up survey through the Weldon Cooper Center for Survey Research at the University of Virginia. This school year was chosen to eliminate the impacts of COVID on the data for this study.
2. The study only includes students working full-time.

Assumptions

The following assumptions were made in this study:

1. CTE survey data received from the University of Virginia were accurate and complete.
2. Participants were honest about their satisfaction with CTE programs and their employment outcomes.

3. Students who selected yes to earning an industry, occupational, or professional certification or license earned that license or credential as part of their high school CTE program of study.
4. Students were asked to complete the survey one year following their high school graduation, so it is assumed they recall their satisfaction with their CTE program of study.

Procedures

The data used in this study were collected by the Virginia Department of Education through the Center for Survey Research of the University of Virginia's Weldon Cooper Center, which was an existing data set. The researcher was given permission by the Virginia Department of Education to use the data for the purposes of this study (Appendix A). The data were collected as a one-year follow-up survey for all students who completed a career and technical education program of study while in high school in Virginia. The survey, which is a requirement listed in Perkins legislation (Strengthening Career and Technical Education for the 21st Century Act, 2018, p. 17) and also part of Virginia's CTE plan (Perkins Collaborative Resource Network, 2023), collected data pertaining to demographic information, graduates' satisfaction with their self-chosen CTE programs of study, and their current employment and postsecondary outcomes.

Once the data were obtained, the data were cleaned to include only the data pertinent to the study and analysis of those data was completed using Statistical Package for the Social Sciences (SPSS). Descriptive statistics and logistical regression were used to explain the probability of graduates choosing full-time employment in a field related to their chosen CTE program based on satisfaction with their CTE program of study, whether they earned an industry,

occupational, or professional certification or license as a result of completing their chosen CTE program of study, and gender.

Definition of Key Terms

To gain a better understanding of this study, the following terms are defined:

- Career and Technical Education (CTE) – organized educational activities that offer a sequence of courses that provides individuals with (a) rigorous academic content and relevant technical knowledge and skills needed to prepare for further education and careers in current or emerging professions, which may include high-skill, high-wage, or in-demand industry sectors or occupations, which shall be, at the secondary level, aligned with the challenging State academic standards adopted by a State under section 1111(b)(1) of the Elementary and Secondary Education Act of 1965; (b) provides technical skill proficiency or a recognized postsecondary credential, which may include an industry-recognized credential, a certificate, or an associate degree; and (c) may include prerequisite courses (other than a remedial course) that meet the requirements of this subparagraph (Strengthening Career and Technical Education for the 21st Century Act, 2018, p. 4)
- Career and Technical Education Program Completer –a student who has met the requirements for a CTE concentration (course sequence) and all requirements for high school graduation, or approved alternative (Virginia Department of Education [VDOE], 2021a).
- Career Clusters – A grouping of occupations and broad industries based on commonalities. Within each cluster, there are multiple career pathways that represent a

common skillset of skills and knowledge, both academic and technical, necessary to pursue a full range of career opportunities within that pathway (VDOE, 2021a).

- Career Pathways – a combination of rigorous and high-quality education, training, and other services that:
 - Align with the skill needs of industries in the economy of the State or regional economy involved,
 - Prepare an individual to be successful in any of a full range of secondary or postsecondary education options, including apprenticeships registered under the Act of August 16, 1937 (commonly known as the “National Apprenticeship Act”; 50 Stat. 664, chapter 663; 29 U.S.C. 50 et seq.),
 - Include counseling to support an individual in achieving the individual’s education and career goals,
 - Include, as appropriate, education offered concurrently with and in the same context as workforce preparation activities and training for a specific occupation or occupational cluster,
 - Organize education, training, and other services to meet the particular needs of an individual in a manner that accelerates the educational and career advancement of the individual to the extent practicable,
 - Enable an individual to attain a secondary school diploma or its recognized equivalent, and at least one recognized postsecondary credential, and
 - Help an individual enter or advance within a specific occupation or occupational cluster (Workforce Innovation and Opportunity Act, 1998, p.6).

- Full-time employment – an employee employed on average at least 30 hours of service per week, or 130 hours of service per month (Internal Revenue Service, 2021)
- Industry credential – A recognized industry, trade, or professional association validating essential skills of a particular occupation (VDOE, 2021b).
- Postsecondary education – an institution of higher education that provides not less than a two year program of instruction that is acceptable for credit towards a bachelor’s degree, a tribally controlled college or university, or a nonprofit educational institution offering certificate or other skilled training programs at the secondary level (Strengthening Career and Technical Education for the 21st Century Act, 2018, p. 10).

Summary Overview of Chapters

Chapter I defined career and technical education program completers and provided background on human capital and employability after high school graduation. This chapter concluded with limitations and assumptions and a list of defined terms. Chapter II includes background information and historical, empirical, and theoretical information on career and technical education programs, a breakdown of career clusters associated with career and technical education programs, and background on human capital and employability.

CHAPTER 2

REVIEW OF LITERATURE

Central to this study is the relationship between how satisfaction with a high school CTE program of study can predict how a graduate will choose their employment outcome within one year of high school graduation. This section will provide a review of literature surrounding career and technical education, student satisfaction with school choices, employability after graduating a CTE program of study, human capital accumulation, gender in CTE, common themes in the research, and the gaps in the research being done in this field. This review is organized to show a brief history of CTE, how human capital is accumulated through CTE programs, how that human capital affects employability, and how student satisfaction and gender play a role in graduate outcomes. The last section will discuss CTE programs of study and use Virginia as an example of how CTE programs are organized to provide a better understanding of how students are prepared to enter the workforce after graduation.

Background of Career and Technical Education

Career and technical education has a long history in the United States, dating back to its vocational roots. It could be said that it started as far back as the start of our country with organized apprenticeship to maintain basic elements of society and trades were learned as a family business, but it really became established in education during the late 19th century through Johann Pestalozzi's ideas of including a vocational component in school curriculum (Gordon, 2020). In the early 20th century, vocational education was being used to increase not only the citizenship of students but would also make for greater efficiency in production and increase the wage-earning of youth by helping them move from non-academic occupations as unskilled laborers to positions as skilled workers sought after by industry (Wonacott, 2003). Through the

twentieth century, career and technical education evolved to meet the demands of the labor market as industries grow.

In the 1980's there was a shift in focus with secondary education because of the concerns of declining competitiveness in the international market, pushing students into more high stakes testing and promoting college as the only way to a successful career (Gordon & Schultz, 2020). This shift created a shortage of workers in the skilled trades throughout the next two decades (St. Esprit, 2019). It was also during this time when the emphasis on having a college degree became the proxy for employability (Stone & Lewis, 2012).

In the 1990s, the Carl D. Perkins Vocational and Applied Technology Act of 1990 and the Perkins Vocational and Technical Education Act of 1998 were leveraged to help improve student achievement in CTE programs to develop both academic and occupational skills by linking secondary programs and postsecondary programs (Lynch, 2000). These connections were made through programs like Tech Prep which connected students to postsecondary education with the desired results of completing a two-year associate's degree or a two-year apprenticeship (Newman & Winston, 2016). While these programs did help with areas of vocational education, they did not satisfy the requirements set by the U.S. Department of Education for higher academic attainment.

In the 2000s, there was another shift toward increasing academic standards for students who participated in career and technical education programs in an effort to remove the stigma and increase awareness of what these programs provided. With the reauthorization of the Perkins Act in 2006, there was a resurgence of CTE programs that combined academic rigor with career training and rebranded vocational education to career and technical education to lessen the stigma associated with the vocational education of the past (Newman & Winston, 2016; Rosen et

al., 2018). In recent history, CTE has moved back into the spotlight highlighting advanced academics, credentialing opportunities, and better workplace readiness skills. CTE programs have also become part of the discussion on college completion rates, student loan debt, and inadequate preparation for college (Newman & Winston, 2016).

Although the percentage of students who go to college following high school hovers at 70%, the number of students age 25-29 who complete their college degree within six years sits at 34% (McFarland et al., 2019; Newman & Winston, 2016). From an economic perspective, there is a critical need for more workers trained in critical fields, with over 30 million middle-skill jobs that do not require a four-year degree (Rosen et al., 2018). There is also a concern that traditional high schools will not be able to adequately develop employability skills in graduates (Rosen et al., 2018). Career and technical education continues to expand to fill these gaps today by providing a link between the needs of the labor market and the need for students to be prepared to move into the workforce or continue career-focused education and training beyond high school (Stone, 2014).

The Stigma of Career and Technical Education

Career and technical education has been stigmatized throughout much of its history by being perceived as less rigorous than core courses due to its focus on workforce preparation and incorrect associations with low pay, low-prestige occupations (Fletcher, 2012). CTE has also been criticized for constraining student achievement and academic development (Howard et al., 2022). CTE's ties to at-risk youth and socioeconomic status have helped create this effect, but research shows it can be an effective means to prevent student dropout in high school and prepare college- and career-ready graduates (Gottfried & Plasman, 2018). Although there have been attempts to rebrand CTE through legislation, negative perceptions still plague CTE

programs (Howard et al., 2022). Gray and Lewis (2018) noted a nationwide study in 2016-2017 that 32% of school districts report negative student and parent perceptions are a moderate barrier to CTE participation. Howard et al. (2022) also noted students who participate in CTE programs were less likely to attend a four-year college.

CTE programs can be a catalyst for success for students who are not interested in attending college directly after high school. For the past decade and a half, the proportion of students who enroll in postsecondary education immediately after completing high school has hovered just below 70% (McFarland et al., 2019). This implies that over 30% of high school graduates choose to forego college for other opportunities (Plasman, 2019). Of the 70% that choose to go to college, only 34% of students graduate with their degree within six years (McFarland et al., 2019; Newman & Winston, 2016). Career and technical education provides the link between the needs of the labor market and the needs of young people to be prepared to move into the workforce or continue career-focused education and training beyond high school (Stone, 2014).

Human Capital

Human capital, according to Becker (1993) can be defined as activities that influence future monetary and psychic income (non-monetary rewards such as pride or prestige) by increasing the resources of people. Becker argued that education and competence development are some of the most important investments that can be made in human capital. He suggests that non-traditional education such as vocational courses, seminars, and other non-program activities contribute to a person's human capital accumulation because this type of education improves physical and mental health and makes people happier because they are more productive (Becker, 1993).

There has been little research done on human capital accumulation as it pertains to career and technical education program completion at the high school level. Dougherty (2016) looked at CTE course taking and its impact on labor market outcomes. In a study of education and labor outcomes in Arkansas, Dougherty found that most students participate in CTE courses as part of their high school education, but there were additional benefits for students who took multiple CTE courses, especially students who were considered concentrators, or took a sequence of three or more specific, related classes. Daugherty also found the more CTE courses students take, the better their education and labor market outcomes (Dougherty, 2016). Dougherty (2018) provided a framework to identify human capital accumulation in a study in Massachusetts that looked at the causal impact of participating in a specialized high school-based CTE delivery system on high school persistence, completion, earning professional certifications, and standardized test scores, with a focus on low-income family students, as they are overrepresented in CTE and in non-high school completers (Dougherty, 2018). The results suggested that participation in a high-quality CTE program boosts the probability of on-time graduation from high school but could not determine if these programs helped accumulate meaningful human capital.

On a global scale, Wallenborn (2010) addressed human capital accumulation as a tool to promote socioeconomic progress through vocational education and training. Wallenborn also contended that an investment in career training can lead to increasing economic competitiveness and reducing poverty in the triangle of productivity, employability, and sustainable growth.

Donald et al. (2019) provided context for self-perceived employability and human capital accumulation in a study that focused on undergraduate perception of human capital and employability. Using social capital, cultural capital, psychological capital, scholastic capital, market value capital, and skills as subcategories of human capital, the study found that students'

perceptions of employability and human capital accumulation were dependent on career ownership. Mobley et al. (2017) noted that the career-focused education found in CTE programs gave students career ownership through the use of work-based learning, career and technical student organizations (CTSOs), skill-based competitions, and real-world projects.

Social Capital. Social capital can be found throughout the literature and in various studies pertaining to education. Coleman (1988) defined social capital as a structure of relations between actors and among actors. Coleman was interested in social capital as it pertained to the relationships gained by people while accumulating human capital through skills and education. Coleman felt social capital encompassed social structures and how people acted within those social structures (Coleman, 1988). Portes (1998) linked the relationship between teachers and students to social capital through a bonded solidarity, which helps students further accumulate capital. Bourdieu (1986) described social capital as a durable network of institutionalized relations, similar to a membership, where each member shares a similar credential that gives them credibility. This capital can be found in the students that attend career and technical education programs of study together, and along with their teacher become a group where having the same skill set or credential makes the members feel solidarity with their fellow students and teachers. Manno (2020) argued that schools need to focus on creating career pathway partnership models that build student social capital by expanding community networks, access to opportunity, and prepare them for life.

Flap and Boxman (2017) studied how social capital and networks factored into job searching for persons who had just completed higher level vocational training and were prepared to enter the workforce. The study's theoretical model was designed to understand if the use of formal and informal channels affected whether a person could secure employment and whether

an employer would select a candidate based on their social capital. The results showed that job seekers more often search informally for jobs when they possess more social capital (Flap & Boxman, 2017).

Cultural capital. Culture capital can be defined as an individual's social assets to include things like education, intellect, style of speech, dress, etc. and is used to explain how power in society was transferred and social classes were maintained (Aschaffenburg & Maas, 1997; De Graaf et al., 2000; Kalmijn & Kraaykamp, 1996; Roscigno & Ainsworth-Darnell, 1999; Sullivan, 2001). Bourdieu (1986) coined this term to describe how individuals enter the education system with varying levels of social assets because of their social backgrounds. De Graaf et al. (2000) studied participants in the Netherlands where they found significant effects on student attainment based on parents' cultural capital. In a study using data from the 1988 National Education Longitudinal Survey (NELS), Roscigno and Ainsworth-Darnell (1999) found that differences in cultural capital and household education resources showed inequality based on race, showing family background is influential for academic achievement.

Psychological capital. Psychological capital is the study of understanding who a person is rather than what or who they know (Luthans et al., 2004). Stajkovic et al. (2015) lists traits such as confidence, hope, optimism, and resilience as core competencies that directly factor into work motivation. This type of capital focuses on students experiencing positive emotions about their academic experience which increases self-efficacy and academic engagement and results in higher academic performance (Carmona-Halty et al., 2021).

Scholastic capital. Baruch (2009) defines scholastic capital as the volume of knowledge acquired by an individual, drawing on the role of education in preparing students for the graduate labor market and their future careers. This type of capital begins to accumulate through the early

years of schooling and builds upon itself as students perceive the value of things like grades, certifications, and diplomas (Nimmi et al., 2021). Career and technical education is by design applied learning which delivers content curriculum with relevant, authentic, and motivating context (Stone et al., 2008).

Market value capital. Baruch et al. (2005) define market value capital as having experience in the job market either prior to or during higher education and claims it is a part of human capital. Donald et al. (2019) found this type of capital is usually gained through courses designed to help students apply what they have learned in the classroom or in internships. Career and technical education programs in Virginia give students this experience using applied courses of instruction and opportunities to apply what they have learned outside the classroom. Students in CTE programs of study gain experience in their chosen field in the classroom prior to graduation, as well as receive opportunities to use their knowledge and skills in apprenticeship programs established by the high school as part of their standard curriculum (VDOE, 2021a).

Weber (2014) took a different approach to human capital accumulation in vocational education. This study looked at the link between human capital depreciation and education level using data from the Swiss Labor Force Survey (SLFS) to estimate if human capital depreciation is significantly related to education type. The study concluded education was significant because individuals having acquired more general skills during their youth appeared to invest more in their working lives. Vocationally trained workers, while receiving training in specific skills, did not invest as much throughout their careers. The conclusion states general education enables workers to adapt more effectively to new situation on the job market. Specific education, however, makes workers dependent on a specific workstation or a particular occupation, making them vulnerable to market fluctuations.

Skills. Education and adequate training are prerequisites for success in the workplace, but many education programs lack the real-world skills the workplace requires (McGunagle & Zizka, 2018). Donald et al. (2019) noted skills such as teamwork, oral communication, problem solving, time management, literacy skills, numeracy skills, and Information Technology (IT) skills are necessary to improve graduate self-perception of employability. These skills have also been seen throughout the literature as important skills sought by employers (Lerman, 2013; Oswald et al., 2019; Stone & Lewis, 2012).

Student Satisfaction with Education Programs

Student satisfaction can be measured as opinions of students about the services they received through student satisfaction feedback (Razinkina et al., 2018). Part of that assessment is how they feel about their environment, how important they found school to be, and the relationships made throughout the course of their education (Coelho & Dell'Aglio, 2019). Although student satisfaction is often measured in assessments following instruction, administrators tend to be suspicious of the results because other variables could contribute to the satisfaction ratings that did not come from the quality of the instruction they received (Howard & Maxwell, 1980).

There has been research on student satisfaction at the postsecondary level. Franklin (1999) developed a theoretical framework for student satisfaction based on qualitative data from university students. This framework showed student satisfaction comprised three constructs: landscape, geography, and consumerism. Landscape was defined as understanding what was expected of the students, feeling like they belong, and individual attention. Geography was defined as the operating core of the education process, to include the importance of caring, and having competent faculty and quality teaching. Consumerism was defined as being direct

consumers of the educational process. Students know they are investing in education and want their experience to reflect that investment. Each of these constructs is important in understanding how students define their own satisfaction (Franklin, 1999).

There have been studies at the community college level that have shown students who graduated from CTE programs of study were likely to work in the same field as their chosen CTE program. A longitudinal study in the Midwest showed over 83% of the total participants continued to work in the same field as their community college career program in the years following graduation (Conklin, 1998). Of the respondents, 86% expressed satisfaction with both their current job and nine out of 10 respondents showed their school experience enhanced self-confidence, improved their quality of life, and helped them achieve their educational objectives (Conklin, 1998). In California, Stevens et al. (2019) found there were statistically significant positive returns for a variety of CTE programs in the California community colleges, and this was especially true of individuals who were unlikely to complete a standard four-year academic program. Pham et al. (2020) found students who studied CTE programs in California community colleges had improved work status, higher hourly wages, and higher degree and certificate earning.

At the high school level, Loera et al. (2013) looked at what factors promoted motivation and academic engagement in a career and technical education context. Using 267 participants in 11th and 12th grade, the study focused on educational aspirations, perceived quality of academy programs of study, adults' impact on college enrollment, satisfaction with student life, and academic engagement as constructs. This study showed quality and effectiveness of a CTE program influences students' decisions to enter a program of study, and the programs have to be known for their excellence, caring staff, and career preparation (Loera et al., 2013).

Student satisfaction is addressed on the CTE completer follow-on survey which is part of the reporting requirements outlined by Perkins, which follow-on data from all CTE completers one year after graduating from high school. While the survey data does address satisfaction, the survey only asks one Likert scale question about overall satisfaction with the student's CTE program of study. Coelho and Dell'Aglia (2019) discuss other factors that could affect satisfaction to include environment, academic relevance, and relationships which are not addressed in the completer survey.

Student Perceptions of Employability

Perceived employability concerns an individual's perception of their possibilities of finding and maintaining employment in the workforce (Vanhercke et al., 2014). This perception can change from person to person depending on their competency, their disposition, and their human capital accumulation (Vanhercke et al., 2014).

While the concept of self-perceived employability has been studied (Magnano et al., 2019; Sungjun et al., 2015; Vanhercke et al., 2014; Wittekind et al., 2010), it is usually focused on understanding the employee rather than the student (Donald et al., 2019). It is also known that a deficit of employability skills has been a lingering complaint among employers over the years (Hernandez-Gantes et al., 2018).

Much of the research on student self-perceived employability has been done beyond the high school level (Bourner et al., 2011; Fidan & Koç, 2019; Niu et al., 2019; Rätty et al., 2018). Many of these studies focused on the skills employers were looking to make graduates more attractive to potential employers, with Fidan and Koç (2019) arguing that recent changes in the labor market have led many institutions in higher education to focus on the concept of employability. Rätty et al. (2018) found that students are rethinking the context of employability

because the labor market is ever changing and conflicts with the traditional academic ethos of having “book knowledge” and are looking more toward the soft skills employers are seeking. In their study of graduate students self-perceived employability, Rätty et al. found a vast majority of their participants saw themselves as persistent, self-confident, ambitious, having initiative, having social capital, liked public-speaking and risk taking, and had higher self-perceived employability.

Influences on Perceived Employability

Employability represents how an individual can improve their attractiveness in the labor market to include formal education, competence development and how much time spent in a particular job field (Berntson et al., 2006). There has been a lot of focus on employability at the high school level that includes introducing workplace readiness skills, also known as soft skills, into the curriculum. Workplace readiness skills are now incorporated into all CTE programs of study in Virginia schools (Virginia Department of Education, 2021) and the latest Perkins legislation (Strengthening Career and Technical Education for the 21st Century Act, 2018) has incorporated employability skills in their definitions of career and technical education and as part of their requirements for funding career and technical education programs. This can also be seen internationally where countries are working to promote employability skills among high school graduates. Wallenborn (2010) asserts that in looking at the international picture, vocational training is an important part of secondary education because the growth, employability, and productivity of a student requires up-to-date work-related competencies rather than the more general education achievements.

Earning Credentials in CTE

Credentials play an important role within the structure of career and technical education. Traditional higher education does work for many students, but not every student chooses or can afford college (Shanholtz, 2019). Earning credentials in CTE programs provides students with middle-skills (education beyond high school curriculum but less than a bachelor's degree) and can make students marketable in industries those credentials are needed (Prebil & McCarthy, 2018; Shanholtz, 2019). Many career pathways in CTE enable students to secure industry-recognized credentials and obtain employment within an occupational area and to advance to higher levels within their occupation (Dortch, 2014).

The Strengthening Career and Technical Education for the 21st Century Act (2018) and Workforce Innovation and Opportunity Act (2014) both include credential offering as part of the funding allocated for CTE programs. The Workforce Innovation and Opportunity Act requires local boards to award grants or contracts to providers of youth workforce investment activities that can lead to recognized credentials (Workforce Innovation and Opportunity Act, 2014). The Strengthening Career and Technical Education for the 21st Century Act (2018) includes credentials as an indicator of a quality CTE program and has become one of the reporting factors for states as an indicator of program quality. CTE programs in Virginia offer opportunities for students to gain industry credentials during their CTE programs of study. This program has allowed over 118,000 Virginia students to earn an industry credential since 2002, with 8,647 students earning a credential during the 2019-2020 school year (Virginia Beach City Public Schools, 2022). It should be noted that the number of students earning a credential was affected by school closures during the COVID-19 pandemic (VDOE, 2021b).

Although credentials have become prominent in today's CTE programs, there is some confusion surrounding the value that should be placed on credential earning. With over 5,000 active certifications available in the United States (Prebil & McCarthy, 2018), offerings vary state to state and how these credentials are defined can be inconsistent (Hendricks et al., 2021). Having so many credentials can cause students, teachers, and employers to have difficulty understanding their real value (Markow et al., 2017). In a study of understanding how computer aided drafting (CAD) credentials impacted community college programs and employment, Trent (2011) found that while education in computer aided drafting was important, credentials did not play a significant role in employer's hiring practices and found that employers only found credentials somewhat important. Trent's study noted that experience and people skills were held in higher regard than credentials when looking for respective employees.

Workplace Readiness Skills (WRS). Workforce readiness is an issue of great national and societal importance (Oswald et al., 2019). Having the skills to secure decent work fills the needs of survival and social connection as well as helps individuals reach a higher level of fulfillment in their lives (Oswald et al., 2019). The world of work is rapidly evolving because of factors such as globalization and market uncertainties but the need for skilled workers with transferrable skills like communication and problem-solving continue to grow (Lau et al. 2020).

Along with the technical knowledge taught in each program of study, the Strengthening Career and Technical Education Act (2018) has included language that outlines the inclusion of employability skills as part of CTE programs of study (Granovskly, 2018). The act also included competitive grant programs to support strategies and activities to align workforce skills with labor market needs (Granovskly, 2018). Work-based learning is a part of career and technical education that teaches skills largely ignored in more conventional school based learning and

includes soft skills like teamwork, problem solving, communication, entrepreneurship, work discipline, and improved literacy and numeracy (Stone & Lewis, 2012). Lerman (2013) points out that developing effective employability skills requires learning in the context of the workplace. Skills like learning to listen, working effectively in teams, maintaining work discipline, and being a reliable employee are valuable to employers and may not be taught at the postsecondary level (Lerman, 2013). While this credential offering helps answer calls from employers to improve workplace readiness skills in future employees, there can be some confusion as to the impact of including credentials in soft skills. While including soft skill credentials in CTE as part of the Perkins-required “quality indicator” rather than increasing industry credentials, it can lead to credentials being a check in the box rather than increasing human capital through industry recognized credentials (Hendricks et al. (2021).

In Virginia, Workplace Readiness Skills (WRS) have been added as part of their competencies within all CTE programs of study (VDOE, 2021b). These skills incorporate workplace readiness skills into the curriculum with knowledge and skills necessary to succeed in a variety of industries. The skills are a set of personal qualities, people skills, and professional abilities identified by employers and educators that were determined to be essential for employee success in today’s workplace (Crespin, 2019). Skills listed in Virginia’s 22 Workplace Readiness Skills are identified throughout the literature as high demand skills for employers (Casner-Lotto et al., 2009; Cummings & Babb, 2022; Majid et al., 2019; Minton-Eversole, 2009). Table 1 outlines the skills identified by the Commonwealth of Virginia as the Workplace Readiness Skills required to be taught in CTE programs. These skills are found in the competencies of every state CTE course and are also offered as part of a credential separately for all students graduating from high school in Virginia (Virginia Department of Education, 2021b).

Table 1*21st Century Workplace Readiness Skills for the Commonwealth*

Personal Qualities and People Skills	<ol style="list-style-type: none"> 1. Positive work ethic: comes to work every day on time, is willing to take direction, motivated to accomplish the task on hand 2. Integrity: abides by workplace policies and laws and demonstrates honesty and reliability 3. Teamwork: contributes to the success of the team, assists others, and requests help when needed 4. Self-representation: Dresses appropriately and uses language and manners suitable for the workplace 5. and manners suitable for the workplace 6. Diversity Awareness: Works well with all customers and coworkers 7. Conflict Resolution: Negotiates diplomatic solutions to interpersonal and workplace issues 8. Creativity and resourcefulness: Contributes new ideas and works with initiative
Professional Knowledge and Skills	<ol style="list-style-type: none"> 9. Speaking and Listening: Follows directions and communicates effectively with customers and fellow employees 10. Reading and writing: Reads and interprets workplace documents and writes clearly 11. Critical thinking and problem solving: Analyzes and resolves problems that arise in completing assigned tasks 12. Health and safety: Follows safety guidelines and manages personal health 13. Organizations, systems, and climates: Identifies big picture issues and his or her role in fulfilling the mission of the workplace 14. Lifelong learning: Continually acquires new industry-related information and improves professional skills 15. Job acquisition and advancement: Prepares to apply for a job and to seek promotion 16. Time, task, and resource management: Organizes and implements a productive plan of work 17. Mathematics: Uses mathematical reasoning to accomplish tasks 18. Customer service: Identifies and addresses the needs of all customers, providing helpful, courteous, and knowledgeable service
Technology Knowledge and Skills	<ol style="list-style-type: none"> 19. Job-specific technologies: Selects and safely uses technological resources to accomplish work responsibilities in a productive manner 20. Information technology: Uses computers, file management techniques, and software/programs effectively 21. Internet use and security: Uses the Internet appropriately for work 22. Telecommunications: Selects and uses appropriate devices, services, and applications

Note. This table shows the skills that are associated with the 21st Century Workplace Skills for the Commonwealth according to the Virginia Department of Education (2021b)

Gender

Gender differences have always been present in the labor market. Most often talked about are the differences in earnings which is clear in the data and literature (Bureau of Labor Statistics, 2020; Cervantes & Cooper, 2022), but other factors such as social capital and nontraditional course taking are also shown to play a role in labor outcomes. Gottfredson (1981) developed a theory of circumscription and compromise which explained how individuals would look favorably on certain career fields and avoid others based on gender norms. Gottfredson contended this could be due to how an individual's worldview is developed and the societal norms learned, and could help explain how gender plays a role in the occupation an individual studies (Gottfredson, 1981). Northern and Petrilli (2019) point out that when looking at CTE course taking at the national level, male students take more courses in Information Technology (IT), Science, Technology, Engineering, and Mathematics (STEM), manufacturing, architecture, and construction whereas female students tend to take more courses in health science, human services, education, arts, audio/visual (A/V) technology, and communications. There have been studies that also found unexpected gender differences in CTE and gender disparity in nontraditional course taking. Fluhr et al. (2017) conducted a study using data from a Midwestern state collected to satisfy Perkins requirements and had a sample size of 269,072 students. The study found that male students were 1.275 times more likely to take gender-nontraditional courses than female students, but that same study also looked at wage gap disparities which showed program area was more dependent than gender in the disparities (Fluhr et al., 2017). When looking at the transition to college, Dietrich et al. (2016) pointed out that outcomes such as student transfers to a four-year university from community college were similar for both males and females, but there was a higher proportion of females who earned a certificate or an

associate's degree while at the community college. Looking at employment outcomes, Northern and Petrilli (2019) found that although there are gender differences in course taking in CTE, there was no evidence that students responded differently to employment based on gender meaning all students were more likely to take CTE courses that correspond to their local employment opportunities.

CTE Programs of Study

CTE programs are organized into 16 career clusters (with some states such as Virginia adopting a 17th Energy career cluster), which are occupational groupings that identify skills knowledge and skills needed as students follow a pathway toward an occupation (Conneely & Hyslop, 2018). In the United States, 98% of public school districts offer CTE programs to students and 83% of those districts offer CTE programs in the traditional high school (Gray & Lewis, 2018). Virginia has a robust career and technical education program that includes many programs of study at the high school level and throughout the community college framework. In school year 2016-2017, Virginia high schools saw close to 300,000 students enrolled in one of the 16 career clusters (Virginia Department of Education, 2018). Of those 300,000 students, 40,496 were considered career and technical education program completers (Virginia Department of Education, 2021). Virginia's career and technical education program centers on those career clusters where programs of study are developed. Table 2 shows sample academic plans of study for each of the career clusters provided in the Commonwealth of Virginia. School districts can develop plans of study based on factors such as labor market needs and employer feedback.

Table 2

Career Clusters Represented in the Commonwealth of Virginia per the Virginia Department of Education (VDOE, 2021a)

Career Cluster	Sample Academic and Career Plans of Study
Agriculture, Food & Natural Resources	Agribusiness systems; Animal systems; Environmental service systems; Food products and processing systems; Natural resources systems; Plant systems; Power, structural and technical systems
Architecture and Construction	Construction; Design/pre-construction; Maintenance operations
Arts, A/V Technology and Communication	Audio/video technology and film; Journalism and broadcasting; Performing arts; Printing technology; Telecommunications; Visual arts; Interior design
Business Management and Administration	Administrative support; Business information management; General management; Human resource management; Operations management
Education and training	Administration and administrative support; Professional support services; Teaching and training
Energy	Energy sustainability and efficiency; Energy transmission, distribution, and storage; Fuels production; Power generation
Finance	Accountants and auditors; financial managers; Insurance sales agents; Tellers; Loan officers; Bill and account collectors; Loan interviewers and clerks; Budget analysts; Tax preparers; Credit analysts

Career Cluster	Sample Academic and Career Plans of Study
Government and Public Administration	Foreign service; Governance; National security; Planning; Public management and administration; Regulation; Revenue and taxation
Health Science	Biotechnology research and development; Diagnostic services; Health informatics; Support services; Therapeutic services
Hospitality and Tourism	Lodging; Recreation, amusements, and attractions; Restaurants and food/beverage services; Travel and tourism
Human Services	Consumer services; counseling and mental health services; Early childhood development and services; Personal care services
Information Technology	Information support and services; Network systems; Programming and software development; web and digital communications
Manufacturing	Health, safety, and environmental assurance; Logistics inventory control; Maintenance, installation, and repair; Manufacturing production process development; Production; Quality assurance
Marketing	Marketing communications; Marketing management; Merchandising; Professional sales
Public Safety	Correction services; Emergency and fire management services; Law enforcement services; Legal services; Security and protective services

Career Cluster	Sample Academic and Career Plans of Study
Science, Technology, Engineering, and Mathematics	Engineering and technology (Agriculture); Engineering and technology (Engineering); Engineering and technology (Technology); Science and mathematics
Transportation, Distribution, and Logistics	Facility and mobile equipment maintenance; Health, safety, and environmental management; Logistics planning and management services; Sales and service; Transportation operations; Transportation systems/infrastructure planning, management, and regulation; Warehouse and distribution center operations

Virginia CTE Program Graduate. Per the guidelines of Superintendent’s Memo #062-21 by James F. Lane, Superintendent of Public Instruction in the Commonwealth of Virginia (Lane, 2021), there are three ways a student can be considered a CTE program graduate and will receive the career and technical education seal on their diploma:

- Student earns a Standard or Advanced Studies Diploma and completes a prescribed sequence of courses in a career and technical education concentration or specialization that they choose with a B average or better
- Student passes an examination or an occupational competency assessment in a career and technical education concentration or specialization that confers certification or occupational competency credential from a recognized industry, trade, or professional association
- Student acquires a professional license in that career and technical education field from the Commonwealth of Virginia. (Lane, 2021)

A CTE program graduate is the same as a CTE program completer defined as a student who has met the requirements for a CTE concentration (course sequence) and all requirements for high school graduation, or approved alternative (Virginia Department of Education [VDOE], 2021a).

CTE Reporting Requirements

Federal accountability and reporting requirements for CTE programs have historically been focused on outcomes such as student achievement of academic or technical skills, graduation rates, postsecondary enrollment, and students completing CTE programs in nontraditional roles (U.S. Department of Education, 2022). In Virginia's Perkins V four-year plan, the core indicators that are required to meet reporting standards include reporting the percentage of CTE concentrators who, in the second quarter after graduating, are in postsecondary education or advanced training, military service, in a service program that receives assistance under Title I of the National and Community Service Act of 1990, are volunteers, or are employed (VDOE, 2020). Along with core indicators, congress made accountability a central focus, which included new reporting requirements to include additional quality indicators. This established new requirements for tracking data based on indicators of performance outlined in the legislation, as well as new quality indicators to better define high quality CTE programs. The requirement to have CTE program completers take part in a follow-up survey has been part of Perkins legislation in years prior, but the latest amended Perkin's authorization included a requirement for states to report on indicators of performance while expanding that reporting to include a new set of quality indicators. This new requirement expands state reporting to include whether students attained postsecondary credentials, earned postsecondary credits through dual or concurrent enrollment or participated in work-based

learning. In Virginia, one new program quality indicator identifies the number of CTE concentrators who met or exceeded a recognized postsecondary credential compared to the total number of students who took an assessment aligned to an industry standard (Perkins Collaborative Resource Network, 2023).

Gaps in the Literature

There are noticeable gaps in the literature where it pertains to the outcomes of high school students who graduate from CTE programs of study and whether they choose employment in their CTE field of study. The current research looks at CTE programs through a similar lens as this study, but the focus of much of that research is at the postsecondary or adult learning level (Donald et al., 2019; Stevens et al., 2019; Pham et al., 2020). Stevens et al. (2019) noted that, although there are significant results at the community college level, it does not mean postsecondary CTE programs are an easy solution for all students and workers. Research at the secondary level could close this gap in the literature and provide context on how high school CTE programs can improve high school graduate employment outcomes and help understand the skilled labor shortage in the United States.

There are also gaps in student satisfaction with CTE programs of study at the high school level. Much of the literature focused on student satisfaction at the postsecondary level (Conklin, 1998; Franklin, 1999; Stephens et al., 2019). This study will focus on student satisfaction at the high school level and how it affects employment outcomes of CTE students who choose to work full time after graduation. At the high school level, Loera et al. (2013) looked at what factors promoted motivation and academic engagement in a career and technical education context, but did not focus on overall satisfaction with students' CTE program of study. This study will focus

on overall satisfaction with students' CTE program and its relationship with employment outcomes.

There are also noticeable gaps in credential earning as it pertains to high school graduates who earn credentials and then choose full-time employment after high school graduation. Plasman et al. (2017) link high school CTE course taking to postsecondary credentials in the same CTE career cluster, but do not include credential earning at the high school level. Castillo et al. (2005) identified the importance of credentials in high school CTE as a measure of program success, but did not address the potential of student employment outcomes following graduation. Giani (2022) looked at credentials and employment outcomes of high school students, but the study was limited to the state of Texas. This study will expand upon Giani's work in credential earning and whether it can be an indicator of entering full-time employment after graduation based on the credentials they earned as part of a CTE program of study.

Summary

The goal of this literature review was to provide historical and current contexts for this study that examines to what extent student satisfaction with CTE programs, earning credentials in that program, and gender are related to whether graduates choose full-time employment in their CTE field of study. The first section outlined a brief history of career and technical education to provide background knowledge of why these programs exist. The second section focused on how CTE programs are administered in the Commonwealth of Virginia to show what is available to students graduating from CTE programs in Virginia, including opportunities to earn credentials and workplace readiness skills. The final section focused on student satisfaction, employability, human capital accumulation, and gender to show how skills accumulation is related to human capital accumulation, which increases perceived employability in the literature.

These combined topics laid the groundwork for exploring the research questions in this study.

Chapter III will detail the methodology of this study to include variables, instrumentation, data collection, and statistical analysis.

CHAPTER 3

METHODOLOGY

This chapter is dedicated to the methodology and procedures used in this study. It will outline the participants, research variables, instrumentation, data collection, procedures, and analysis performed. The purpose of this study was to determine the likelihood that a high school CTE graduate would pursue full-time employment in their chosen CTE field of study based on satisfaction with their CTE program, whether they earned a credential during that program, and their gender. There were three questions this study tried to address:

RQ1: How will CTE program graduates' satisfaction with their high school programs of study predict if their full-time employment is related to their CTE fields of study?

RQ2: How will professional certification or license in CTE program graduates' high school fields of study predict if their full-time employment is related to their CTE fields of study?

RQ3: How will gender of CTE program graduates predict if their full-time employment is related to their high school CTE fields of study?

Research Design

This study used a quantitative correlational research design to predict the outcomes of high school graduates who completed a CTE program of study and whether those outcomes are related to graduates' CTE programs of study. Correlational research design is used to examine the extent to which differences in one variable are associated with differences in one or more other variables (Leedy et al., 2019). A correlation exists if, when one variable increases, another increases or decreases in a predictable fashion, allowing for predicting the value of the other variable with some degree of accuracy (Leedy et al., 2019). The research also took a post-

positivist approach, where seeking absolute truth is the elusive goal and progress toward understanding tends to be gradual and probabilistic (Leedy et al., 2019).

Participants

The participants chosen for this study were all students who completed a CTE program of study in the Commonwealth of Virginia in 2018, completed the CTE Completer Follow-up Survey (Center for Survey Research, Weldon Cooper Center for Public Service, 2021) administered through the University of Virginia's Weldon Cooper Center for the Virginia Department of Education in 2019, and selected employed full-time on their survey responses. These data are a compilation of all CTE program completers one year after their program completion who completed the follow-up survey. The participants were surveyed one year after they graduated from high school and were considered a CTE completer per the Virginia Department of Education, Office of Career and Technical Education Services, as students who met all the requirements for a career and technical concentration and all requirements for high school graduation (The Career and Technical Education [CTE] Completer Follow-Up Survey Guide, 2021).

Table 3 shows the number of CTE completers based on school year in the Commonwealth of Virginia (VDOE, 2021a). These numbers include students who completed CTE programs of study and completed high school with a diploma. The study will focus on CTE completers from the 2018-2019 school year who also completed the CTE follow-on survey in 2019 one year after CTE program completion. This participant group was chosen because they completed their CTE program and completed the follow-up survey prior to the COVID-19 pandemic. There were several impacts to student learning during the COVID-19 pandemic to include limited engagement with CTE students due to the nature of the hands-on training CTE

provides, as well as limited credential offering in CTE programs (Dougherty et al., 2022). The totals in Table 3 are not the participant totals as the study will select only participants who selected *employed full time* on their survey responses. Those participant numbers will be defined in chapter 4.

Table 3

Total CTE Program Completers and Survey Responders

School Year	Number of CTE Completers	CTE Completers who responded to the Follow-up Survey
2018-2019	41,426	31,278
2017-2018	40,516	32,285
2016-2017	42,404	33,673
2015-2016	39,291	31,120

Variables

The dependent variable for this study was the consistency between CTE program graduates' fields of study and the fields of their full-time employment one year after their CTE program completion. The independent variables for this study were graduates' satisfaction with their CTE program of study, whether the graduate earned an industry, occupational, or professional certification or license during their CTE program of study, and gender.

The categorical dependent variable with the binary outcomes (i.e., yes vs. no) was the relationship between CTE program of study and the field of full-time employment one year after their CTE program completion. The related survey item asked if the graduates' employment was related to their CTE program of study.

The independent variable for RQ1 was students' satisfaction with their CTE program of study. This was an ordinal, categorical variable. The data were collected using a four-point

Likert-type scale ranging from one being *very dissatisfied* to four being *very satisfied*. The subgroup of satisfaction that will be used to derive the odds and predicted probabilities will be the *very satisfied* subgroup, which were students who chose “very satisfied” with their CTE program of study on the follow-up survey.

The independent variable for RQ2 was whether students earned an industry, occupational, or professional certification or license as a result of completing their chosen CTE program of study. This was a binary, categorical variable with the responses being *yes* or *no*. The subgroup of earned industry, occupational, or professional certification or license that will be used to derive the odds and predicted probabilities will be the *yes* subgroup. These were students who earned a credential as part of their CTE program of study on the follow-up survey.

The independent variable for RQ3 was gender. This is a binary, categorical variable (male/female) and no options (such as non-binary) were provided. These data were provided as part of the demographic information within the data set. Other independent variables were used for initial data analysis to include career cluster and whether students continued postsecondary education in the same field as their CTE program of study. The subgroup of gender that will be used to derive the odds and predicted probabilities will be the *female* subgroup. Gender data was derived from the Department of Education database and was included as part of the demographic data for the CTE follow-up survey.

Instrumentation

The data for this study were collected by the Virginia Department of Education, Office of Career and Technical Education Services, using the Virginia CTE Completer Follow-up Survey (Center for Survey Research, Weldon Cooper Center for Public Service, 2021). Permission to

use the data can be found in Appendix A and a copy of the survey instrument can be found in Appendix C.

The first section of the instrument collected information related to satisfaction with graduates' CTE programs of study, whether the graduate received an industry, occupational, or professional certification or license as a result of completing the program, and whether the graduate was currently working to obtain an industry, occupational, or professional certification or license. For this study, Questions 1 and 2 of the survey were used to identify the level of satisfaction of each participant and whether a credential was earned during their CTE program of study.

The second section of the instrument collected employment and labor force status information to include whether the graduate was currently active duty with the U.S. Armed Services, employed in a full-time position, or employed in a part-time position. For this study, Question 5 was used to identify participants who selected "employed full time" on the survey. Participants who did not select "employed full time" were removed from the study. Questions 10 and 11 were used to identify whether participants' full-time employment was related to their CTE courses in high school and if their credential was related to their current full-time employment.

The third and fourth section of the instrument collected information related to postsecondary education following graduates' CTE programs in high school such as whether the graduate has received training or any other education since graduating from high school, if they were a full or part-time student, which types of education they participated in after high school, and to what extent their postsecondary area of study is related to the CTE program they

completed in high school. Section four allowed participants to make comments about their experience in their CTE programs. These sections were not used in this study.

The demographic information was provided by the Department of Education and gender was a binary category associated with their student identification number. Students were not given the opportunity to select gender while completing the survey.

Method of Data Collection

The data used in this study were collected by the Virginia Department of Education through the Center for Survey Research of the University of Virginia's Weldon Cooper Center (Weldon Cooper Center for Public Service, n.d.), making this an existing data set. Permission was given by the Virginia Department of Education to use the data set for the purposes of this study (Appendix A).

The Center for Survey Research collected these data from Virginia high school graduates who completed a CTE program while attending high school. This survey satisfied the requirements outlined in Perkins focusing on collecting data on outcomes such as student achievement of academic or technical skills, graduation rates, postsecondary enrollment, and students completing CTE programs in nontraditional roles (U.S. Department of Education 2022). It also satisfied quality indicator data such credential earning as outlined in the latest amendment of Perkins (Perkins Collaborative Resource Network, 2023), and has been adopted as part of Virginia's CTE plan to satisfy reporting requirements by following up with students who have completed a CTE program of study within one year of high school graduation (VDOE, 2020). The survey and directions on how to complete the survey are delivered one year after high school graduation through various channels to include email, text, teacher engagement, and social

media. The survey was delivered using a student number assigned by the Virginia Department of Education.

Data Analysis

A binary logistical regression was used for this study. This model is used when studying how a set of predictor variables are related to a binary, categorical variable (Harrell, 2015). This model can be used to determine the probabilities of the outcome based on two possible responses such as yes/no, true/false, or negative/positive (Harrell, 2015). This study looked at the probability of graduates' full-time employment in the industry related to their CTE program of study based on satisfaction with CTE programs, whether graduates received an industry, occupational, or professional certification or license as a result of completing their CTE program, and their gender. The likelihood ratio chi-square test will be used for RQ1, RQ2, and RQ3 to assess goodness of fit based on the ratio of their likelihoods. Should satisfaction levels, credential earning, and gender relate to the predicted probabilities of the consistency between CTE program graduates' field of study and the fields of their full-time employment one year after their CTE program completion, the Wald test of the regression coefficients will examine if a particular subgroup differs from the reference group in terms of the aforementioned predicted probability. Moreover, the predicted probabilities of the consistency between CTE program graduates' fields of study and the fields of their full-time employment one year after their CTE program completion will be estimated for various subgroups defined by each statistically significant independent variable.

For each research question, a binary logistical regression was used to determine the probability of graduates choosing full-time employment related to their CTE program using

satisfaction with their CTE program of study, whether they earned an industry, occupational, or professional credential or license during their CTE program of study, and gender as predictors.

Summary

Chapter 3 detailed the methodology and procedures of this study. The chapter began with a description of the study participants. Research variables were named and categorized and what descriptive data would be included in the data collection. The dependent variable was graduates' employment in their chosen CTE program of study. The independent variables were students' satisfaction with their CTE programs of study, whether graduates received an industry, occupational, or professional certification or license as a result of completing their CTE program, and gender. Data from the Virginia CTE Follow-Up Survey (Weldon Cooper Center for Public Service, 2021) were used, and data were analyzed using a binary logistical regression model. The findings of the data collection and analysis will be reported in Chapter IV.

CHAPTER 4

RESULTS

The problem of this study was to identify to what extent graduates' satisfaction with their CTE programs of study, earned credentials and gender predicted if graduates used their CTE programs of study in their employment outcomes. This chapter presents the results of the research questions:

RQ1: How will CTE program graduates' satisfaction with their high school programs of study predict if their full-time employment is related to their CTE fields of study?

RQ2: How will professional certification or license in CTE program graduates' high school fields of study predict if their full-time employment is related to their CTE fields of study?

RQ3: How will gender of CTE program graduates predict if their full-time employment is related to their high school CTE fields of study?

The findings of the study are presented in this chapter including human subjects approval, response rate, descriptive data, and logistic regression analysis.

Human Subjects Approval

This study was approved by the Human Subjects Committee of Old Dominion University (Appendix B). This study was deemed exempt as it uses survey research on adults that has already been collected. The Weldon Cooper Center removed all identifiable information (names and student identification numbers) prior to providing the data, so all participants remained anonymous.

Response Rate

The data used for this study were collected by the Walden Cooper Center of the University of Virginia for the Virginia Department of Education. Permission was given to use these data (Appendix A). Permission was received from Old Dominion University's Human Subjects Committee to proceed with the existing data set (Appendix B) for the purposes of this study. There were 41,438 participants who responded to the survey. Once applying the inclusion criteria identified in Chapter 3 (students who selected employed full time on the survey), the final number of participants analyzed for this study was 7,712 graduates. The participants included students who graduated from high school who also completed a CTE program of study while enrolled in public school and were employed full time at the time the survey responses were recorded.

Descriptive Data

In the participant group ($n = 7,712$), there were a larger number of participants working full-time in a field related to their CTE program ($n = 4,035$, 52.3%) than participants who were not working full-time in a field related to their CTE program ($n = 3,677$, 47.7%). There were more students earned a certification or license as part of their CTE program of study ($n = 5,488$, 71.2%) than students who did not earn a certification or license as part of their CTE program of study ($n = 2,224$, 28.8%). There were more male participants ($n = 4,923$, 63.8%) than female participants ($n = 2,789$, 36.2%). Table 4 lists the descriptive statistics for each of the independent variables in the study.

Table 4*Descriptive Statistics for Independent Variables in the Sample*

Variable	Frequency	Percentage	M(<i>SD</i>)	<i>Mdn</i>	Range	
					Min.	Max.
Satisfaction			3.45 (.545)	3.00	1	4
Very Satisfied	3,653	47.4				
Satisfied	3,934	51.0				
Dissatisfied	93	1.2				
Very Dissatisfied	32	.4				
Gender						
Male	4,923	63.8				
Female	2,789	36.2				
Credential Earning						
Yes	5,488	71.2				
No	2,224	28.8				

Statistical Analysis

A binary logistical regression was used for this study. This model is used when studying how a set of predictor variables is related to a binary, categorical variable (Harrell, 2015). This model can be used to determine the probabilities of the outcome based on two possible responses such as yes/no, true/false, or negative/positive (Harrell, 2015). This study looked at the probability of graduates' full-time employment in the industry related to their CTE program of study based on satisfaction with CTE programs, whether or not graduates received an industry, occupational, or professional certification or license as a result of completing their CTE program, and their gender. The likelihood ratio chi-square test was used for RQ1, RQ2, and RQ3 to assess goodness of fit based on the ratio of their likelihoods. Should satisfaction levels, credential earning, and gender relate to the predicted probabilities of the consistency between CTE program graduates' field of study and the fields of their full-time employment one year after their CTE program completion, the Wald test of the regression coefficients examined if a particular subgroup differs from the reference group in terms of the aforementioned predicted probability.

Moreover, the predicted probabilities of the consistency between CTE program graduates' fields of study and the fields of their full-time employment one year after their CTE program completion was estimated for various subgroups defined by each statistically significant independent variable.

Student Satisfaction. Research Question 1 investigated if student satisfaction with their CTE program of study could predict if a student would choose to work full time in the same field as their CTE program of study. The subgroup of satisfaction that was used to derive the odds and predicted probabilities was the *very satisfied* subgroup, which were students who chose "very satisfied" with their CTE program of study on the follow-up survey. Using logistic regression, the results showed a relationship between student satisfaction and whether a student chooses to work full time in the same field as their CTE program of study $\chi^2(3, N = 7,712) = 430.788, p < .001$. The beta for the independent variable was negative, suggesting a negative relationship on the probabilities of whether students chose full-time employment in the same field as their CTE program as satisfaction declined.

Predicted probabilities of students choosing to work full time in the same field as their CTE program of study were calculated to determine how student satisfaction predicted whether a student would choose to work full time in the same field as their CTE field of study. Using the predictor *Student Satisfaction*, with values ranging from 1 (very dissatisfied) to 4 (very satisfied), and using very satisfied students as the reference group, the results showed the predicted probability of .64577 (64.5%) for students choosing to work full time in the same field as their CTE program of study among very satisfied students. The predicted probability decreased to .41637 (41.6%) among students who said they were satisfied with their CTE program of study. The predicted probability decreased to .26882 (26.8%) among students who said they were

dissatisfied with their CTE program of study. Last, the predicted probability increased to .40625 (40.6%) among students who said they were very dissatisfied with their CTE program of study. Table 5 presents the chi-square likelihood ratio test result, and Table 6 presents the regression coefficients intervals (CI) for odds ratios (OR) for the predictor.

Table 5

Omnibus Tests of Model Coefficients for Student Satisfaction

		χ^2	<i>df</i>	Sig.
Step 1	Step	430.788	3	<.001
	Block	430.788	3	<.001
	Model	430.788	3	<.001

Table 6

Logistic Regression Results for Predicting Whether Student Satisfaction Predicts Choosing Full-Time Employment in Same Field as CTE Program of Study

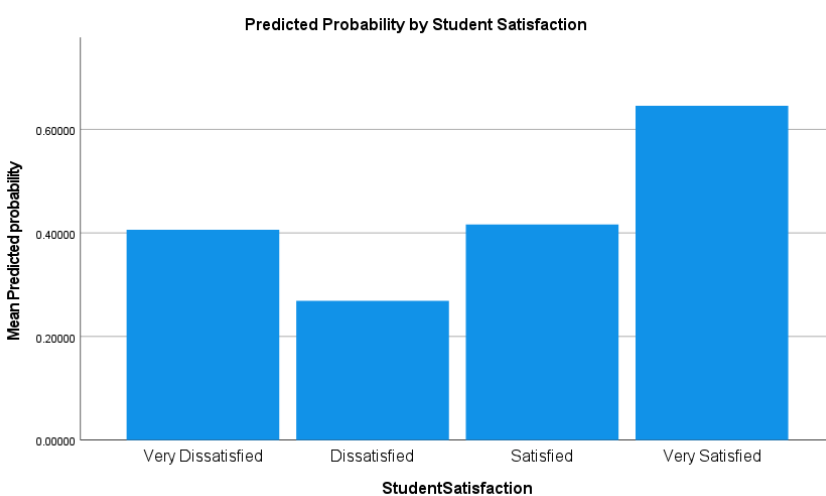
Step	Variable Entered	B	Wald	<i>df</i>	Sig.	Exp (B)	95% CI for Exp (B)	
							Lower	Upper
1 ^a	Student Satisfaction		416.068	3	<.001			
	Very Dissatisfied	-.980	7.345	1	.007	.375	.185	.762
	Dissatisfied	-1.601	45.859	1	<.001	.202	.127	.321
	Satisfied	-.938	392.467	1	<.001	.391	.357	.429
	Constant	.600	301.327	1	<.001	1.823		

Figure 1 shows the predicted probabilities for students who will choose to work full time in their CTE program of study dependent on satisfaction with their CTE program of study. Looking at the probabilities, it shows that as student satisfaction increases, so does the probability of that student choosing to work full time in the same field as their CTE program of

study except for very dissatisfied students. It should be noted that of the total number of participants ($N = 7,712$) there were only 32 participants who said they were very dissatisfied with their CTE program.

Figure 1

Predicted probabilities for full-time employment in the same field as CTE program of study based on satisfaction with CTE program of study



Credential Earning. Research Question 2 investigated if a student earning a credential as part of their CTE program of study could predict if a student would choose to work full time in the same field as their CTE program of study. The subgroup of earned industry, occupational, or professional certification or license that was used to derive the odds and predicted probabilities was the *yes* subgroup. These were students who earned a credential as part of their CTE program of study on the follow-up survey. Using logistic regression, the results showed a relationship between credential earning and whether a student chooses to work full time in the same field as their CTE program of study $\chi^2(1, N = 7,712) = 421.12, p < .001$. Predicted probabilities were calculated to determine how earning a credential predicted could predict whether a student would choose to work full time in the same field as their CTE field of study.

Using the predictor *Credential Earned*, with binary of 0 for *no* and 1 for *yes*, the results showed the predicted probability of .59712 (59.7%) for students choosing to work full time in the same field as their CTE program of study among students who earned a credential. The predicted probability decreased to .34083 (34%) for students who said they did not earn a credential as part of their CTE program of study. Table 6 presents the chi-square likelihood ratio test result, and Table 7 presents the regression coefficients intervals (CI) for odds ratios (OR) for the predictor.

Table 6

Omnibus Tests of Model Coefficients for Credential Earning

		χ^2	<i>df</i>	Sig.
Step 1	Step	421.118	1	<.001
	Block	421.118	1	<.001
	Model	421.118	1	<.001

Table 7

Logistic Regression Results for Predicting Whether Credential Earning Predicts Choosing Full-Time Employment in the Same Field as CTE Program of Study

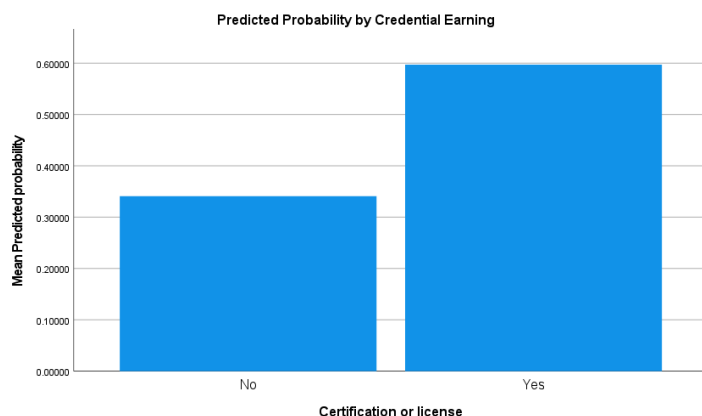
Step	Variable Entered	B	Wald	<i>df</i>	Sig.	Exp (B)	95% CI for Exp (B)	
							Lower	Upper
1 ^a	No Credential Earned	-1.053	401.984	1	<.001	.349	.315	.387
	Constant	.393	.028	1	<.001	1.482		

Figure 2 shows the predicted probabilities for students who will choose to work full time in their CTE program of study dependent on credential earning as part of their CTE program of study. The figure shows a higher probability of students working full time in the same field as

their CTE program of study if they earned a credential as part of their CTE program. It is less likely for students to work in the same field if they did not earn a credential as part of their CTE program.

Figure 2

Predicted Probabilities for Credential Earning



Gender. Research question three investigated if gender could predict if a student would choose to work full time in the same field as their CTE program of study. The subgroup of gender used to derive the odds and predicted probabilities was the *female* subgroup. Using logistic regression, the results showed a nonsignificant relationship between gender and whether a student chooses to work full time in the same field as their CTE program of study $\chi^2(1, N = 7,712) = 1.864, p = .172$. Table 8 presents the chi-square likelihood ratio test result, and Table 9 presents the regression coefficients intervals (CI) for odds ratios (OR) for the predictor.

Table 8

Omnibus Tests of Model Coefficients for Gender

		χ^2	<i>df</i>	Sig.
Step 1	Step	1.864	1	.172
	Block	1.864	1	.172
	Model	1.864	1	.172

Table 9

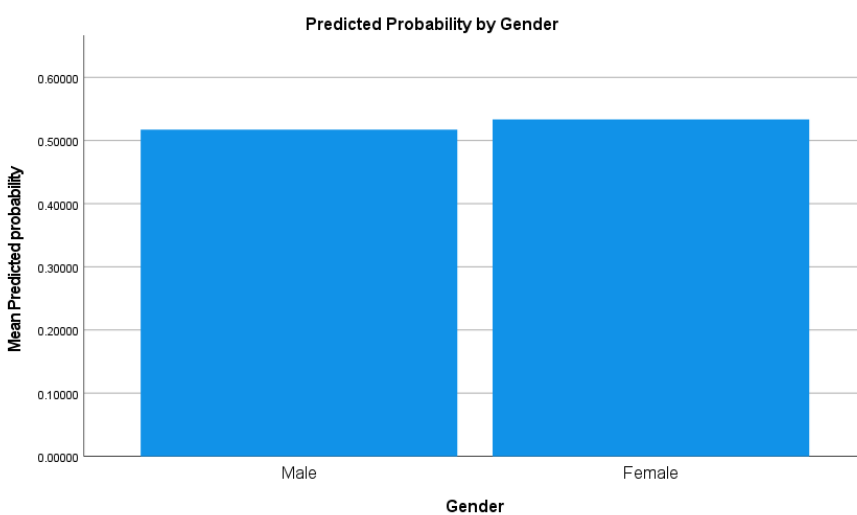
Logistic Regression Results for Predicting Whether Gender Predicts Choosing Full-Time Employment in the Same Field as CTE Program of Study

Step	Variable Entered	B	Wald	df	Sig.	Exp (B)	95% CI for Exp (B)	
							Lower	Upper
1 ^a	Gender	.065	1.863	1	<.172	1.067	.972	1.171
	Constant	.069	5.937	1	<.015	1.072		

Figure 3 shows the predicted probabilities for students who will choose full-time employment in the same field as their CTE program of study dependent on gender. The predicted probabilities show that the probability was generally the same for both male and female students.

Figure 3

Predicted Probabilities by Gender



Summary

This study focused on employment choices of high school graduates who completed a CTE program of study and whether their satisfaction with their CTE program of study, whether they earned a credential as part of that CTE program of study and gender could predict whether a CTE program graduate would work full-time in the same industry as their CTE program of study. The results showed a significant relationship between student satisfaction and whether a student chooses to work full time in the same field as their CTE program of study $\chi^2(3, N = 7,712) = 430.788, p < .001$, indicating student satisfaction with their CTE program significantly predicts the outcome variable, full-time employment in the same field as their CTE program of study. Predicted probabilities were calculated to determine how student satisfaction predicted whether a student would choose to work full time in the same field as their CTE field of study. Using the predictor *Student Satisfaction*, with values ranging from 1 (very dissatisfied) to 4 (very satisfied), the results showed the predicted probability of .64577 for very satisfied students. The predicted probability decreased to .41637 for students who said they were satisfied with their CTE program of study. The predicted probability decreased to .26882 for students who said they were dissatisfied with their CTE program of study. Last, the predicted probability increased to .40625 for students who said they were very dissatisfied with their CTE program of study. It should be noted that the number of participants who chose very dissatisfied was low (32 participants) so this could affect the results.

Students who earned a license or industry credential was significant $\chi^2(1, N = 7,712) = 421.12, p < .001$, indicating credential earning during students' CTE program of study significantly predicted the outcome variable, full-time employment in the same field as their CTE program of study. Using the predictor *Credential Earned*, with binary of 0 for *no* and 1 for *yes*, the results showed the predicted probability of .59712 for students who earned a credential.

The predicted probability decreased to .34083 for students who said they did not earn a credential as part of their CTE program of study.

The variable gender was non-significant. The results showed a nonsignificant relationship between student satisfaction and whether a student chooses to work full time in the same field as their CTE program of study $\chi^2(1, N = 7,712) = 1.864, p = .172$. A detailed discussion of these findings will be presented in Chapter V.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

This chapter discusses the conclusions and recommendations of the dissertation. The problem of this study was to identify to what extent graduates' satisfaction with their CTE programs of study, earned credentials and gender predicted if graduates used their CTE programs of study in their employment outcomes. This chapter summarizes the study, discusses the conclusions of the study, and provides recommendations based on the study findings.

Summary

Career and technical education (CTE) programs are an option for high school students who are looking to build career skills to enter the workforce. Today's rigorous, relevant, and industry driven programs in career and technical education prepare students for jobs that offer competitive wages, require a high level of skill, and are in demand in the workforce (Mindham & Schultz, 2019). For students who may not want to attend college directly after graduation, participation in career and technical education programs increases earnings and improves employment outcomes, reduces dropout and absentee rates, and improves postsecondary outcomes (Drage, 2009; Gottfried & Plasman, 2018). Also, students who decide to immerse themselves in CTE programs may experience positive tradeoffs such as better preparedness for entering the workforce without incurring large student loan debts for post-secondary education or trade school (Howard et al., 2022). Students who feel they have a say in their educational pursuits, have an interest in the content, and can relate the knowledge to something tangible would gain satisfaction from the realization that learning will be of some benefit to them in the future (Lawrence & Vimala, 2013).

Educators, public officials, and policymakers must ensure that every student in our country graduates from high school prepared for college and a successful career (Jocson, 2018). For the past decade and a half, the proportion of students who enroll in postsecondary education immediately after completing high school has hovered just below 70% (McFarland et al., 2019). This implies that over 30% of high school graduates are choosing to not attend college for some other opportunity (Plasman, 2019). Career and technical education programs, by design, can prepare students who are not planning to attend college after graduation to enter the workforce.

The problem of this study was to identify to what extent graduates' satisfaction with their CTE programs of study, earned credentials, and gender predicted if graduates used their CTE programs of study in their employment outcomes. To guide this study, the following questions were asked:

1. How will CTE program graduates' satisfaction with their high school programs of study predict if their full-time employment is related to their CTE fields of study?
2. How will professional certification or license in CTE program graduates' high school fields of study predict if their full-time employment is related to their CTE fields of study?
3. How will gender of CTE program graduates predict if their full-time employment is related to their high school CTE fields of study?

The data for this study were collected by the Virginia Department of Education, Office of Career and Technical Education Services, using the Virginia CTE Completer Follow-up Survey (Center for Survey Research, Weldon Cooper Center for Public Service, 2021). The first section of the instrument (Appendix C) collected information related to satisfaction with graduates' CTE programs of study and whether the graduate received an industry, occupational, or professional certification or license as a result of completing the program. The second section of the

instrument collected employment and labor force status information to include whether the graduate was employed in a full-time position and if employment was related to their CTE program of study. Participants who did not select “employed full time” were removed from the study. The demographic information was provided by the Department of Education and gender was a binary category associated with their student identification number. Data analysis began with an examination of descriptive data and a binary logistic regression was done to determine the probability a graduate would become employed full time in a job related their CTE program of study based on the independent variables of student satisfaction, credential earning, and gender.

Conclusions

The problem of this study was to identify to what extent graduates’ satisfaction with their CTE programs of study, earned credentials, and gender predicted if graduates used their CTE programs of study in their employment outcomes. The research questions looked at whether satisfaction with CTE programs, earning credentials, and gender could predict whether a student chose full-time employment in a field related to their CTE program.

Research Question 1 looked at the relationship between student satisfaction and choosing full-time employment in a field related to their CTE program. The results showed students who were very satisfied with their program were much more likely to work full time in a field related to their CTE program within one year of graduating high school. The study also showed that very dissatisfied students have a higher probability than dissatisfied students to work full time in the same field as their CTE program of study, but it should be noted that the number of participants who chose very dissatisfied was low (32 participants) so this could have an impact on the results. This result aligns with the findings of Conklin (1998) where students who

completed a CTE program and were satisfied with their education chose employment in the same field. While this study did look at overall satisfaction with students' CTE programs, looking at other factors could strengthen the results of this study by looking at other factors that have the potential to increase student satisfaction to include interactions with teachers and interactions with fellow students (Kim & Kim, 2021). Coelho and Dell'Aglio (2019) pointed out looking at factors like how they feel about their environment, how important they found school to be, and the relationships made throughout the course of their education could help understand other factors that contribute to overall student satisfaction.

Research Question 2 looked at the relationship between credential earning and choosing full-time employment in a field related to their CTE program. The results showed students who earned a credential as part of their CTE program were much more likely to work full time in a field related to their CTE program within one year of graduating high school. This study aligned with other research suggesting students who earned credentials had a higher likelihood of working full time in their CTE field of study within one year of graduating high school. Industry credentials give employers confidence in a professional's knowledge and skill level, which contributes to the success of CTE students who earn them (Reese, 2011). Schools expanding credentialing opportunities in CTE programs could increase student satisfaction with CTE programs as they know the value of credentials in the workforce. The results of this study align with Giani (2022) whose study also showed similar trends in credential earning and employment outcomes, showing that credential earning does increase the likelihood that students will work in the same field as their field of study. While the literature made very strong arguments for increasing credential earning opportunities, there is also literature to support using caution when looking at the impact of credentials on CTE programs. While as advocates like Stone (2017)

point out that industry recognized credentials signal to the labor market that an individual possesses a specific set of desired skills, there are other studies that argue there is confusion about how much emphasis should be placed on credentials given the number of offerings available today. There are more than 5,000 active certifications available in the United States (Prebil & McCarthy, 2018), and many credential offerings vary state to state and how credentials are defined can be inconsistent (Hendricks et al., 2021). Having so many credentials can cause students, teachers, and employers to have difficulty understanding their real value (Markow et al., 2017; Trent, 2011). Future research could investigate some limitations of credential earning to better identify the inconsistencies in credential earning and provide more context to those credentials that provide the most benefit to industry partners.

Research Question 3 looked at the relationship between gender and choosing full-time employment in a field related to their CTE program. The results for this indicated the relationship was nonsignificant. This aligns with the research showing gender is not always indicative of how an individual will choose a CTE program of study and continue into that field after graduation. Northern and Petrilli's (2019) research showed gender plays a role in certain CTE pathways, which may be more obvious when studying CTE pathways, but noted there was no evidence that students responded differently to employment based on gender. Donald et al. (2019) also noted in their study that career ownership had the greatest impact on employability, even when applying moderators of gender and degree subject. This could be an indicator that gender norms may be less of a factor than taking ownership of one's career. Narrowing the focus of a study to look at CTE pathways individually may help to better represent how gender plays a role in the employment outcomes of students based on their specific program of study tied to a CTE pathway. There has been a push to recruit more females into CTE programs to close the

gender gap, so narrowing the focus of a study could identify CTE programs where recruitment can be improved to eliminate gender bias.

The results of the data analysis using binary logistic regression are consistent with human capital theory. This theory is where a person's human capital (i.e., qualifications, knowledge, skills, and experience) is likely to increase earnings or productivity (Becker, 1993; Wittekind et al., 2010). This study can be used by both leaders and industry partners to identify the best way forward to improve student employment outcomes after completing CTE programs of study. This demonstrated there is a relationship between student satisfaction and credential with employment outcomes and can have implications for CTE programs in the future. This study provides overarching knowledge of student satisfaction and credential earning as factors, but this study can be replicated to further refine the scope, or include effects such as propensity score matching to better understand the impact of the independent variables.

For industry partners, this study is essential in understanding some drivers that cause students to decide to stay in their chosen CTE field after high school. Industry partners are the first place CTE administrators turn to for support of their CTE programs, and having a way to see a return on investment could lead more industry partners to invest in CTE programs. One way those industry partners can see that return is to provide support to programs to increase credential earnings at the high school level and fund initiatives that will increase the overall satisfaction of the students who are attending those CTE programs.

From a federal standpoint, this study can have implications on federal funding. Per the current legislation, states are required to report on how they are meeting the indicators of performance outlined in the Strengthening Career and Technical Education for the 21st Century Act (2018). This study could also be used by state, local, and program advisory committees to

develop funding plans for CTE programs of study. Committees can look at programs where student satisfaction is low and identify possible funding increases to provide more credential or certification opportunities, or to improve the CTE program to add relevance to the local labor market. It can also show industry partners a return on their financial investments into CTE, so those partnerships continue in the future.

Lastly, this study showed a more robust analysis of the data being collected on CTE program completers could be used to provide new context to historical and trend analysis in CTE programs. The Weldon Cooper Center of Survey Research collect these data from CTE program completers every year on behalf of the Department of Education as a requirement of Perkins legislation. These data could be analyzed more rigorously to provide a wealth of information not currently reported by the Department of Education to include predicting student outcomes based on data in survey responses like student satisfaction. This analysis could benefit both local and national CTE leaders when looking at historical trends and gaps in CTE programs, or when they are seeking grants or contributions from industry and community partners.

Recommendations

Based on the findings of this study, the following are recommendations for researchers and practitioners.

Future Research

Researchers could take a closer look at individual CTE pathways. This study could be replicated for specific CTE pathways to identify possible gaps in specific pathway areas. Looking at individual pathways could provide insight into programs that may not be working for students or identify gaps in programs that can be closed to increase student satisfaction. This could not only improve programs, but potentially help industry partners fill employment gaps or

expand their industry footprint. CTE programs are seeing potential increases in areas where industry has expanded in recent years. Michael and Liu (2020) mention the expansion of Science, Mathematics, Engineering, and Technology (STEM) initiatives that will have some impact on certain CTE programs so focusing on STEM fields in CTE could be a study to identify if satisfaction, credential earning, and gender are factors in employment outcomes.

There could also be differences in specific Career Clusters which may indicate variations in satisfaction, credential earning, and gender. It may also be a benefit to study programs that offer industry credentials compared to programs that do not offer a credential to identify improvement areas in student satisfaction and gender gaps. At the time of this study, Advance CTE announced an initiative to update the Career Clusters framework so this work will impact future research and may make historical comparisons difficult (Career Clusters, 2023).

Another area of focus could look at individual pathways to identify student satisfaction for nontraditional students in gender dominated fields. Gottfredson (1981) explained how individuals would look favorably on certain career fields and avoid others based on gender norms, but there are students who deviate from the norm and are tracked as nontraditional students in the CTE follow-up data. Replicating this study for nontraditional students could provide some insight into gender differences in CTE programs and the relationship with employment outcomes.

Another area for future research is looking at how student satisfaction is measured. Measuring student satisfaction may need to include more than generic questions relating to overall satisfaction of a CTE program of study. The follow-up survey used in this study asked one question about student satisfaction using a Likert-type scale response. While this can provide a broad overview of student satisfaction, it does not provide insight into other factors that could

also have implications on student satisfaction. Factors such as academic advising and counseling, family and teacher influences, socioeconomic status, and many other factors could be focus areas to better assess student satisfaction, but the current follow-up survey does not include questions that address some of these factors. A future study on academic advising and student satisfaction could identify potential ways CTE leadership could implement more academic counseling and advising programs for CTE students to increase satisfaction levels for students. Stipanovic et al. (2012) pointed out that few CTE programs provide the right amount of guidance counseling and academic advising to make informed decisions about which program of study to pursue. If students are advised to take programs that fit their goals and interests, satisfaction with that program could increase.

Another avenue for CTE leaders is through student assessment throughout the CTE program of study. Imperatore and Hyslop (2018) noted in their report on the *ACTE Quality CTE Program of Study Framework* that using formative and summative assessment should be a best practice in CTE. These assessments not only include academic assessments but also reflect student's interests, preferences, and abilities, and assist with planning for further education or careers (Stipanovic et al., 2012). This study gives more of a broad understanding of satisfaction with CTE programs of study. Future research could include looking at individual CTE programs of study to determine satisfaction levels of graduates to identify what high-satisfaction programs are doing and implement those recommendations into other programs of study.

Developing an instrument that can measure student satisfaction may help identify areas where CTE can improve or where something may lack that can improve the overall satisfaction for students. One example of a survey that expands upon the many facets of student satisfaction is the National Student Outcomes Survey which is part of Australia's vocational education

program. This survey collects information on vocational education and training (VET) students' reason for training, their employment outcomes, how satisfied they were with training, and further study outcomes. This survey is similar to the CTE follow-on survey used in this study, but includes other factors that could affect student satisfaction such as problem solving, written and numeric skills, teacher quality, knowledge assessment, and learning resources (NCVER, 2022).

Another focus area for future research would be looking at the addition of quality indicators in CTE programs. Reporting postsecondary credential earning is one of the new requirements outlined in the Perkins V legislation. Industry recognized credentials are conferred by industry partners and provide a way for employers to gauge the knowledge and skills of future employees and their ability to meet industry standards (Giani, 2022). For students entering full-time employment out of high school, credential earning is a way to boost their employability and provide a means to be productive in society. Shanholtz (2019) points out that credentials improve student employment outcomes in middle-skill pathways where credentials play a large part. Castellano et al. (2005) noted that while credentials are an essential part of the CTE program success, teachers and administrators are concerned with the growing cost of maintaining the programs and the costs of the exams themselves. We also know there can become a conflict between earning soft skill credentials versus industry recognized credentials. Hendricks et al. (2021) argued that including soft skill credentials as part of Perkins-required quality indicators rather than specifying industry credentials can minimize the value of credentials because this can lead to credentials being a "check in the box" rather than increasing human capital through industry recognized credentials.

Industry partners who work with and provide funding for CTE programs will want to see a return on their investment. For CTE leadership, one way to provide that return on investment is to have students graduate from CTE programs and go on to fill the employment gaps of those industries. Giving those industry partners a solid return on their investment could create more investment opportunities in other quality indicator areas such as work-based learning and dual enrollment, which expands CTE programs into the postsecondary sphere. Having more industry partner buy in could also lessen the burden on CTE leadership to identify additional funding to maintain these programs. The literature told us that over 30% of high school students are choosing to not attend college for some other opportunity (Plasman, 2019). For these students, acquiring human capital through CTE programs may increase their earning potential while also increasing their chances of maintaining meaningful employment.

Future research could include focusing research on student satisfaction, credential earning and gender within CTE pathways. This study focused on all CTE program completers from one school year prior to the COVID-19 pandemic due to the limitations the pandemic had on hands-on learning and credential earning. While this provided an overarching picture of employment outcomes based on student satisfaction, credential earning, and gender, it did not focus attention on individual CTE pathways which are narrower in focus and could provide more insight on potential gaps that can't be seen in this study. The data used in this study could isolate each CTE pathway and identify if there are programs where student satisfaction is an issue, or possible credential earning opportunities that are not being taken advantage of. There are CTE programs within each pathway that could provide unique perspectives as it pertains to student satisfaction or credential earning. Individual pathways could also provide insight into gender

differences or bias that were not seen in this study. This could not only improve programs, but potentially help industry partners fill employment gaps or expand their industry footprint.

Another area of future research could be studying the impact of the Workplace Readiness Skills Certification. Another study could identify if the Workplace Readiness Skills certification was contributing to the increase in credential earning and students' employment outcomes. There may even be specific CTE pathways where this credential is proving to be more successful. Lau et al. (2020) indicated that although the world of work is evolving, there is still a need for skilled workers who possess both technical and transferrable skills. Those transferrable skills are those skills that prepare students for the world of work in high school. Oswald et al. (2019) emphasized the importance of workforce readiness in our changing society and how securing employment fills the needs of survival and social connection as well as helps individuals reach a higher level of fulfillment in their lives.

Virginia has included workplace readiness skills as a requirement in each CTE class with the potential to earn a soft skill credential, so understanding the impact of this credential could have positive implications for future studies in both credential earning and workplace skills learning. Lapinski (2021) found that time spent in a career and technical student organization (CTSO) related to a student's CTE program of study also increases soft skill attainment. This is another area that can be examined as part of understanding the relationship between workplace readiness and the workplace readiness skills credential.

Workplace skills are not only sought after by employers, but they also build human capital and create a workforce that is adaptable to the changing job market. We also know there could be some confusion when looking at the impact on credentials in CTE when soft skill credentials are added to CTE programs (Hendricks et al., 2022). Understanding how this

certification affects CTE programs can provide context in certain CTE pathways where the certification is more often obtained or identify pathways that have a critical need in workplace readiness skill sets. It is also important to refrain from using these types of soft skill certifications need to as a check in the box for Perkins reporting requirements

A final area of research could be looking at COVID and the implications of remote learning on CTE program satisfaction and credential earning. The COVID-19 pandemic disrupted educational institutions for over a year and CTE programs had to shift from their traditional hands-on learning approach to more of an online environment. This disruption could be an interesting study of the effects of remote learning on CTE programs as it pertains to student satisfaction, credential earning, and also the impact on gender. Studies on the increase of instructional technology use in CTE programs using online learning environments could also be studied as our world is shifting to more of an online presence in higher education and in the world of work.

Implications for Practitioners

A quality CTE program where students are satisfied with their learning experiences and can earn credentials that make them more valuable to their chosen industry is important in building a student's human capital. Student success is not only a reflection on the student's ability to be a valued member of society, but also a reflection on the educational institution that the student attended. For CTE administrators, having the ability to show industry partners the value they provide by supporting CTE programs at the high school level makes it easier for administrators and industry partners to continue to improve CTE programs and prepare students to fill the employment gaps that some industries are facing. Being able to provide a quantitative return on the investment these industry partners are making only gives them more reason to

continue to support these programs in the future. Teachers who are teaching these programs are motivated to develop their students because they can see how their students are building their human capital through identifying areas where satisfaction is low and improving those programs to better support the students attending those programs. This could be especially true if teachers hold the same credentials as the ones students are earning in their classrooms because teachers understand the value of the credential and understand what a student needs to learn to earn that credential. This holds true in Virginia as teachers are required to hold an industry credential in the industry they teach in, so the value of the credential is seen throughout the program of study.

Students who graduates from high school will enter the workforce at some point, whether it is right after high school or after college. For those students who choose to enter the workforce directly out of high school, educational institutions are challenged with preparing these students to be successful. This study shows that student satisfaction with their CTE program and offering a credential are drivers of success for CTE students, and this should be leveraged with industry partners to make sure our schools are serving all students, whether they pursue postsecondary education or enter the workforce after high school graduation.

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APPENDIX A: APPROVAL TO USE THE SURVEY

Ryder, Joseph <joseph.ryder@doe.virginia.gov>

Mon, Feb
28, 9:01
AM

to Sean, me, David

Sean,
David has approved the request for the Completer Data to be released to Meg Turley, it will need to exclude any identifiable student information (names, STI, addresses, phone numbers, etc.) and comply with FERPA regulations meaning that any student counts below 10 will need to be redacted.

But otherwise you should be good to release the data to her for analysis.

Let me know if you have any questions or need me to review the file.

Thanks!
Joseph

--

Joseph Ryder, Specialist
Data Collection, Reporting and Accountability
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APPENDIX B: IRB APPROVAL



OFFICE OF THE VICE PRESIDENT FOR RESEARCH

Physical Address

4111 Monarch Way, Suite 203
Norfolk, Virginia 23508

Mailing Address

Office of Research
1 Old Dominion University
Norfolk, Virginia 23529
Phone(757) 683-3460
Fax(757) 683-5902

DATE: November 17, 2022

TO: Philip Reed
FROM: Old Dominion University Education Human Subjects Review Committee

PROJECT TITLE: [1978277-1] THE IMPACT OF SATISFACTION WITH HIGH SCHOOL CAREER AND TECHNICAL EDUCATION PROGRAMS, CREDENTIAL EARNINGS, AND GENDER ON FULL-TIME EMPLOYMENT OUTCOMES OF HIGH SCHOOL GRADUATES IN VIRGINIA

REFERENCE #:
SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF EXEMPT STATUS

DECISION DATE:

REVIEW CATEGORY: Exemption category #2

Thank you for your submission of New Project materials for this project. The Old Dominion University Education Human Subjects Review Committee has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

We will retain a copy of this correspondence within our records.

If you have any questions, please contact John Baaki at (757) 683-5491 or jbaaki@odu.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Old Dominion University Education Human Subjects Review Committee's records.

APPENDIX C: SURVEY

2021 Follow-up Survey of 2020 CTE Students

Section 1 – SATISFACTION

1. Overall, how satisfied are you with the preparation you received in your high school Career and Technical Education (CTE) program for further education or employment?
 Very Satisfied Satisfied Dissatisfied Very dissatisfied
2. Did you receive an industry, occupational, or professional certification or license as a result of completing the CTE program? Yes No
3. Are you currently working to obtain an industry, occupational, or professional certification or license?
 Yes No

Section 2 – EMPLOYMENT AND LABOR FORCE STATUS

The following questions refer to current military service or paid employment:

4. Are you currently on active duty in the U.S. Armed Services?
 Yes No
5. Are you currently employed in a full-time position?
 Yes No
6. Are you currently employed in a part-time position?
 Yes No

Interviewee may answer
"YES" multiple times

If the interviewee answered "NO" to all of the above (Questions 4-6):

7. Are you actively seeking current employment?
 Yes No
8. Which best describes why you are not working? (mark all that apply)
- | | |
|--|---|
| <input type="checkbox"/> You are a student | <input type="checkbox"/> You lack the skills to get a job |
| <input type="checkbox"/> You are waiting to enter the military | <input type="checkbox"/> You do not desire employment |
| <input type="checkbox"/> You cannot find a job | <input type="checkbox"/> You are disabled |
| <input type="checkbox"/> You are a homemaker | |

If the interviewee is currently working full-time or part-time:

9. Were you required to complete your high school CTE program in order to qualify for your job?
 Yes No
10. Is your current job in a field that is related to any of your past CTE courses?
 Yes No

2021 Follow-up Survey of 2020 CTE Students

Section 2 – EMPLOYMENT AND LABOR FORCE STATUS (Continued)

If the interviewee is currently working full-time or part-time:

11. Is your current job in a field that is related to any certification you earned through your high school CTE program?

Yes No

12. How much of what you learned in your CTE courses are you using for your current job?

Most Some Little None

Section 3 – EDUCATION

13. Have you received training or any other education since graduating from high school?

- Yes, you are currently enrolled
 Yes, you were enrolled previously but not now
 You received no further training or education

If the interviewee answered "YES" above:

14. Are you currently or were you a full-time or part-time student?

Full-time Part-time

15. Please mark any of the types of education you have participated in since high school
 (mark all that apply)

- | | |
|--|---|
| <input type="checkbox"/> Community college | <input type="checkbox"/> Four-year university |
| <input type="checkbox"/> Registered apprenticeship | <input type="checkbox"/> Technical school/college |
| <input type="checkbox"/> Business/Industry training through your employer | <input type="checkbox"/> Other |
| <input type="checkbox"/> Occupational/technical training through a local school system | |

16. To what extent is/was your area of study related to the CTE program you completed in high school?

Closely related Somewhat related Not related

Section 4 – COMMENTS

17. Do you have any comments or suggestions on your past high school CTE education?

.....

VITA

Margaret J. Turley

Education

Old Dominion University, Norfolk, VA Doctor of Philosophy, Education	May 2023
Old Dominion University, Norfolk, VA Master of Science, Occupational and Technical Studies	August 2017
Excelsior University, Albany, NY Bachelor of Science, Criminal Justice Administration	May 2009

Professional Experience

Leidos, Virginia Beach, VA <ul style="list-style-type: none"> • Training Manager – Manage training teams, design and develop curriculum and instructional aids • Design and implement curriculum and training materials for Navy CTE programs 	2008-present
United States Navy <ul style="list-style-type: none"> • Cryptologic Technician Technical (CTT) • Navy Instructor • Master Training Specialist 	1994-2008

Association Membership

Association for Career and Technical Education	2019-present
Association for Educational Communications and Technology	2020-2021

Publications and Presentations

- Mclaughlin, J., Turley, M., Lucchesi, R., Keen, C., & Ramlatchan, M. (2020). *Four facets of needs assessment and analysis for the design of online learning systems*. Retrieved from https://members.aect.org/pdf/Proceedings/proceedings20/2020i/20_12.pdf
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